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7 BOOK

KEYBOARD

Computer Science With Application Software

THIRD EDITION

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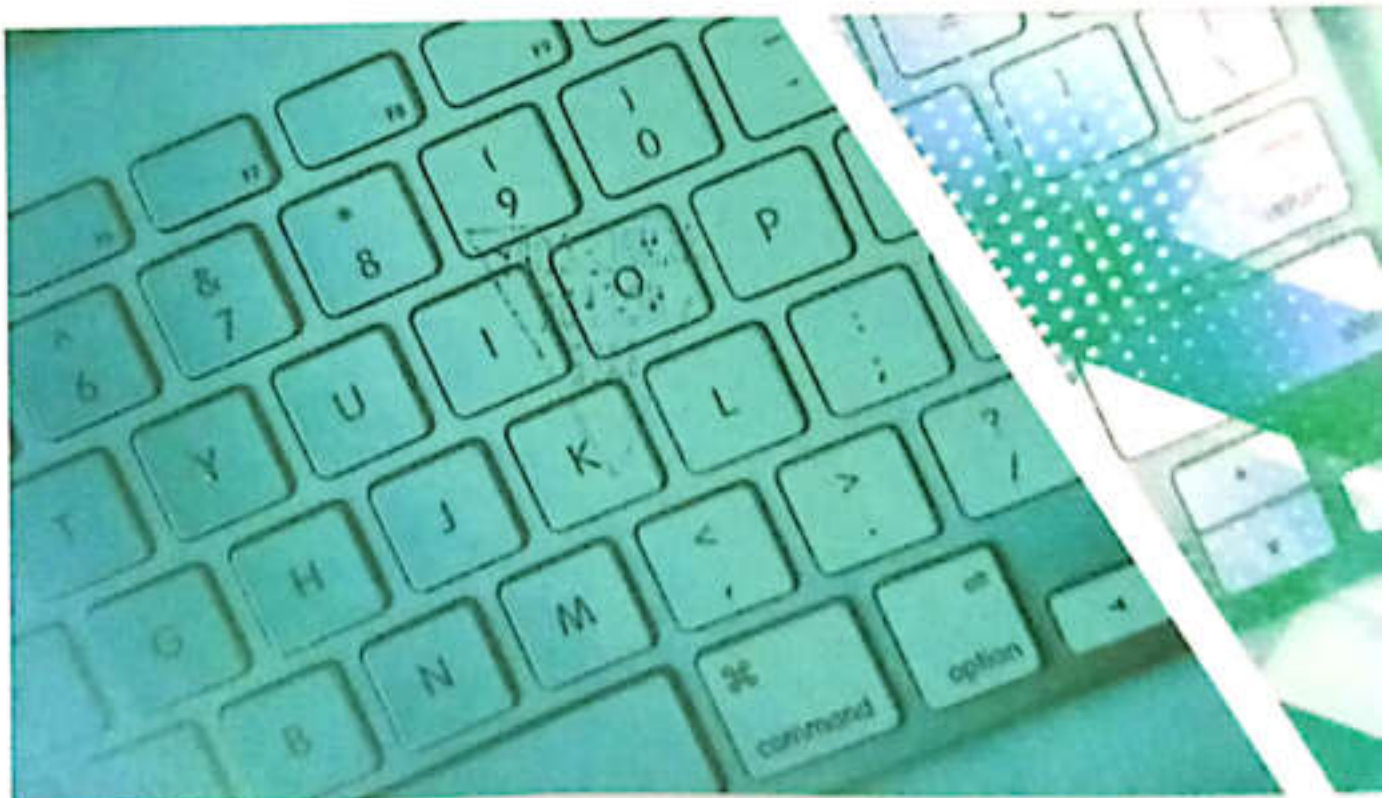
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KEYBOARD

Computer Science With Application Software

THIRD EDITION



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Data Processing

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Preface

Keyboard: Computer Science with Application Software (Third Edition); a series of eight books for Classes 1 to 8; is a concerted effort to impart knowledge about computers using an interesting and interactive approach. Computer science is a fascinating and wide-ranging subject with limitless opportunities for creativity and application. Today computers influence every facet of our lives. In the highly competitive world we live in, a basic working knowledge of computers is essential for success. There is, therefore, a great desire to introduce computer education to children at an early age. There should also be enough room for them to explore and create on their own.

This series introduces the subject in language that is simple and direct. Technical vocabulary is introduced where necessary and all such terms are defined at the end of each chapter. Comic strips, icons, engaging characters, and illustrations make the learning process an enjoyable experience.

The content is based on extensive feedback from teachers, and on the latest trends in computer education. Particular care has been taken to update facts and figures, and to include information about the latest devices in the market.

The focus of Books 1 to 5 is on learning the basics of computer science; on understanding MS Office 2013 and using K Turtle, as a programming language.

Books 6 to 8 move beyond elementary concepts and introduce Publisher 2013 (Flash Version CS3), HTML 5, Dreamweaver (Version CS3), Photoshop (CS3), Microsoft Small Basic, and Visual Basic (Version Microsoft Visual Basic 2013 Express). This edition also gives them the potential opportunity for hands-on experience of sound and video editing through the programmes, Audacity and Lightworks.

With a strong emphasis on developing 21st century computer skills: critical thinking, communication, collaboration, and creativity—this edition of *Keyboard: Computer Science with Application Software* will prove to be invaluable for students and teachers.

Key Features

Each chapter in this book is introduced through two delightful characters, Goggle and Toggle.

Hi! I am Goggle. My friend, Toggle, and I will accompany you into the world of computers.



Hello there!
My name is Toggle.



The key features in this series can be broadly divided into:

- **LEARNING TOOLS**
- **ASSESSMENT TOOLS**
- **FOR TEACHERS** the course includes teacher's notes within the Student's Books, comprehensive Teaching Guides, and an exciting new **downloadable digital resources**.

Learning Tools

Fast Forward provides keyboard shortcuts for menu commands, to help users save time while performing routine operations.

Fast forward

Font dialog box Ctrl + D

Top Tip gives students useful tips on the options available for different operations.

Top tip

Starter images are backgrounds with outlines of images, or 3D photographs, that you can use in Tux Paint.

Practice Time, included after every major topic, provides situational exercises along with their solutions to reinforce learning.

Practice time

The given information is used to solve the problems. Write the answers in the spaces provided.

1. A house is 10 m high. A tree is 1/5 of the height of the house. How tall is the tree?

2. A box contains 100 pencils. 1/4 of the pencils are red. How many red pencils are there?

3. A box contains 100 pencils. 1/4 of the pencils are red. How many red pencils are there?



Did You Know? provides interesting information on the topic being covered.

Did you know?

One point equals $\frac{1}{72}$ of an inch.

Assessment Tools

Exercises

contain both objective and descriptive questions, and test learners on all aspects of conceptual theory covered in a chapter.

Group Project

encourages students to collaborate and exchange ideas on common project.



In the Lab

challenges students to apply the concepts learned to real-life situations.

Worksheets

unit-based and conforming to the continuous assessment recommendations of various boards.

Computer Manners presents computer etiquette in a child-friendly manner using cartoon strips.



Memory Bytes summarises each chapter for a quick recapitulation of all the topics in that chapter.

Memory Bytes

- The **Area of Interest** sets a specific area of study.
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FOR TEACHERS

- The **downloadable teaching resource** is an exciting new digital teaching aid that offers reinforcement and assessment materials.



- The **Test Generator** is an innovative, easy-to-use assessment tool. It has been designed to aid teachers in creating a variety of test papers from an extensive pool of questions for effective evaluation.

The course is also supported by:

- Teacher's Notes** within the Student's Books that provide important information and suggestions on creative approaches to a chapter or a topic.
- Teaching Guides** that include lesson plans, the complete answer key to the Student's Books, worksheets, and test papers.

Tricky Terms at the end of each chapter provides a list of important terms along with their definitions for easy recall.

Tricky Terms

Template A pre-defined design layout that users use while designing.	Scratch Area The grey area around the publication page where objects can be placed before insertion in the publication page.
Objects The elements you place on your publication.	Drop Cap A text formatting style that enlarges the first letter of the selected text.
Guides They are horizontal and vertical lines that appear on your publication while editing. They help in aligning text, images, and other objects on the page.	Search A search engine used to find objects or content in the database.
	Signature A series of lines that form a signature.

Contents

Preface	iii	
Key Features	iv	
1. Formulas in Excel 2013	1	
• Cell and Range References		
• Using Formulas		
• Error Results		
• AutoSum Feature		
• Functions Library		
2. Creating Charts in Excel 2013	20	
• Types of Charts		
• Components of a Chart		
• Creating a Chart		
• Sparklines		
3. Computer Viruses	40	
• What Does a Computer Virus Do?		
• Types of Computer Viruses		
• Malware		
• Preventing Virus Infections		
• Antivirus Software		
4. Loops and Graphics in Small Basic	52	
• For...EndFor		
• While...EndWhile		
• GraphicsWindow		
5. Introduction to Visual Basic	66	
• Graphical User Interface		
• Getting Started with Visual Basic		
• Visual Basic Window		
• Developing an Application		
• Working with Variables		
6. Communication on the Internet	87	
• Chat, Instant Messaging, and Newsgroups		
• Blogs and Web Feeds		
• Social Networking: Facebook, MySpace, Twitter		
• Other Services: E-Greetings, Online Gaming and Online Telephony		
• Cloud Computing and Online Sharing		
7. More Tools in Flash	100	
• Pen Tool		
• Eyedropper Tool		
• Importing a Picture		
• Transforming Objects		
• Working with Text		
8. Animations in Flash	115	
• The Timeline and Layers		
• Animation with Motion and Shape Tweening		
• Using a Masking Layer		
• Animation using a Motion Guide		
• Applying Filters		
• Applying Timeline Effects		
• Working with Sound		
9. Introduction to HTML 5	130	
• Structure of a Website		
• What is HTML?		
• HTML Editors		
• HTML Coding		
• Structure of an HTML Document		
• Line Break Element		
• Cascading Style Sheets		
• Background Properties		
10. Basic HTML 5 Commands	146	
• HTML Elements		
• Text Properties		
• Font Properties		
• Setting Margins		
• Setting Borders		
• Inline Styles		
Keyboard Shortcuts	161	

Chapter 1

Formulas in Excel 2013



In Excel, formulas are written differently from how you write them in Math.

An **Excel formula** always starts with an equals (=) sign and it can contain values, cell references, functions, and operators.

- **Values:** 987 and 36.7 (numeric), 'Computer' and 'Hi' (string)
- **Cell references:** C3, B2:B5, A2:D8, B:E, 4:10
- **Functions:** sum, average, min, max, count
- **Operators:** +, -, *, /, ^, >

In this Chapter

- Cell and Range References
- Using Formulas
- Error Results
- AutoSum Feature
- Functions Library

Thus, a **formula** in Excel is a sequence of values, cell references, functions, and/or operators in a cell that produces a new value from existing values.

CELL AND RANGE REFERENCES


A **reference** identifies a cell or a range of cells in a worksheet, and tells Excel where to look for the values or data you want to use in a formula. Let us consider a few examples.

The cell in column A and row 1	A1
The range of cells in column B and rows 1 through 20	B1:B20
The range of cells in row 4 and columns B through D	B4:D4
All cells in row 8	8:8
All cells in row 3 through 6	3:6
All cells in column E	E:E
All cells in columns B through D	B:D
The range of cells in columns C through E and rows 5 through 10	C5:E10

Top Tip

The status bar at the bottom of the window displays the current action being taken. When you are not doing anything, the status is **Ready**. When you enter data in a cell, the status changes to **Enter**. When you double-click or press F2 to edit a cell, the status changes to **Edit**.

USING FORMULAS

To enter a formula, select a cell and enter the formula in the cell or in the **Formula Bar**. When you finish entering the formula and click  (or press Enter), the cell will show the formula result and not the formula itself.

However, you see the formula in the **Formula Bar** when the cell is selected. To understand how a formula can be entered in the formula bar, let us calculate the sum of the numbers in cells B2, C2, and D2 as shown in the worksheet below (Figs. 1.1–1.4).

Step 1

Name Box

E2	A	B	C	D	E
1	Roll No.	Test I	Test II	Test III	Total
2	9001	45	43	40	

Fig. 1.1 Click the cell in which you want to put the formula, which in this case is E2. The cell reference E2 appears in the **Name Box**.

Step 2

Enter button Formula Bar

SUM	A	B	C	D	E
1	Roll No.	Test I	Test II	Test III	Total
2	9001	45	43	40	=

Fig. 1.2 Type the equals (=) sign. You can type it either in the cell or in the **Formula Bar**. What you type will appear in both places automatically.

Step 3

	A	B	C	D	E
1	Roll No.	Test I	Test II	Test III	Total
2	9001	45	43	40	=B2+C2+D2

Fig. 1.3 Continue typing 'B2+C2+D2' as shown. Notice the different colour borders that appear around these cells.

Step 4

	A	B	C	D	E
1	Roll No.	Test I	Test II	Test III	Total
2	9001	45	43	40	128
3					

Fig. 1.4 Click or press Enter. Cell E2 will display the formula result. This will change automatically if data changes in cells B2, C2, or D2.

pointing

An easier method of adding a cell reference to a formula is to click on the cell instead of typing the cell address. This method is called pointing. After typing '=', do not type 'B2'. Click on cell B2 instead. A moving dashed border called a marquee will appear around B2 (Fig. 1.5). The status bar will display a status of **Point**.

	A	B	C	D	E
1	Roll No.	Test I	Test II	Test III	Total
2	9001	45	43	40	=B2

Fig. 1.5 Entering a cell reference by pointing

Now type '+' and click on cell C2. Then type '+' and click on cell D2. Cell E2 will now have the same formula as in Figure 1.3. Press **Enter** to see the value.

Relative, Absolute, and Mixed References

When you use a cell (or a range) reference in a formula, you can use the following three types of references:

- **Relative** The row and column references can change when you copy the formula to another cell. By default, Excel creates **relative cell references** in a formula. For example, A1, B5, D4, etc.
1. Consider the worksheet given below (Fig. 1.6) to find the **Interest Amount** using the formula **Principal Amount * Rate of Interest * Time in Years**.
 2. Select cell D3 and using the AutoFill handle, drag it to cell D6 (Fig. 1.7).
 3. Release the mouse button; the calculated values will appear (Fig. 1.8).

	A	B	C	D
1	Principal Amount	Rate of Interest	Time in Years	Interest Amount
2	10000	8%	1	800
3	50000	9%	1	
4	100000	10%	1	
5	500000	12%	1	

Fig. 1.6 Select cell D3, enter the formula =A3*B3*C3, and press Enter. The calculated value will appear.

	A	B	C	D
1	Principal Amount	Rate of Interest	Time in Years	Interest Amount
2	10000	8%	1	800
3	50000	9%	1	
4	100000	10%	1	
5	500000	12%	1	
6				

Fig. 1.7 Drag the AutoFill handle

- Select cell D4 and D5, and note the formula in the **Formula Bar** (Figs. 1.8 and 1.9).

	A	B	C	D
1				
2	Principal Amount	Rate of Interest	Time in Years	Interest Amount
3	10000	8%	1	800
4	50000	9%	1	4500
5	100000	10%	1	10000
6	500000	12%	1	60000

Fig. 1.8 Formula in cell D4

	A	B	C	D
1				
2	Principal Amount	Rate of Interest	Time in Years	Interest Amount
3	10000	8%	1	800
4	50000	9%	1	4500
5	100000	10%	1	10000
6	500000	12%	1	60000

Fig. 1.9 Formula in cell D5

The formula in cells D3 to D6 is the sum of the three cell values to their left. The reference changes if the formula is copied to another cell. This is because the formula uses **relative referencing**. It is useful if you want to total row data for each row using the same formula.

- **Absolute** The row and column references do not change when you copy a formula because the reference is to a fixed cell address. It uses two dollar signs in the reference—one for the column letter and the other for the row number. For example, \$A\$1, \$D\$5, and \$B\$7.

- Consider the worksheet given in Figure 1.10.

The formula entered in cell C3 is **=A3*B3*\$D\$1**.

Select cell C3 and using the AutoFill handle, drag it to cell C6 (Fig. 1.10).

- When you copy the formula to cell C4, it becomes **=A4*B4*\$D\$1**.

A part of the formula is relative (A4*B4), while another part is absolute (\$D\$1). Wherever you copy the formula, only the relative part will change. The absolute part remains the same.

Now, can you guess the formula that would be copied to cell C5? Yes, it would be **=A5*B5*\$D\$1**.

	A	B	C	D
1			Time in Years	1
2	Principal Amount	Rate of Interest	Interest Amount	
3	10000	8%	800	
4	50000	9%	4500	
5	100000	10%	10000	
6	500000	12%	60000	

Fig. 1.10 Absolute referencing

- **Mixed** The row or column reference is relative while the other is absolute. For example, \$A1 or A\$1.

- Consider the worksheet in Figure 1.11. It calculates the area of a rectangle for various lengths and breadths. The formula in cell C3 is **=B3*C\$2**. Copy the formula to the cell range C3:F6.

	A	B	C	D	E	F
1			Breadth			
2			1	2	3	4
3	Length	1	1	2	3	4
4		2	2	4	6	8
5		3	3	6	9	12
6		4	4	8	12	16

Fig. 1.11 Mixed referencing

Both the cell references are mixed. The reference to cell B3 uses an absolute reference for the column (\$B) and the reference to cell C2 uses an absolute reference for the row (\$2).

There is a way to view the formulas copied to the cell range C3:F6. Click the **FORMULAS** tab. In the **Formula Auditing** group, click the **Show Formulas** button. The formula used in each of the cells of the range will be shown in the cells (Fig. 1.12).

	A	B	C	D	E	F
				Breadth		
1			1	2	3	4
2						
3	Length	1	=B3*C\$2	=B3*D\$2	=B3*E\$2	=B3*F\$2
4		2	=B4*C\$2	=B4*D\$2	=B4*E\$2	=B4*F\$2
5		3	=B5*C\$2	=B5*D\$2	=B5*E\$2	=B5*F\$2
6		4	=B6*C\$2	=B6*D\$2	=B6*E\$2	=B6*F\$2

Fig. 1.12 Formulas in the selected cells

Top Tip

You can use the F4 key repeatedly to have Excel cycle through all the four reference types. For example, if you enter =A1 to start a formula, pressing F4 converts the cell reference to =\$A\$1. Pressing it again displays =A\$1 and then again displays =A1. Pressing it one more time returns you to the original =A1.

Note: The type of cell reference is important only if you copy the formula to other cells.

Circular Reference

A **circular reference** occurs when a formula refers to its own value. For example, if you enter the formula =A1+A2+A3 in cell A3 (Fig. 1.13), every time it calculates the formula in cell A3, it must be calculated again because A3 has changed. The calculation would go on forever. You will see a warning in such a case (Fig. 1.14). Click **OK** and correct the formula.

	A
1	12
2	32
3	=A1+A2+A3

Fig. 1.13 Circular reference

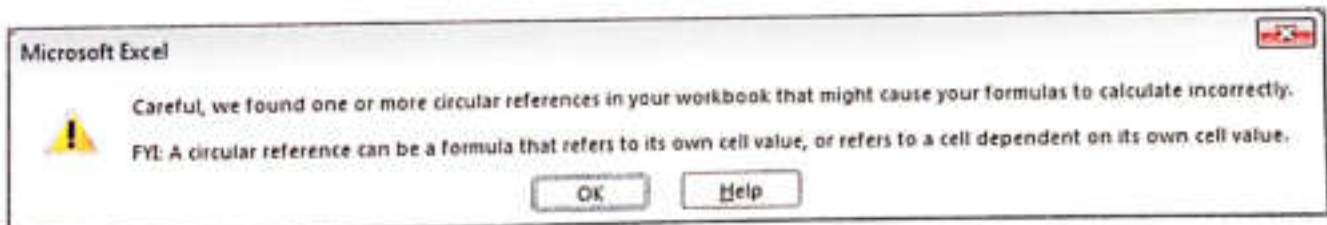


Fig. 1.14 Warning in the case of a circular reference

PRACTICE TIME



Mohsin, the owner of a furniture shop, wants to calculate the final price (total amount + sales tax amount) of the furniture items in his store. He has created the worksheet given on the next page for this purpose. The sales tax amount is 8.6% of the total amount. Can you help him in this task?

	A	B	C	D	E	F
1	Item	Quantity	Price	Total Amount	Sales Tax Amount	Final Price
2	Table Clock	5	250			
3	Lamp	4	200			
4	Study Table	3	3000			
5	Computer Table	5	5000			
6						
7	Sales Tax	8.60%				

SOLUTION

1. Create the worksheet as shown in the figure above.
2. Select cell D2 and type " $=B2*C2$ " and click Enter.
3. Select cell D2 and using the **AutoFill** handle, drag it through the cell range D3:D5.
4. Select cell E2 and type " $=D2*$B7 " and click Enter.
5. Select cell E2 and using the **AutoFill** handle, drag it through the cell range E3:E5.
6. Select cell F2 and type " $=D2+E2$ " and click Enter.
7. Select cell F2 and using the **AutoFill** handle, drag it through the cell range F3:F5.
8. The output will look as given below.

	A	B	C	D	E	F
1	Item	Quantity	Price	Total Amount	Sales Tax Amount	Final Price
2	Table Clock	5	250	1250	107.50	1357.50
3	Lamp	4	200	800	68.80	868.80
4	Study Table	3	3000	9000	774.00	9774.00
5	Computer Table	5	5000	25000	2150.00	27150.00
6						
7	Sales Tax	8.60%				

Text formulas

A **text string** or a **text value** is a sequence of characters on which you cannot perform operations like **subtraction**, **multiplication**, or **division**. However, you can join strings together. This is called **concatenation**.

We use the **ampersand (&)** character to concatenate strings. For example, if you type

"=Respect"&" "&"Elders"

in a cell and press ENTER, you will see the result **Respect Elders** (Fig. 1.15).

Let us now consider another example to understand how to use the ampersand character. In this example, we will enter a formula that will display a sentence with information from the table.

C1				f.	=A1 & " " & B1
	A	B	C	D	
1	Respect	Elders	Respect Elders		

Fig. 1.15 Concatenated text

Step 1

	A	B	C	D	E	F
1	Roll No.	Name	Grade			
2	1	Sameera	A1			
3	2	Ramsha	B1			
4	3	Naeem	A2			
5	4	Ghauri	B2			
6						
7	=B2 & ", whose roll number is "& A2 & ", got the grade "& C2					

Fig. 1.16 Click the cell A7 in which you want the result of the formula to be displayed. Type =B2 & ", whose roll number is "& A2 & ", got the grade "& C2 and press Enter. Notice the spaces inside the quotation marks after the comma.

Step 3

	A	B	C	D	E
1	Roll No.	Name	Grade		
2	1	Sameera	A1		
3	2	Ramsha	B1		
4	3	Naeem	A2		
5	4	Ghauri	B2		
6					
7	Sameera	whose roll number is 1, got the grade A1			
8	Ramsha	whose roll number is 2, got the grade B1			
9	Naeem	whose roll number is 3, got the grade A2			
10	Ghauri	whose roll number is 4, got the grade B2			

Fig. 1.18 Release the left mouse button and see the magic of Excel! The formula is copied into all the cells in the range. The row numbers have been changed in each cell.

So, do you agree that using a formula is faster and more accurate than typing each sentence one at a time, especially if you have to do it a number of times? Just imagine how useful this feature would be if you had a really long list!

Step 2

	A	B	C	D	E
1	Roll No.	Name	Grade		
2	1	Sameera	A1		
3	2	Ramsha	B1		
4	3	Naeem	A2		
5	4	Ghauri	B2		
6					
7	Sameera	whose roll number is 1, got the grade A1			
8					
9					
10					

Fig. 1.17 Click cell A7 again, and point the cursor to the small black square on the lower-right corner of the cell. This is the fill handle. The cursor changes to a small black cross. Drag the fill handle to cell A10, keeping the left mouse button pressed.

Did you Know?

With 1048576 rows and 16384 columns, an Excel worksheet has $1048576 \times 16384 = 17179869184$ cells. If you enter a single digit in each cell at a speed of 1 digit per second, it will take you about 19884 days of nonstop work to fill the worksheet!

PRACTICE TIME

Aman, a computer operator, wants to put together the first name, the middle name, and the last name in the **Full Name** column as shown in the following figure. Can you help Aman in his task?

	A	B	C	D
1	First Name	Middle Name	Last Name	Full Name
2	Naeel	Waleed	Jamil	
3	Sabeer	C	Wahaj	
4	Areeb	Waleed	Farooq	
5	Wahab	D	Anwar	
6	Mahwish	V	Fahad	

SOLUTION

1. Enter the data as shown on the previous page.
2. Select cell D2 and type = A2 & " " & B2 & " " & C2 and press Enter.
3. Select cell D2 and drag the **AutoFill** handle to the cell range D3:D6.
The worksheet will look as shown alongside.

	A	B	C	D
1	First Name	Middle Name	Last Name	Full Name
2	Hani	Wahid	Imam	Hani Wahid Imam
3	Saleem	C	Wahid	Saleem C Wahid
4	Areeb	Wahid	Faraz	Areeb Wahid Faraz
5	Wahid	D	Imam	Wahid D Imam
6	Muhammad	Y	Faraz	Muhammad Y Faraz

Mathematical Operators Used in Formulas

Table 1.1 shows the mathematical operators used in Excel and their order of evaluation in formulas from first to last.

Table 1.1 Excel operators and their precedence

Operation	Operator	Order of Evaluation	Formula	Result
Exponent	^	1	2 ^ 4	16
Multiplication	*	2	8 * 5	40
Division	/	2	10 / 3	3.33
Addition	+	3	24 + 58	82
Subtraction	-	3	46 - 19	27

- Any operation contained in brackets will be carried out first, followed by any exponent (power).
- Then follow division and multiplication operations, which are given equal importance. They are carried out in the order in which they occur in the formula, left to right. Whichever appears first in a formula is carried out first.
- After that, addition and subtraction operations are given equal importance. They are also carried out in the order in which they occur in a formula, from left to right.

So, if two operators have the same order of evaluation, Excel simply evaluates them from left to right. Some examples of how Excel evaluates formulas are given in Table 1.2.

Table 1.2 Examples of Evaluation

Formula	Output
= (8 + 3) * 2	22
= 8 * 2 + 3	19
= 2 + 3 ^ 4	83
= 4 + 5 * 4 - 2	22
= 6 + 10 / 2 * 3 - 6	15

ERROR RESULTS

Sometimes a cell with a formula displays an error result rather than a proper value. This happens when the formula has a problem and Excel cannot process it. Table 1.3 lists some common errors in Excel along with their possible reasons.

Table 1.3 Common formula errors in Excel

Error	Reason
#####	The column is not wide enough to display the value.
#DIV/0!	The formula contains an invalid operation, i.e. division by zero.
#N/A	The formula uses a value that is not available.
#NUM!	A problem with a value; for example, a negative number is specified when a positive number is expected.
#REF!	The formula refers to a cell that does not exist. This happens if the cell has been deleted from the worksheet.
#VALUE!	The formula has an invalid argument; for example, text in a cell where a numeric value is required.

AUTOSUM FEATURE

The **AutoSum** feature automatically adds numbers in the selected cells. You can also use it to find the average, maximum, etc., for a range of cells. The **AutoSum** button is present at two places on the ribbon:

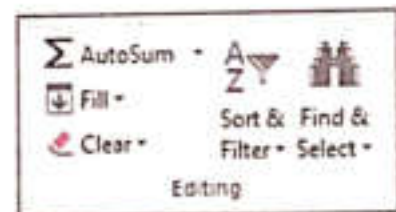


Fig. 1.19 Editing group on the HOME tab

- In the **Editing** group on the **HOME** tab (Fig. 1.19).
- In the **Function Library** group on the **FORMULAS** tab (Fig. 1.20).

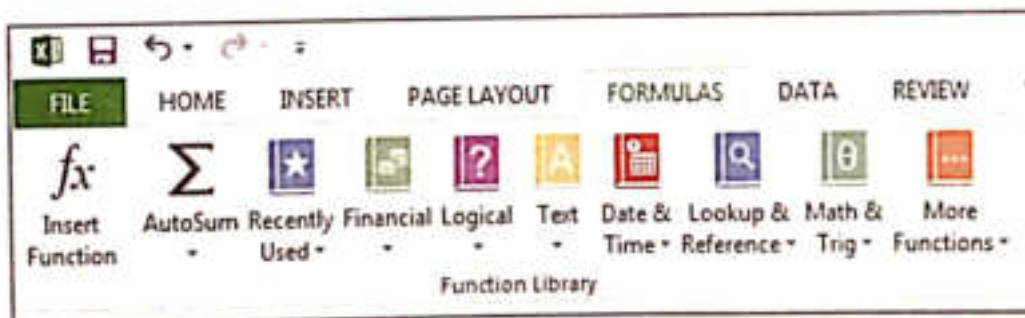


Fig. 1.20 Function Library group on the FORMULAS tab

Calculating Totals with AutoSum

Consider this example where we need to find the total marks of students in three tests.

1. Type the data in a worksheet as shown (Fig. 1.21). Select cell E4 and click **AutoSum** in the **Editing** group on the **HOME** tab. For more options other than addition, click the drop-down menu arrow to the right of the **AutoSum** button (Fig. 1.22). With **AutoSum** or **Sum**, Excel

will create a formula with the **Sum** function along with a cell range. A moving marquee surrounds cells B2 through D2 and a screen tip appears below the cell, telling you the correct format of the **Sum** function.

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43		=SUM(B2:D2)	
3	A002	38	40	37	SUM(number1, [number2])	
4	A003	45	46	42		
5	A004	42	40	43		

Fig. 1.21 AutoSum creates a formula with the SUM function

- Press ENTER, or click the **AutoSum** button again, to view the result (Fig. 1.23).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	
3	A002	38	40	37		
4	A003	45	46	42		
5	A004	42	40	43		

Fig. 1.23 Result of AutoSum in cell E2

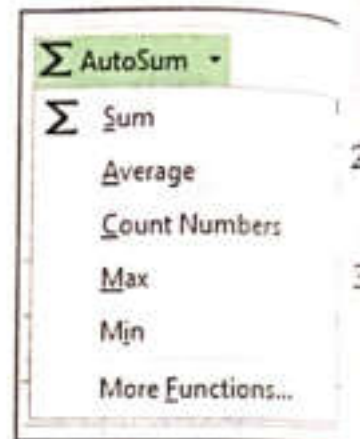


Fig. 1.22 AutoSum button menu

- As you have learnt earlier, you can use the **AutoFill** feature to fill a range of cells. Select cell E2. Point the cursor to the fill handle (the small black square at the lower-right corner) of cell E2. It will change to a small black cross. Keeping the left mouse button pressed, drag the fill handle to cell E5 (Fig. 1.24).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	
3	A002	38	40	37		
4	A003	45	46	42		
5	A004	42	40	43		

Fig. 1.24 Use AutoFill to enter the formula in the desired range of cells

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	
3	A002	38	40	37	115	
4	A003	45	46	42	133	
5	A004	42	40	43	125	

Fig. 1.25 The formula is copied to all the cells selected

- Release the left mouse button to view the result (Fig. 1.25).

Other AutoSum Functions

You are already familiar with the **Sum** function. It is inserted automatically when you click the **AutoSum** button.

Let us consider an example to familiarise ourselves with the other functions (Fig. 1.22).

- Type the data as shown (Fig. 1.26) in a worksheet. Select cell F2, click the **AutoSum** drop-down menu arrow, and choose **Average** from the **AutoSum** menu. The **Average** function will

	A	B	C	D	E	F	G	H
1	Roll No.	Test I	Test II	Test III	Total	Average		
2	A001	45	43	40		=AVERAGE(B2:E2)		
3	A002	38	40	37	115			
4	A003	45	46	42	133			
5	A004	42	40	43	125			
6								
7	Maximum							
8	Minimum							
9	No. of Students							

Fig. 1.26 Average function

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	
4	A003	45	46	42	133	
5	A004	42	40	43	125	
6						
7	Maximum					
8	Minimum					
9	No. of Students					

Fig. 1.27 Result of the formula

be inserted automatically. The range in the formula is B2:E2, which is not what we want. Correct the cell range by changing E2 to D2.

2. Press ENTER and you will get the result (Fig. 1.27).

3. Select cell F2. Point the cursor to the lower-right corner of cell F2. Keeping the left mouse button pressed, drag the fill handle to cell F5. Release the left mouse button to view the result (Fig. 1.28).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum					
8	Minimum					
9	No. of Students					

Fig. 1.28 Using the fill handle for F2:F5

4. Now, let us select cell B7 and choose **Max** from the **AutoSum** menu. Correct the cell range in the formula to B2:B5 and press ENTER to view the result (Fig. 1.29).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum	45				
8	Minimum					
9	No. of Students					

Fig. 1.29 Max function applied in cell B7

5. To fill the remaining cells in the row, first select cell B7. Point the cursor to the fill handle of cell B7. Keeping the left mouse button pressed, drag the fill handle to cell F7. Release the left mouse button to view the result (Fig. 1.30).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum	45	46	43	133	66.5
8	Minimum					
9	No. of Students					

Fig. 1.30 Using the fill handle for B7:F7

6. Let us now try the **Min** function. Select cell B8 and choose **Min** from the **AutoSum** menu. Correct the cell range in the formula to B2:B5 and press ENTER to view the result (Fig. 1.31).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum	45	46	43	133	66.5
8	Minimum	38				
9	No. of Students					

Fig. 1.31 Min function in cell B8

7. As in the case of the **Max** function, to fill the remaining cells in the row, first select cell B8. Point the cursor to the fill handle and drag the fill handle to cell F8. Release the left mouse button to view the result (Fig. 1.32).

	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum	45	46	43	133	66.5
8	Minimum	38	40	37	115	57.5
9	No. of Students					

Fig. 1.32 Copying the formula in cells C8 to F8

8. Finally, let us select cell B9 and choose **Count Numbers** from the **AutoSum** menu. Correct the cell range in the formula to B2:B5 and press ENTER to view the result (Fig. 1.33). This inserts a formula with the **Count** function. The **Count** function counts the number of numeric values in a range.

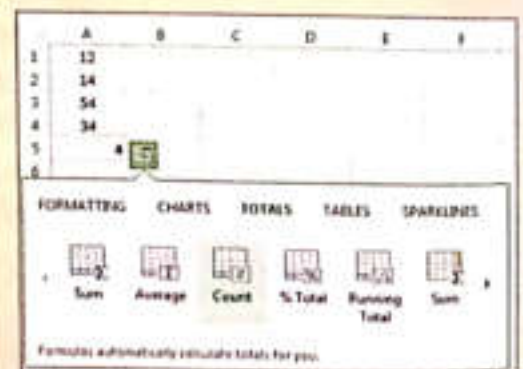
	A	B	C	D	E	F
1	Roll No.	Test I	Test II	Test III	Total	Average
2	A001	45	43	40	128	64
3	A002	38	40	37	115	57.5
4	A003	45	46	42	133	66.5
5	A004	42	40	43	125	62.5
6						
7	Maximum	45	46	43	133	66.5
8	Minimum	38	40	37	115	57.5
9	No. of Students	4				

Fig. 1.33 Count function in B9

Top Tip

The **Quick Analysis** tools also let you total your numbers quickly. Whether it is a sum, average, or a count, Excel shows the calculation results right below or next to your numbers.

1. Select the cells that contain the numbers you want to add or count.
2. Click the **Quick Analysis** button at the bottom-right corner of the selection.
3. Click **TOTALS**, move your cursor across the buttons to see the calculation results for your data, and then click the required button.



TIP

PRACTICE TIME



'Apna Store' maintains data on its employees in a worksheet as given on the right. List the steps to calculate the total, average, maximum, and minimum salaries. Also find out the number of employees working in the store.

SOLUTION

1. Type the data as shown in the worksheet alongside.
2. Select cell C8, click the arrow next to **AutoSum** and select **Sum**. The formula will appear in C8. Correct the cell range to C2:C6 and click Enter. The total salary will appear.
3. Select cell C9, click the arrow next to **AutoSum** and select **Average**. In the formula that appears in C9, correct the cell range to C2:C6 and click Enter. The average salary will now be shown in cell C9.
4. Select cell C10, click the arrow next to **AutoSum** and select **Max**. Correct the cell range to C2:C6 and click Enter. The maximum salary will be displayed.
5. Now, select cell C11, click the arrow next to **AutoSum**, and select **Min**. The formula will appear in C11. Correct the cell range to C2:C6 and click Enter. The minimum salary will be shown.
6. Finally, select cell C13, click the drop-down menu arrow of **AutoSum** and select **Count Numbers**. The formula will appear in C13. Correct the cell range to C2:C6 and click Enter. The number of employees will appear.
7. The final worksheet will look as shown alongside.

	A	B	C
1	Employee No.	Employee Name	Salary
2	E101	Maryam Iqbal	55000
3	E102	Nausheen Anwar	49000
4	E103	Waqar Khawar	53000
5	E104	Essa Meer	65000
6	E105	Wafa Virani	42000
7			
8		Total Salary	
9		Average Salary	
10		Maximum Salary	
11		Minimum Salary	
12			
13		No. of Employees	

	A	B	C
1	Employee No.	Employee Name	Salary
2	E101	Maryam Iqbal	55000
3	E102	Nausheen Anwar	49000
4	E103	Waqar Khawar	53000
5	E104	Essa Meer	65000
6	E105	Wafa Virani	42000
7			
8		Total Salary	264000
9		Average Salary	52800
10		Maximum Salary	65000
11		Minimum Salary	42000
12			
13		No. of Employees	5

FUNCTIONS LIBRARY

Functions in Excel are predefined formulas that perform specific calculations. We will discuss some basic functions here.

Click the **FORMULAS** tab (Fig. 1.20). In the **Function Library** group, click the function button for the category of function you want to use, such as **Financial**, **Logical**, **Text**, **Date & Time**, **Lookup & Reference**, or **Math & Trig**. Then select the required function from the list that appears.

Let us learn about two functions in the **Math & Trig** category: GCD and LCM.

2.

GCD

This function calculates the GCD or the **greatest common divisor** of two or more integers. The greatest common divisor is the largest integer that can divide the numbers without a remainder. It is also called the **highest common factor**. The steps to calculate the GCD are as follows:

1. Type two numbers in cells A1 and A2. Select cell A3, which is the cell where you want the GCD of the two numbers. Click the **Math & Trig** button and then select **GCD** from the drop-down menu (Fig. 1.34).

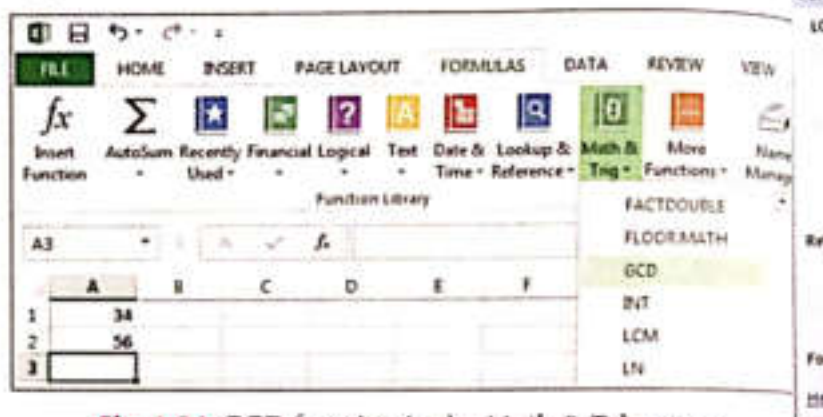


Fig. 1.34 GCD function in the Math & Trig menu

2. The **Function Arguments** dialog box appears (Fig. 1.35). Type A1 and A2 in the **Number1** and **Number2** text boxes, respectively.

Observe that the result of the formula appears near the bottom of the dialog box. Click **OK**.

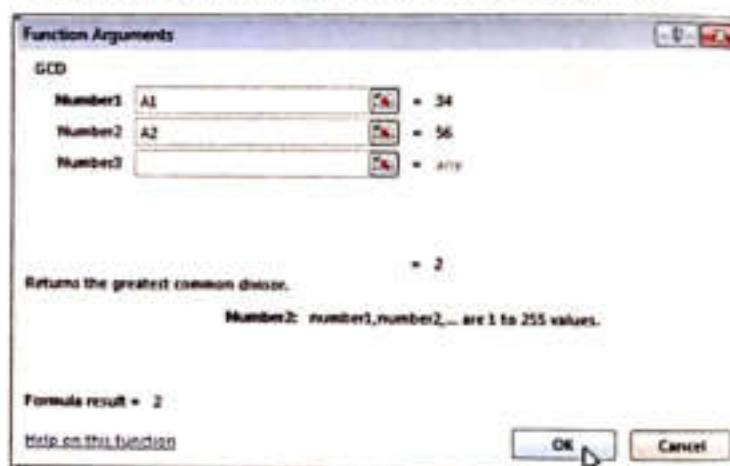


Fig. 1.35 Function Arguments dialog box

3. The output will now be seen in cell A3.

LCM

This function calculates the **least common multiple** of two or more integers. The least common multiple (LCM) is the smallest positive integer that is a multiple of all the given numbers. The steps to calculate LCM are:

1. Type three numbers in cells A1, A2, and A3. Select cell A4 where you want the LCM of the three numbers. Click **Math & Trig** and then select **LCM** from the drop-down menu (Fig. 1.36).

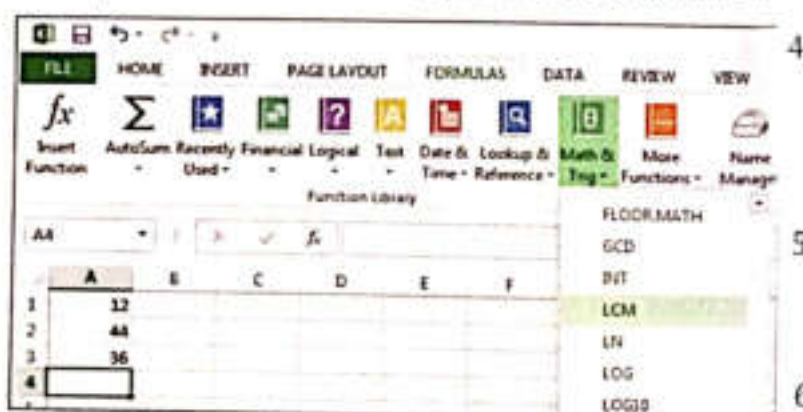


Fig. 1.36 LCM function in the Math & Trig menu

2. The **Function Arguments** dialog box appears (Fig. 1.37). Type A1, A2, and A3 in the Number1, Number2, and Number3 text boxes, respectively. Note that the result can be seen near the bottom of the dialog box.

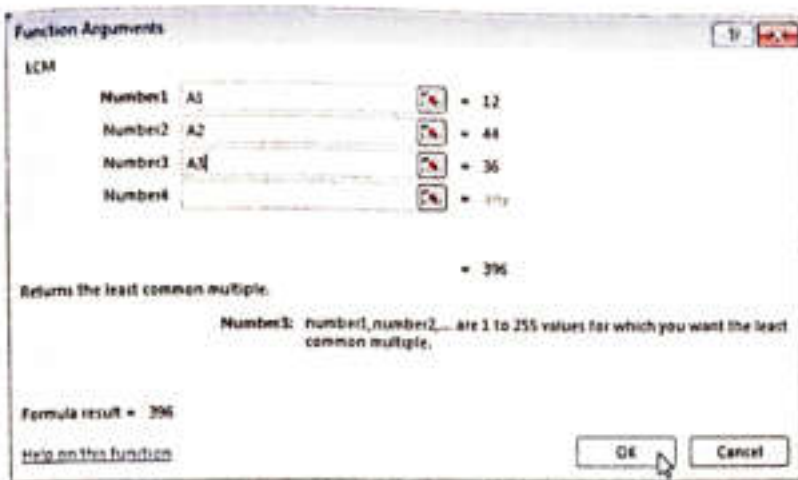



Fig. 1.37 Enter the cell references to calculate the LCM

3. Click **OK**. The output will appear in cell A4 (Fig. 1.38).

	A
1	12
2	44
3	36
4	396

Fig. 1.38 Output in cell A4

Creating a Formula Using Insert Function

1. Click the cell in which you want to enter a formula.
2. Click **Insert Function**  on the Formula Bar or click the **More Functions** option from the **AutoSum** menu (Fig. 1.22) or click the **Insert Function** button in the **Function Library** group on the **FORMULAS** tab (Fig. 1.20).
3. The **Insert Function** dialog box appears (Fig. 1.39).
4. In the **Or select a category** box, select **All**. If you are familiar with the function categories, you can also select a category.
5. In the **Select a function** box, select the function you want to use and then click **OK**.
6. In the argument dialog boxes that are displayed for the function you selected (in this case LCM), enter the values or cell references, or select the cells that you want to reference, and click **OK**.

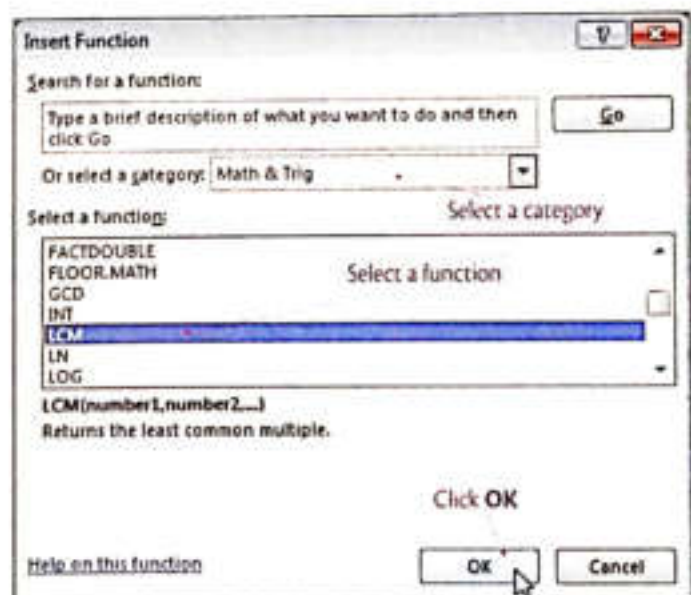


Fig. 1.39 Insert Function dialog box

Tricky Terms



Formula a sequence of values, cell references, functions, and/or operators in a cell that produces a new value from existing values

Text String a sequence of characters on which subtraction, multiplication, and division cannot be performed

Concatenation the process of joining text values in a series

Function a pre-defined formula that performs specific calculations

Pointing adding a cell reference to a formula by clicking a cell or a range

Memory Bytes



- A formula in Excel always starts with an **equals (=)** sign.
- Formulas can be entered in the Formula Bar or in a cell.
- There are three types of cell referencing—relative, absolute, and mixed.
- The default cell referencing is relative.
- The \$ sign is used for absolute referencing.
- Text formulas involve concatenation of text strings.
- The concatenation operator is '&' (ampersand).
- Numeric formulas involve the use of various arithmetic operators (^, *, /, + and -).
- The **AutoSum** feature automatically adds numbers in the selected cells.
- The **AutoSum** menu provides access to **Sum**, **Average**, **Count Numbers**, **Max**, **Min**, and other functions.
- The **Insert Function** button is used for adding and calculating functions in a worksheet.



EXERCISES



Descriptive Type Questions

1. Answer the following.

- What is a circular reference? Explain with an example.
- Write the steps to find the LCM of three numbers.
- The two ways of entering a cell reference in a formula are (a) by typing and (b) by pointing. Explain the difference between the two methods.
- When you enter a formula and click Enter, it displays the calculated value. What will you do to display the formula?
- Name the arithmetic operators you can use in an Excel formula.

- f. Your teacher has asked you to use an Excel sheet to record the marks of your class in the following subjects: English, Science, Mathematics, and Computer Science. With this information you can then calculate the average marks of each student and the names of the students who scored the highest and lowest marks in each subject.
- Compare the different methods of creating this sheet.
 - Give reasons as to why you would select one method over the other.
- g. Assess the advantages of relative, mixed, and absolute reference cells in Excel 2013.
- h. Create a table showing your own overall average marks in all subjects. Make separate columns or rows showing the subjects in which you gained the highest and lowest marks.

Application-Based Questions

- a. Mehak wants to calculate the total of three values in cells A1, A2 and A3. She has written the formula $A1 + A2 + A3$ in cell A4, but did not get the required answer.

	A
1	12
2	14
3	54
4	$A1 + A2 + A3$

- What is wrong with the formula entered in cell A4? How can it be corrected?
- If she changes any value in cells A1, A2, or A3, will that affect the value in cell A4?

- b. Consider the worksheet on the left:

- What will be the result in cell B4 if you click Enter?
- If the formula in cell B4 is copied and pasted to cell D2, what will be the formula and the resultant value?
- Which type of referencing is this?

	A	B	C	D
1	2	4	6	4
2	5	2	3	?????
3	3	1	2	3
4	2	$=A4 + B3$	2	6

- c. Anam has written the formula $=\$B\$1 * A1$ in cell C1 as can be seen in the worksheet alongside.

- What will be the resultant value in cell C1?
- What will be the values in cells C2, C3, and C4, if you select cell C1 and drag the **AutoFill** handle through the range C2:C4?
- Which type of referencing is this (\$B\$1 and A1)?

	A	B	C
1	4	9	$=\$B\$1 * A1$
2	6	3	
3	3	2	
4	8	6	

	A	B	C	D
1	Item Name	Item Price	Discount Amount (8%)	Net Amount
2	Refrigerator	13800		
3	Television	22500		
4	DVD Player	2800		
5	Tablet	14500		

d. Aman wants to calculate an 8% discount on the item price and then the net amount as given in the worksheet on the left.

- What should be the formulas in cells C2 and D2?
- How will you copy the formula in cell C2 to C3:C5 and in cell D2 to D3:D5?



IN THE LAB

- His Mathematics teacher has asked Aman to create a worksheet that will calculate the area and circumference of a circle for radii ranging from 1 cm to 10 cm taking the value of $\pi = 3.14$. Can you help Aman in his task? How will you proceed?

	A	B	C
1	Radius (in cm)	Area	Circumference
2	1		
3	2		
4	3		
5	4		
6	5		
7	6		
8	7		
9	8		
10	9		
11	10		

	A	B	C	D	E	F	G	H	I	J	K
1		11	12	13	14	15	16	17	18	19	20
2	1										
3	2										
4	3										
5	4										
6	5										
7	6										
8	7										
9	8										
10	9										
11	10										

- Seema's Mathematics teacher has asked her to create a worksheet to print the first 10 multiples of the numbers from 11 to 20. Can you help Seema in her task? A sample worksheet is given on the left.

- Myro Pvt. Ltd. maintains data on its salespersons in a worksheet as given on the right. List the steps to calculate the commission (10% of sales amount), the total, average, maximum and minimum of the sales amount, and the commission.

	A	B	C	D
1	Salesperson No.	Salesperson Name	Sales Amount	Commission (10%)
2	S101	Tahir Ansari	1000000	
3	S102	Aman Vrani	1245000	
4	S103	Suneeta Jami	2555000	
5	S104	Alfa Injal	2548800	
6	S105	Deena Choudhry	3550000	
7				
8		Total		
9		Average		
10		Maximum		
11		Minimum		

	A	B	C	D	E
1	Item No.	Item Name	Quantity	Price	Total
2	S01	A4 paper	10	250	
3	S02	Mouse	20	250	
4	S03	Keyboard	11	520	
5	S04	Hard Disk (1 TB)	5	5150	
6	S05	Hard Disk (750 GB)	4	4900	
7	S06	Hard Disk (500 GB)	6	4000	
8	S07	USB (8GB) USB	10	800	
9	S08	(4GB)	9	600	
10	S09	USB (vGB)	10	400	
11	S10	USB (1GB)	5	300	
12					
13			Grand Total		

- The Krio Computer Stationery Shop maintains its stock using the worksheet given on the left. Write the steps to calculate the total (Quantity * Price) and the grand total (sum of E2:E11) of the value of stock held.

GROUP PROJECT

Choose 4 international footballers (preferably not goalkeepers) from 4 different countries.

Carry out a small research project and find out the number of:

- times these players have played for their national teams
- times they have played for their current clubs
- goals they have scored for their national and club teams
- Using this information, create a worksheet to calculate the average number of goals and the most number of goals scored by each player. Find out which player scored the highest number of goals and compare your findings with other groups.

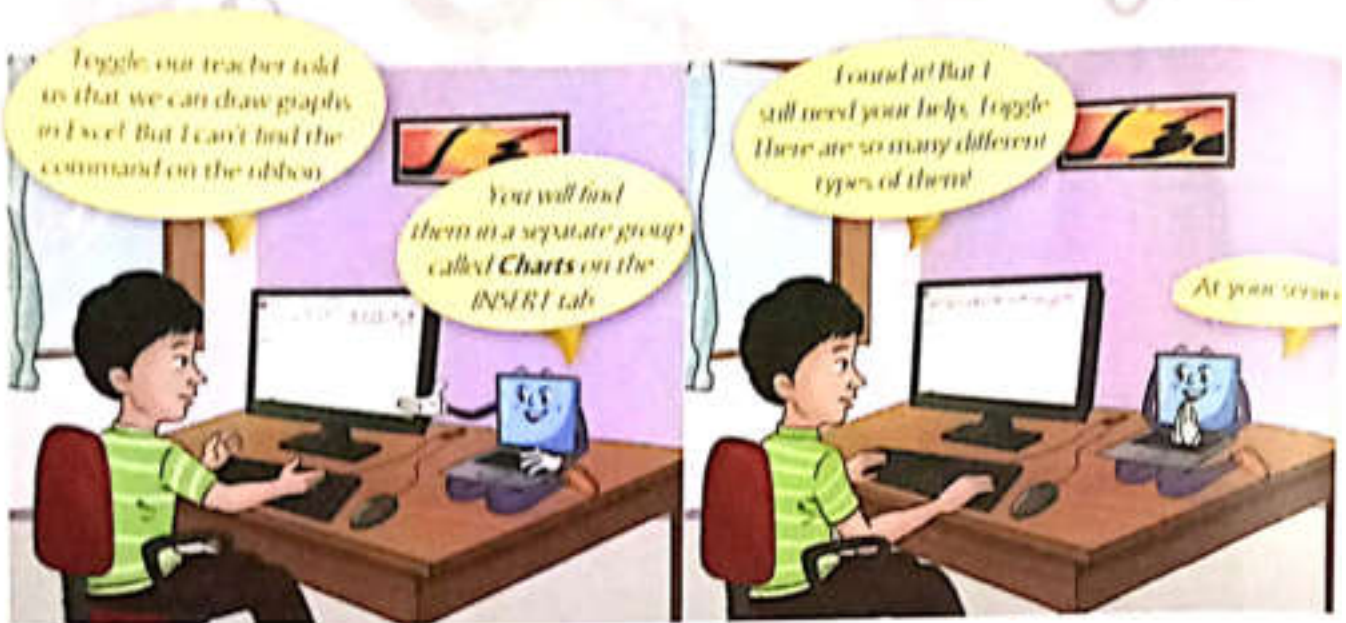


TEACHER'S NOTES

- Discuss various real-life applications of Excel formulas.
- Demonstrate the uses of the Sum, Average, Max, Min, and Count Numbers functions with appropriate examples.
- Show students some examples of formulas that give error results and how to correct them.

Chapter 2

Creating Charts in Excel 2013



A **chart** is a pictorial representation of data. Charts make it easier for us to understand large quantities of data. They help us 'see' the relationship between different parts of the data.

Excel supports various types of charts. You enter data in tabular form and use it to create a chart. A chart in Excel is linked to data in the worksheet. If the data is modified, the chart will change too.

TYPES OF CHARTS

You can create a chart from the data entered in a worksheet. We will use the data in Figure 2.1 to create charts of different types. It shows the revenue and expenditure of a company A in the past five years.

In this Chapter

- Types of Charts
- Components of a Chart
- Creating a Chart
- Sparklines

	A	B	C
1	Year	Revenue	Expenditure
2	Year 1	3075900	1000000
3	Year 2	5046543	2800999
4	Year 3	7044345	3000870
5	Year 4	8000000	2500000
6	Year 5	10000000	3000000

Fig. 2.1 Accounts of company A

Line Chart

A **line chart** (Fig. 2.2) compares trends in data at equal intervals. Line charts are useful for depicting the change in a value over a period of time. They are a good choice when you have many points to plot or when data trends are important.

Line charts are usually used to show production or sales trends over a period of time.

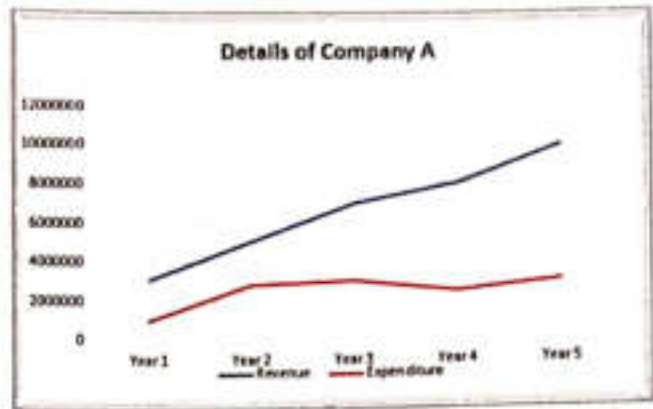


Fig. 2.2 Line chart

Column Chart

A **column chart** (Fig. 2.3) shows changes in data over a period of time, or it illustrates comparisons among items. Categories are organised horizontally and values vertically. In a column chart, each data point in a series is represented by a column that rises from the x-axis.

Column charts are useful when the height of individual points is more important than the trend in a series.

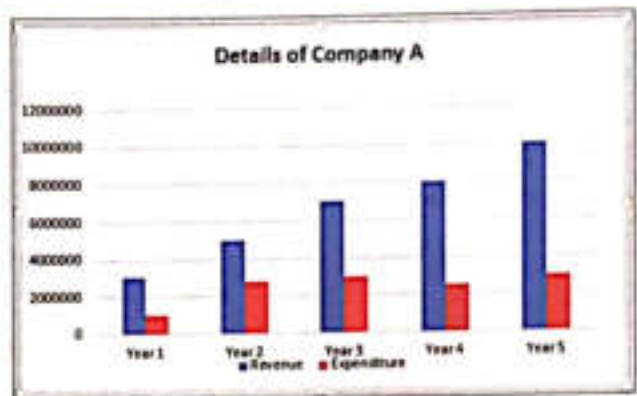


Fig. 2.3 Column chart

3-D Stacked Column Chart

A **3-D stacked column chart** shows the part to a whole (Fig. 2.4).

Bar Chart

A **bar chart** also illustrates comparisons among individual items. Categories are organised vertically and values horizontally (Fig. 2.5). A bar chart can be described as a column chart drawn sideways.

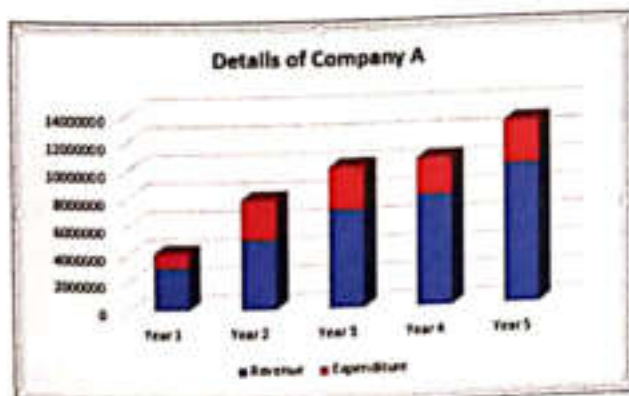


Fig. 2.4 3-D stacked column chart

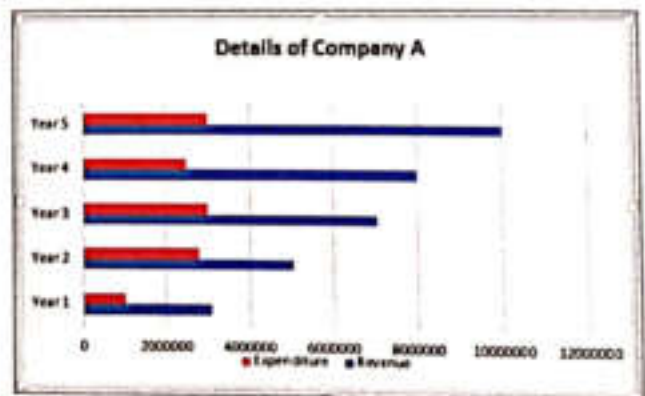


Fig. 2.5 Bar chart

Scatter Chart

A **scatter chart** plots each data point with a marker (Fig. 2.6). Unlike a line chart, the x-axis of a scatter chart has numbers and not text labels. So, x-axis tick marks are spaced according to their values and not just evenly spaced along the axis. Scatter charts are useful to plot relationships between linked sets of numbers, for example, height/weight and price/sales.

The points on a scatter chart can be connected with a line, but it is often used without connecting lines. You might use a scatter chart when your chart has many data points but there is no particular trend in their rise and fall.

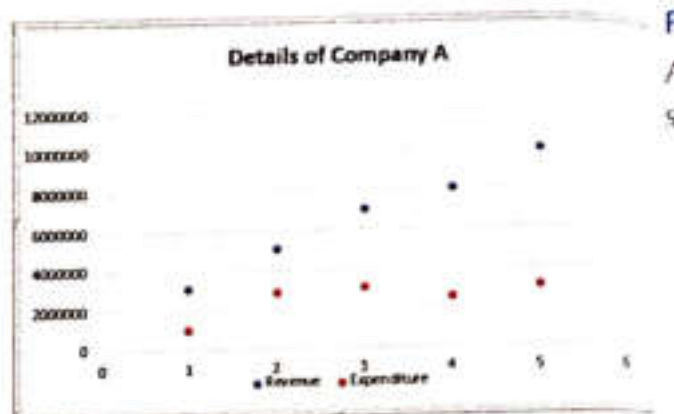


Fig. 2.6 Scatter chart



Fig. 2.7 Pie chart

Pie Chart

A **pie chart** is used to plot data for a single data series. The pie chart shown in Figure 2.7 represents the expenditure figures of Company A for the past five years. Each data point is represented by one 'slice' of the circular pie chart. The size of each slice is proportional to the value it represents; so all the data points taken together make a complete circle.

Doughnut Chart

A **doughnut chart** shows the relationship of parts to a whole. Unlike a pie chart, it can contain more than one data series. Each ring of the doughnut chart represents a data series. In the chart shown in Figure 2.8, the **inner ring** is for **expenditure** and the **outer one** is for **revenue**.



Fig. 2.8 Doughnut chart

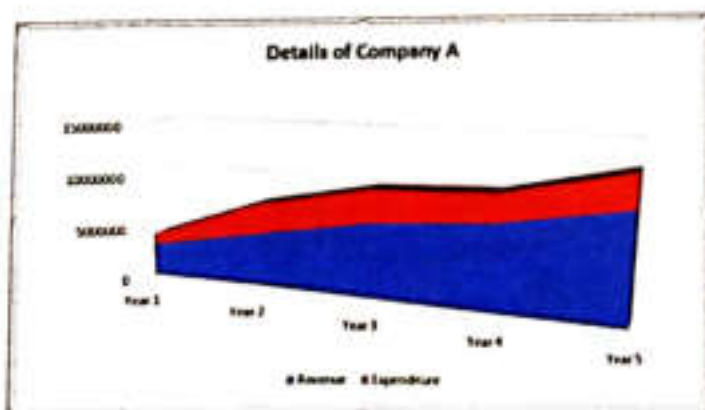


Fig. 2.9 Area chart

Area Chart

An **area chart** (Fig. 2.9) is similar to a line chart but the data point markers are not displayed and the area beneath the lines is filled with colour. You can also plot series one on top of another, producing a total. An area chart emphasises the magnitude of change in data over time. It is mainly used for representing sales and production figures.

Radar Chart

A **radar chart** (Fig. 2.10) plots data in concentric circles. Each data series is plotted along a separate axis from the centre point to the outer ring. Lines connect values from the same series.

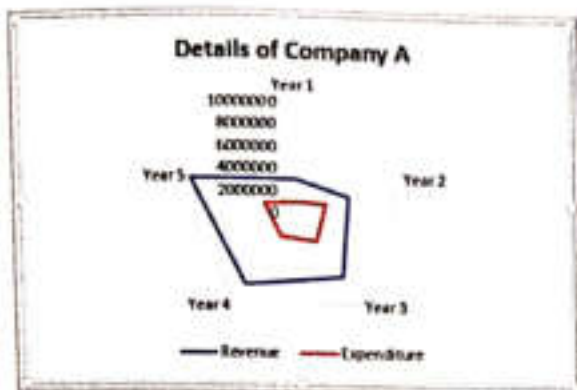


Fig. 2.10 Radar chart

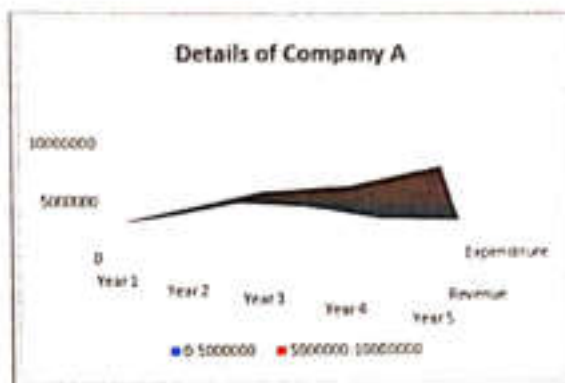


Fig. 2.11 3-D surface chart

3-D Surface Chart

A **3-D surface chart** (Fig. 2.11) creates a three dimensional view of data. A topographic map is an example of this type of a chart.

COMPONENTS OF A CHART

We have seen the different types of charts that are possible for the same data set. Let us now understand the various components of a chart, as shown in Figure 2.12.

Data Table

It refers to the set of data values from which the chart is derived.

X-Axis

It is the horizontal axis of the chart. It is also known as the **category axis**.

Y-Axis

It is the vertical axis of the chart. It is also known as the **value axis**. The value of each data point is plotted on this axis.

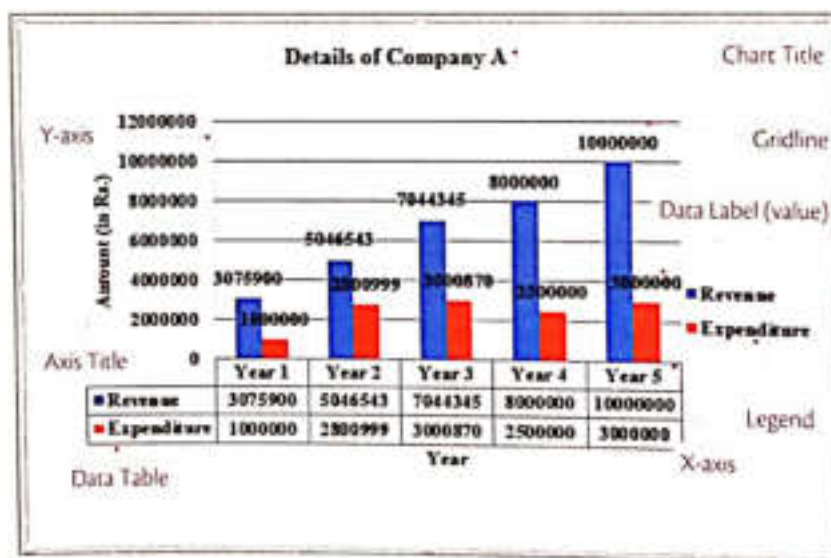


Fig. 2.12 Components of a chart

Chart Title	It is usually placed at the top of the chart and helps the user understand what the chart represents.	2.
Axis Title	It is the title given to an axis. A 2-D graph has two axes (x and y) and a 3-D one has three (x, y, and z).	3.
Chart Area	It refers to the area within which all chart components are placed. Often, it is surrounded by a border.	
Plot Area	It is the rectangular area bounded by the two axes. The x-axis and the y-axis define the two sides of the rectangular plot area.	
Legend	It identifies the data series. A unique colour or pattern is assigned to each data series to make it easier to distinguish them visually.	
Gridlines	Lines that run across the plot area from each category on the x-axis and from each value on the y-axis. You can choose whether to display them or not. They make it easier to identify the value of each data point on the chart.	
Data Label	A label that provides additional information about a data point on a chart.	

Top Tip

When you move the mouse pointer over a chart object, Excel displays a screen tip with the component name.

Charts in 3-D have a base area (the xy plane) known as the **floor**, and vertical areas (the yz and xz planes) known as the **walls** (Fig. 2.13).

Therefore, the two walls and the floor make up the plot area in a 3-D chart.

In Excel 2013, there is no limit on the number of data points in a data series. This does not mean that you can have infinite data points. The number depends upon the memory of the computer.

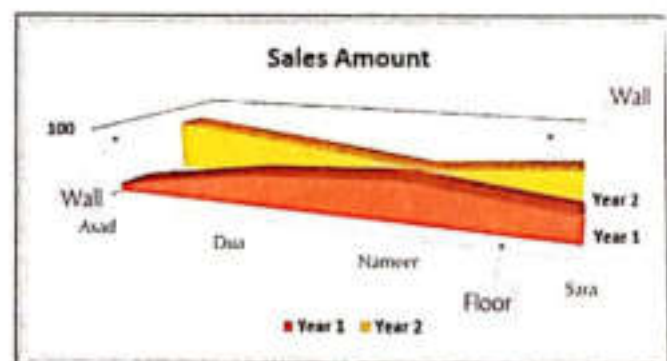


Fig. 2.13 Walls and floor of a 3-D chart

CREATING A CHART

Now that we are familiar with chart types and chart components, let us create a chart.

1. We first need to enter data in a worksheet. In this example, we will use the data from Figure 2.14. Enter the data of two test marks of four students and select the range A1:C5 from which we will make the chart.

	A	B	C
1	Name	Test I	Test II
2	Essa	87	95
3	Naael	92	89
4	Sabika	78	83
5	Bisma	84	72

Fig. 2.14 Data in the worksheet

2. Click the **INSERT** tab. In the **Charts** group, click the **Column** drop-down menu arrow (Fig. 2.15).
3. Click **Clustered Column** in the drop-down list (Fig. 2.16). It is the first from the left in the 2-D Column section.

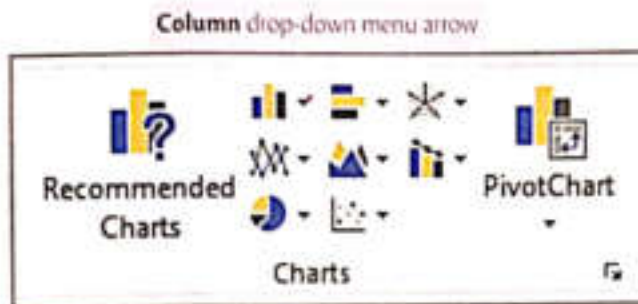


Fig. 2.15 Charts group on the INSERT tab

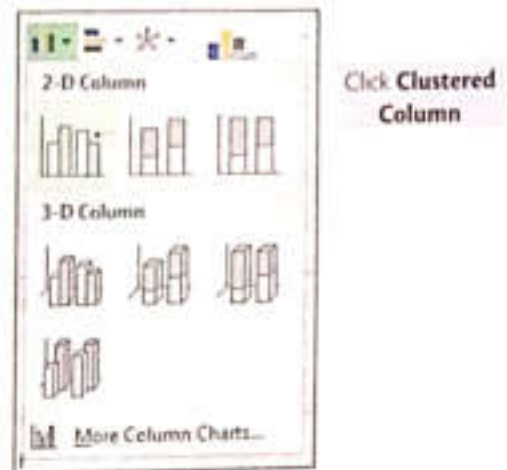


Fig. 2.16 Column drop-down menu

4. Excel graphs the data in a 2-D column chart and places the chart in a box in the centre of the worksheet (Fig. 2.17).

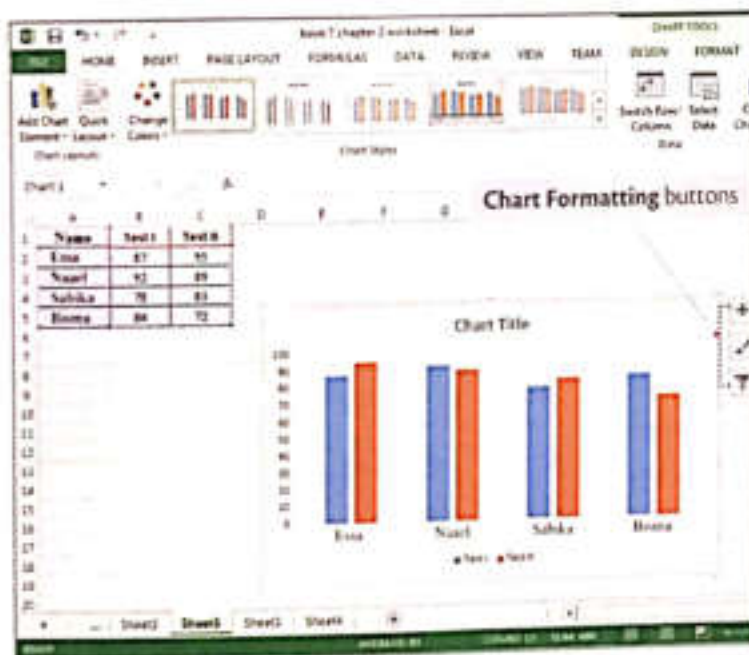


Fig. 2.17 Column chart in the centre of the worksheet

You will see that two new **CHART TOOLS** tabs have appeared on the ribbon: **DESIGN** and **FORMAT**. In Figure 2.17, the **DESIGN** tab is selected.

- You can change the size of the chart by dragging its corners.
 - You can also move it to a different part of the worksheet by dragging the white background.
- If you are not sure which type of chart to create, click the **Recommended Charts** command (Fig. 2.15). It will open the **Insert Chart** dialog box with suggestions for several different charts based on the data (Fig. 2.18).



Fig. 2.18 Insert Chart dialog box

Select a chart in the left pane and click **OK**. It will be inserted in the worksheet.

The **DESIGN** tab gives you different choices on layouts and styles for your chart. You can also move your chart to a new location:

1. Click **Move Chart** in the **Location** group. The **Move Chart** dialog box appears (Fig. 2.19).
2. Click **New sheet** and type a name for the new sheet. Let us name the new sheet **Column Chart**. The chart is moved to a new sheet in the workbook, named **Column Chart** (the name you typed).

The chart is automatically scaled to fill the entire page in landscape orientation.

Top Tip

You see the **CHART TOOLS** tabs—**DESIGN** and **FORMAT**—only when a chart is selected, if you cannot see them, it means no chart is selected. Click your chart to select it and the additional tabs will appear.

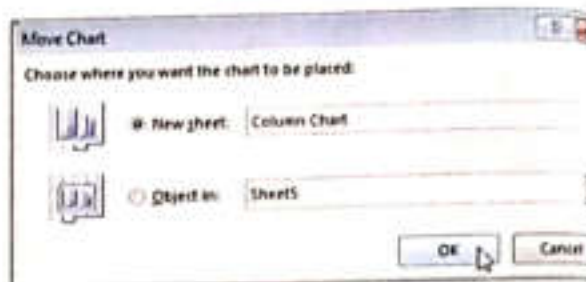


Fig. 2.19 Move Chart dialog box

Chart elements

You can add or change many chart components such as **Axis Titles**, **Chart Title**, **Data Labels**, **Data Table**, **Gridlines**, and **Legend** using the **Add Chart Element** option. Click **Add Chart Element** in the **Chart Layouts** group and select the required options.

Chart Title

Chart Title options are **None**, **Above Chart**, and **Centered Overlay** (Fig. 2.20). Click **Above Chart** and the **Chart Title** text box will be added to the chart (Fig. 2.21). To edit the chart title, double-click the placeholder and type the text.

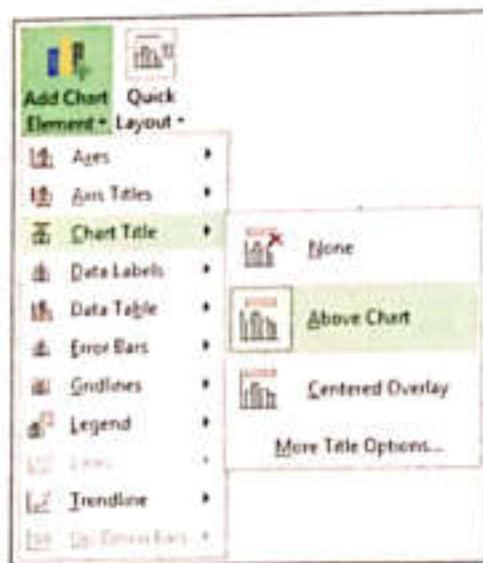


Fig. 2.20 Chart Title options

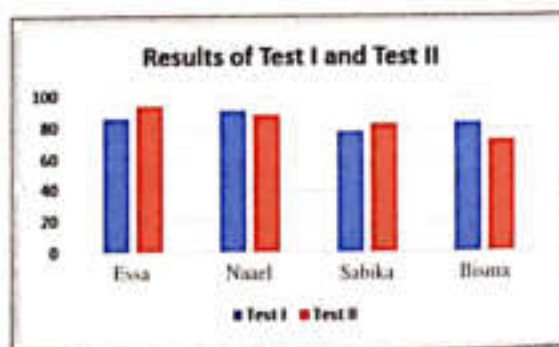


Fig. 2.21 Chart title above the chart

Axis Title

Axis Title allows you to add titles along the x-axis and the y-axis.

- To add an x-axis title, click **Axis Title** ▶ **Primary Horizontal** (Fig. 2.22). The x-axis title text box will appear. Double-click on it and change the title to Name of the Candidate.
- To add a y-axis title, click **Axis Title** ▶ **Primary Vertical** (Fig. 2.23). The y-axis title text box will appear. Double-click on it and change the title to Marks.

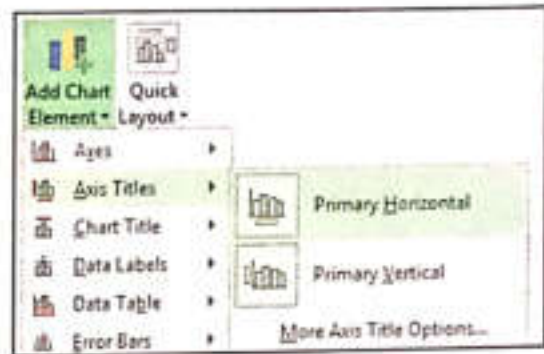


Fig. 2.22 Primary Horizontal option

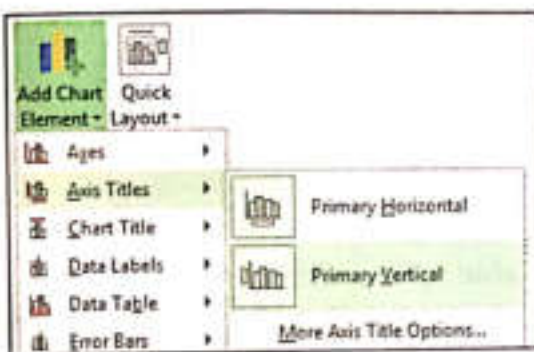


Fig. 2.23 Primary Vertical option

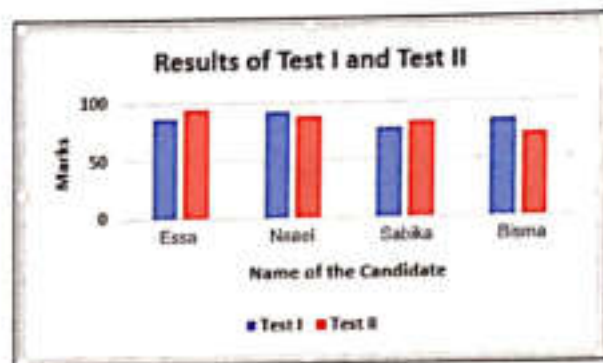


Fig. 2.24 Column chart with Chart Title and Axes Titles

The chart will now look as shown in Figure 2.24.

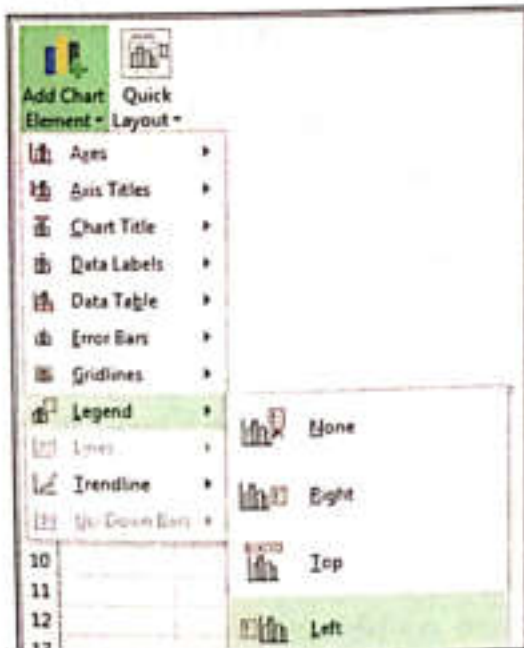


Fig. 2.25 Legend options

Legend

Legend displays a drop-down list with many options. You can hide the legend by clicking **None**.

Click **Legend** ▶ **Left** (Fig. 2.25). The legend will be placed to the left of the chart (Fig. 2.26).

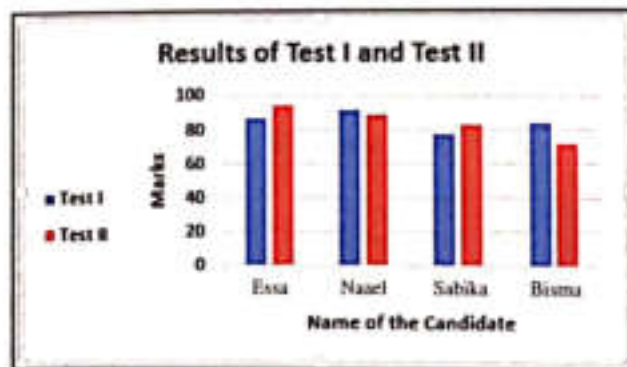


Fig. 2.26 Chart with the legend on the left

Data Labels

You can display the value of each column on the chart. Click **Data Labels** and choose the label location (Fig. 2.27). The chart will look as shown in Figure 2.28.

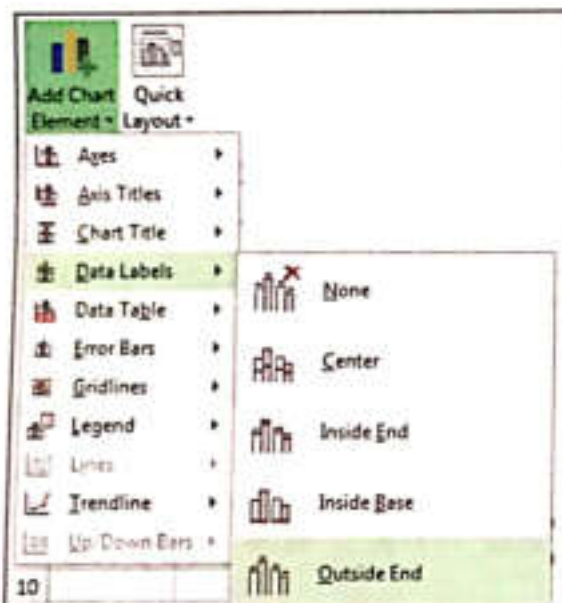


Fig. 2.27 Data Labels options

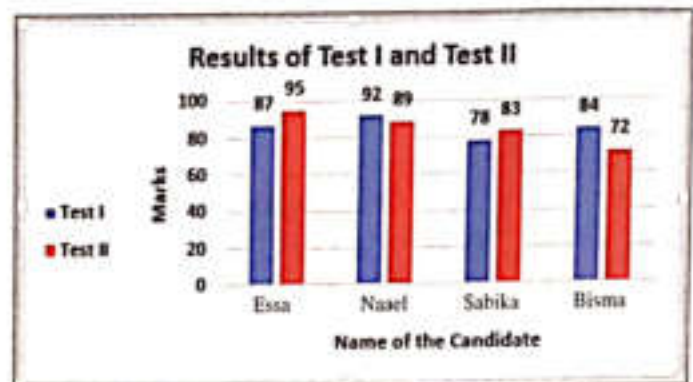


Fig. 2.28 Chart with outside end data labels

Data Table

The **Data Table** option adds a table with the data to the chart. Click **Data Table** ► **With Legend Keys** (Fig. 2.29). The chart will look as shown in Figure 2.30.

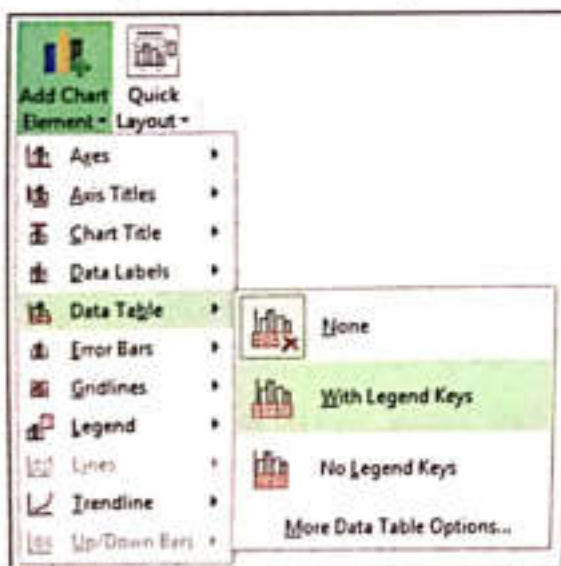


Fig. 2.29 Data Table options

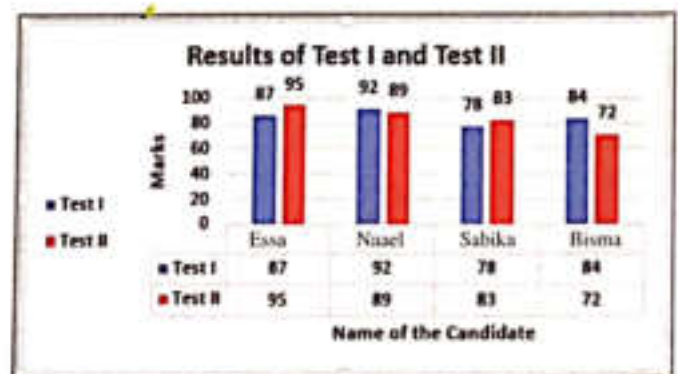


Fig. 2.30 Data table with legend keys

Gridlines

Gridlines in the **Axes** group allows you to specify how gridlines should be displayed on the chart.

Major gridlines are gridlines at large intervals. **Minor gridlines** are arranged at smaller intervals (Fig. 2.32). For both horizontal and vertical gridlines, the options available are **Primary Major Horizontal**, **Primary Major Vertical**, **Primary Minor Horizontal**, and **Primary Minor Vertical** (Fig. 2.31).

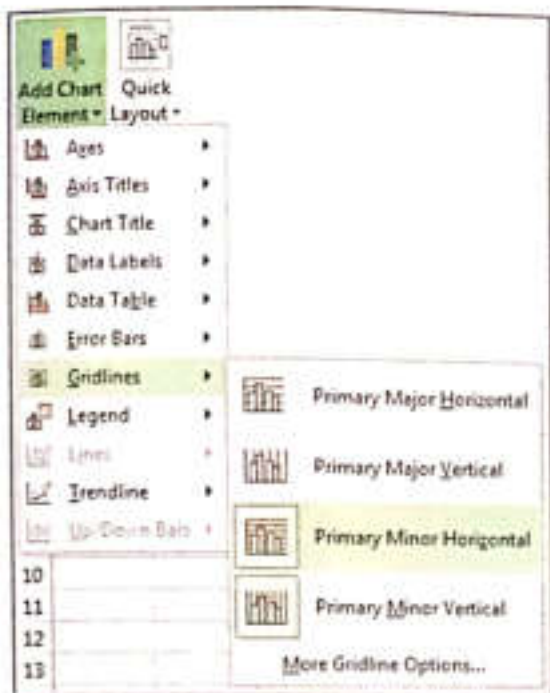


Fig. 2.31 Gridlines options

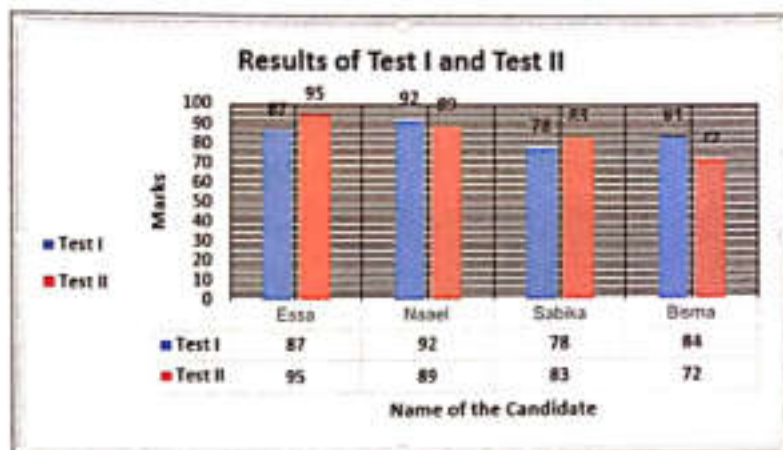


Fig. 2.32 Column chart with minor horizontal and vertical lines

Chart Layout

If you want to quickly add chart elements, click the **Quick Layout** button in the **Chart Layouts** group.

Click, say, **Layout 9** (Fig. 2.33). This layout adds the title to the top (centre) of the chart, axis titles, and moves the legend to the right (centre).

Chart Styles

You can format Excel chart components to make a chart look more attractive. Excel also provides ready-made chart styles. To see them all, click the **More** arrow at the bottom-right corner of the **Chart Styles** group (Fig. 2.34).

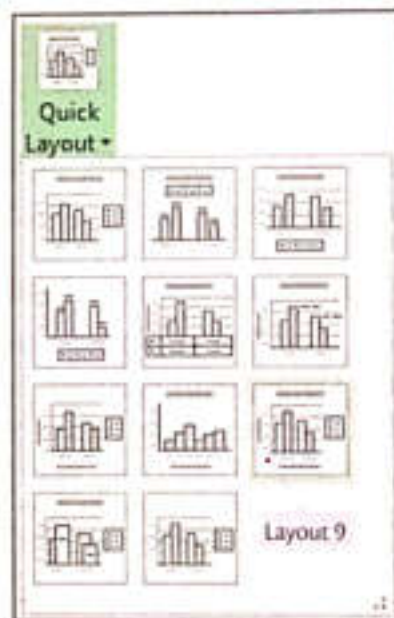


Fig. 2.33 Quick Layout gallery



Fig. 2.34 Options of the Chart Styles group

You can try different chart styles and choose the one that you like. For example, Figure 2.35 shows what your chart will look like in Style 8.

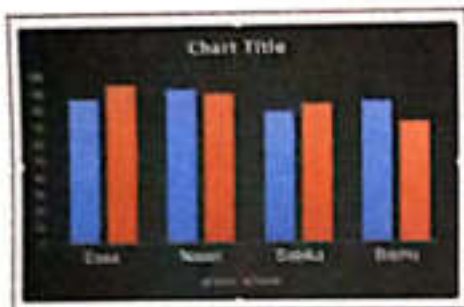


Fig. 2.35 Chart style 8

Change Chart Type

Click the **Change Chart Type** button in the **Type** group. The **Change Chart Type** dialog box appears. Select a new chart type and the desired layout. Click **OK**. The selected chart will appear (Fig. 2.36).

Switch Row and Column Data

Click the **Switch Row/Column** button in the **Data** group. The rows and columns will be switched. Here, **Name of the Candidate** and **Marks** have been switched (Fig. 2.37).

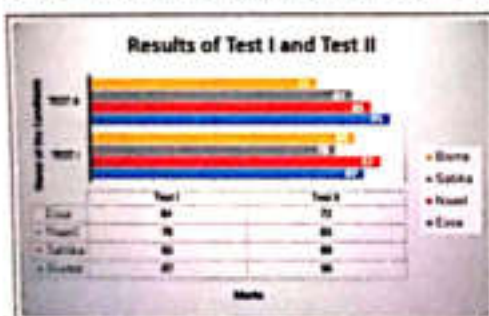


Fig. 2.37 Column chart after switching rows and columns

Top Tip

You can use the **Chart Formatting** buttons (Fig. 2.17) to quickly add chart elements, change the chart style, and filter chart data.



Chart Elements: The first button is used to add chart elements. Click the corresponding check boxes.



Chart Styles: The second button is used to add a chart style and a colour scheme to the chart. Click the required chart style.



Chart Filters: The third button is used to edit data points and select the series and categories you want to display in the chart.

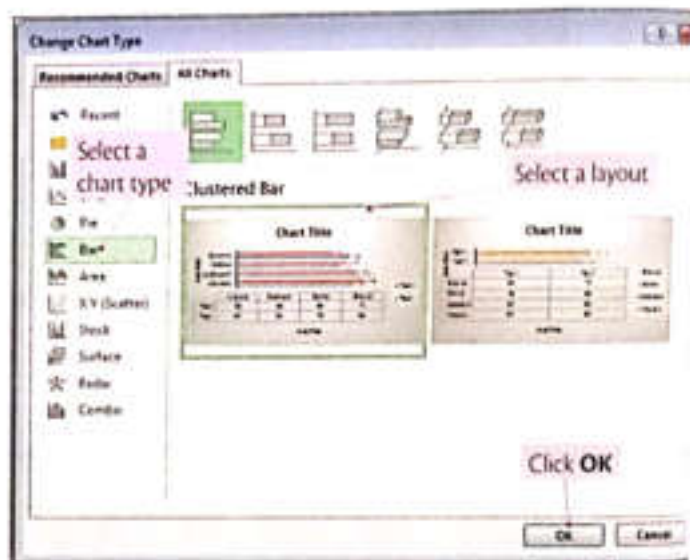


Fig. 2.36 Change Chart Type dialog box

FORMAT tab

The commands for formatting text and numbers in a chart are available on the **FORMAT** tab (Fig. 2.38).

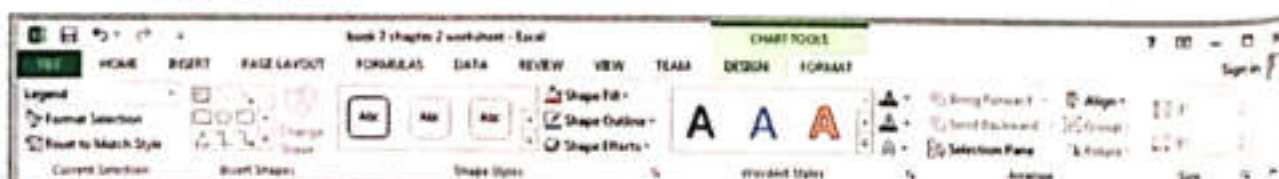


Fig. 2.38 FORMAT tab options

Click on the chart title to select it. Click the **Text Fill** drop-down menu arrow in the **WordArt Styles** group and select blue from the drop-down colour palette (Fig. 2.39). Similarly, make the axes titles orange in colour.

Select the chart as a whole by clicking it. Click the **Shape Fill** drop-down menu arrow in the **Shape Styles** group and select a colour from the drop-down colour palette (Fig. 2.40).

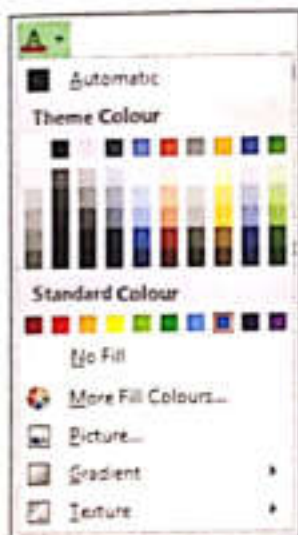


Fig. 2.39 Text Fill



Fig. 2.40 Shape Fill

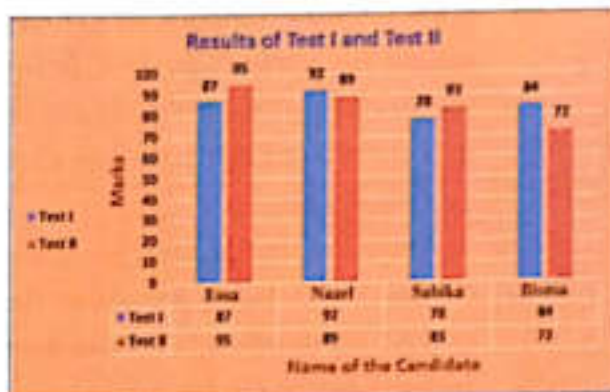


Fig. 2.41 Formatted chart

This will set the background colour for the chart. Fill the chart background with light orange colour. The chart will look as shown in Figure 2.41.

PRACTICE TIME



The class teacher of VII wants to draw a pie chart that indicates the number of students achieving a particular grade in a given test. The class has 43 students. Help him create a pie chart for the data. Also, format the chart and emphasise the grade with the maximum number of students.

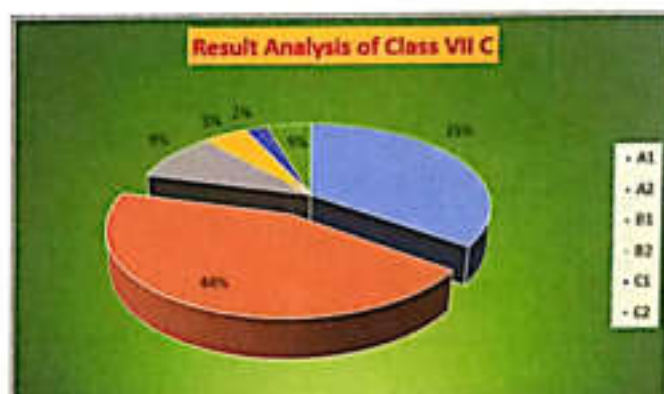
SOLUTION

- Enter the data shown alongside in a worksheet.
- Select the cell range A2:G3.
- Click the **Pie Chart** button in the **Charts** group on the **INSERT** tab.
- A drop-down menu appears. Click the first option in the **3-D Pie** section. A pie chart appears on the worksheet.
- Click the **DESIGN** tab. In the **Chart Layouts** group, click the **Quick Layout** button and select **Layout 6**.

	A	B	C	D	E	F	G
1	Number of Students in a Particular Grade						
2		A1	A2	B1	B2	C1	C2
3	Class VII C	15	19	4	2	1	2

Note: If the tabs do not appear on the ribbon, it means the chart is not selected. Click on the chart to select it.

6. Now, click the legend to select it. Click the **Shape Outline** drop-down menu arrow in the **Shape Styles** group on the **FORMAT** tab and choose blue colour from the palette. This adds a thin, blue border around the legend.
7. Click **Format Selection** in the **Current Selection** group. The **Format Legend** pane appears to the right. Click the **Fill & Line** button, then the **Fill** option, and select **Pattern fill**. A list of patterns appears. Select the desired option.
8. Double-click the chart title text. The context menu appears. Change the font to **Times New Roman**, font size to **14**, and font colour to **red**.
9. Double-click the border of the chart title text box. The **Format Chart Title** pane appears to the right with the **FILL** option selected. Click **Solid fill**. Click the **Color** button and select Red from the colour palette.
10. Select the chart title and change the text as shown below.
11. Double-click the border of the chart. The **Format Chart Area** pane appears to the right with the **FILL** option selected. Click **Gradient fill**. Click the **Preset gradient** button and select a colour of your choice, say, green.
12. The percentage data labels are inside the pie. Click a label and drag it to the outside. Do the same for the other labels.
13. Click the slice with the highest percentage and drag it out.
14. The chart will now look as shown alongside.



Creating a Combo [Combination] Chart

A **combination chart** is a single chart that consists of a series that uses different chart types. It may include a second **value axis**. For example, you may have a chart that shows both columns and lines with two value axes. The value axis for the column chart may be on the left, while for the line chart it may be on the right. The steps to create a column chart are as follows:

1. Select the data range A1:C5 as shown in Figure 2.42.
2. Click the **INSERT** tab. In the **Charts** group, click **Recommended Charts**. The **Insert Chart** dialog box appears (Fig. 2.43).

	A	B	C
1	Name	Weight (kg)	Height (cm)
2	Ehab	65	175
3	Deena	47	156
4	Manal	52	159
5	Pasha	59	162

Fig. 2.42 Select the data range A1:C5

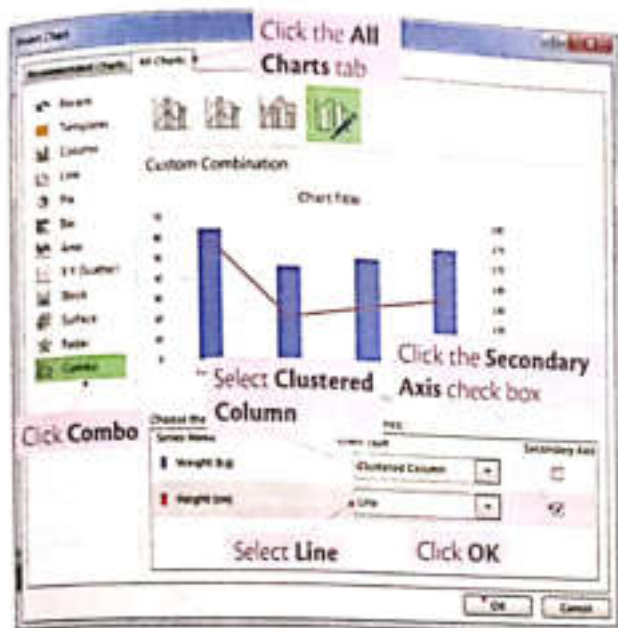


Fig. 2.43 Insert Chart dialog box

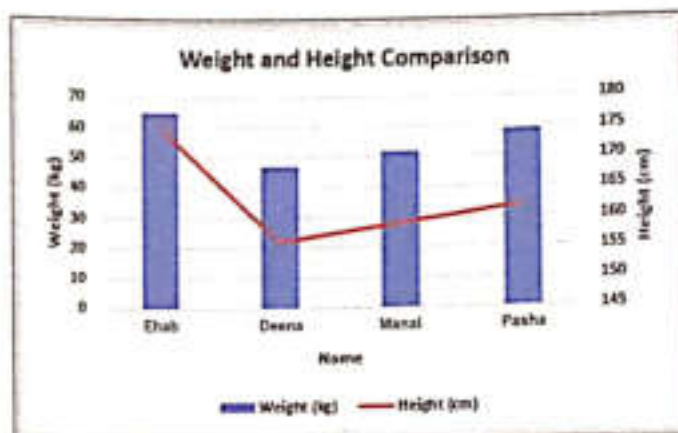


Fig. 2.44 Combo chart (Weight and Height)

3. Click the **All Charts** tab.
4. In the list of chart types, click **Combo**.
5. For the weight, select **Clustered Column** as the chart type.
6. For the height, select **Line** as the chart type and click the **Secondary Axis** check box.
7. Click **OK** to insert the chart. Give appropriate titles to the chart and the axes. The chart will look as shown in Figure 2.44.

SPARKLINES

A **sparkline** is a miniature chart embedded in a single worksheet cell. It provides a visual representation of data. There are three types of sparklines: **line**, **column**, and **win/loss**. Line and column sparklines are **compact versions** of standard line and column charts. The win/loss sparklines indicate whether a cell value is positive (a win), negative (a loss), or zero (a tie). To create a sparkline, follow these steps:

	A	B	C	D	E	F	G
1	Attendance in Percentage						
2	Roll No.	Month 1	Month 2	Month 3	Month 4	Month 5	Sparklines
3	1	86.9	90	92.4	95	91	
4	2	98	96.8	95	97	89.8	
5	3	89	91	90	89.5	89.8	
6	4	78	75	81	85	86	
7	5	80	82	85	90	91	
8	6	97	97	95	94.6	93	
9	7	88	95	89	93	91	
10	8	85	86	91.3	94.6	94	
11	9	67	69.8	76	74	72	
12	10	91	95	93	88	95	

Fig. 2.45 Selected data

1. Select the data (without the column headings) of a single row or if you are creating multiple sparklines, select all the data, i.e. B3:F12 (Fig. 2.45).
2. Click the **INSERT** tab. In the **Sparklines** group, click one of the three sparkline types—Line, Column, or Win/Loss (Fig. 2.46).
3. The **Create Sparklines** dialog box appears (Fig. 2.47).

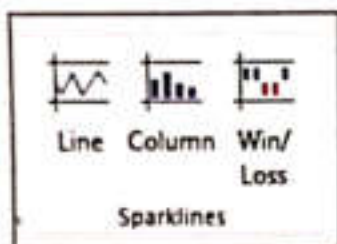


Fig. 2.46 Sparklines group on the INSERT tab

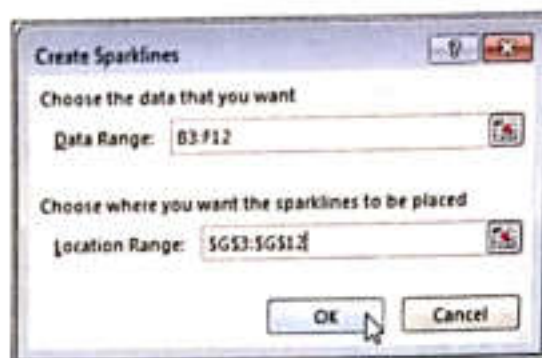


Fig. 2.47 Create Sparklines dialog box

- Specify **Location Range** as \$G\$3:\$G\$12 either by typing or selecting the required cell range. Click **OK**.
- Excel creates the **Sparklines** graphics of the type you specified (Fig. 2.48). Notice the **DESIGN** tab that appears under **SPARKLINE TOOLS** (Fig. 2.49).

	A	B	C	D	E	F	G
1	Attendance in Percentage						
2	Roll No.	Month 1	Month 2	Month 3	Month 4	Month 5	Sparklines
3	1	86.9	90	92.4	95	91	
4	2	98	96.8	95	97	89.8	
5	3	89	91	90	89.5	89.8	
6	4	78	75	81	85	86	
7	5	80	82	85	90	91	
8	6	97	97	95	94.6	93	
9	7	88	95	89	93	91	
10	8	85	86	91.3	94.6	94	
11	9	67	69.8	76	74	72	
12	10	91	95	93	88	95	

Fig. 2.48 Sparklines graphics

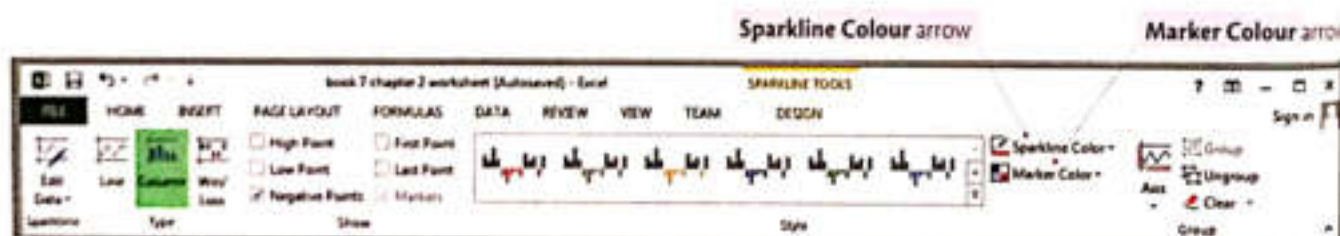


Fig. 2.49 DESIGN tab of SPARKLINE TOOLS

Top Tip

To delete sparklines, do the following:

- Select the sparklines.
- Under **SPARKLINES TOOLS**, click the **DESIGN** tab.
- In the **Group** group, click the arrow next to **Clear**.
- Click **Clear Selected Sparklines**.

	A	B	C	D	E	F	G
1	Attendance in Percentage						
2	Roll No.	Month 1	Month 2	Month 3	Month 4	Month 5	Sparklines
3	1	86.9	90	92.4	95	91	
4	2	98	96.8	95	97	89.8	
5	3	89	91	90	89.5	89.8	
6	4	78	75	81	85	86	
7	5	80	82	85	90	91	
8	6	97	97	95	94.6	93	
9	7	88	95	89	93	91	
10	8	85	86	91.3	94.6	94	
11	9	67	69.8	76	74	72	
12	10	91	95	93	88	95	

Fig. 2.50 Sparklines after changing line and marker colour

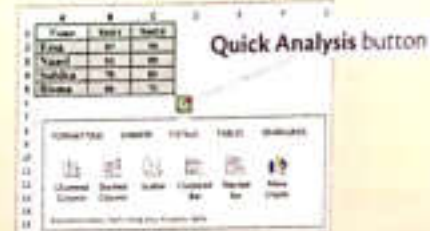
7. Now, click **Columns** in the **Type** group on the **DESIGN** tab (Fig. 2.49).
8. The **Sparklines** appear as shown in Figure 2.51.

	A	B	C	D	E	F	G
1	Attendance in Percentage						
2	Roll No.	Month 1	Month 2	Month 3	Month 4	Month 5	Sparklines
3	1	88.9	90	92.4	95	91	
4	2	98	96.8	95	97	89.8	
5	3	89	91	90	89.5	89.8	
6	4	78	75	81	85	86	
7	5	80	82	85	90	91	
8	6	97	97	95	94.6	93	
9	7	88	95	89	93	91	
10	8	85	86	91.3	94.6	94	
11	9	67	69.8	76	74	72	
12	10	91	95	93	88	95	

Fig. 2.51 Sparklines in the Column style

Top Tip

The **Quick Analysis** button can also help you draw charts and sparklines. Select the A1:C5 data range in the table shown. The **Quick Analysis** button appears at the bottom-right corner of the selection. Click **CHARTS**. You can also choose **SPARKLINES**, but in this case, the data range selected should be B2:C5.



Computer Manners



It is a good idea to label all your CDs and DVDs properly so that later you will be able to find the data you are looking for quickly and easily. Keep CDs and DVDs in proper CD-holders or cases for easy access.

Tricky Terms

Chart a pictorial representation of data

Data Table the many data points from which a chart is derived

X-axis the horizontal axis of a chart, usually the category axis

Y-axis the vertical axis of a chart, usually the value axis

Chart Area the area within which all chart components are found

Data Label a label that provides additional information about a data marker

Memory Bytes

- We can create various kinds of charts in Excel 2013, such as line charts, column charts, bar charts, doughnut charts, area charts, radar charts, scatter charts, pie charts, and 3-D surface charts.
- Column and bar charts compare values across categories. In a column chart, the category axis is horizontal and the value axis is vertical. Bar charts are similar to column charts but the category axis is vertical. Each column or bar represents a single data value from the data table.
- A doughnut chart shows the relationship of parts to the whole in a manner similar to a pie chart.
- A line chart shows change over time intervals.
- A scatter chart shows the relationships among numeric values, or plots points between x and y values.
- A chart has the following components: x-axis, y-axis, chart title, axis titles, chart area, plot area, legend, gridlines, and data label.
- When a chart is selected, two new **CHART TOOLS** tabs—**DESIGN** and **FORMAT**—appear on the ribbon.
- You can change the size of a chart by dragging its corners.
- You can move a chart to different part of the worksheet by dragging the white background.
- On the **DESIGN** tab, you can move a chart, add chart elements, change the chart layout, and the chart style.
- On the **FORMAT** tab, tools are available for formatting a chart.
- A combination chart is a single chart that consists of series which use different chart types. It may include a second value axis.
- A sparkline is a miniature chart embedded in single worksheet cell.

EXERCISES

Objective Type Questions

1. Choose the correct option.

- The chart used to plot data for a single data series.
 - Column chart
 - Pie chart
 - Scatter chart
 - Bar chart
- It provides additional information about a data point on a chart.
 - Legend
 - Data label
 - Data table
 - Gridlines
- The following **CHART TOOLS** tabs appear on the ribbon:
 - DESIGN
 - FORMAT
 - LAYOUT
 - both i. and ii.
- To move a chart to a new worksheet, click the **Move Chart** option in the _____ group.
 - Data
 - Type
 - Location
 - Chart Styles
- These shortcut buttons appear at the top-right corner of a chart.
 - Chart Elements
 - Chart Styles
 - Chart Filters
 - all of these

Descriptive Type Questions

1. Answer the following.

- Describe all the possible components of a chart.
- What is a combo chart? How will you create a combo chart?
- What is a sparkline? How is it different from a chart?
- How will you delete sparklines?
- What do you understand by the **Quick Analysis** button? Write the steps to create a bar chart using the **Quick Analysis** button.
- Which type of comparison chart could you use for each of the following? State a reason for your choice.
 - the number of boys and girls studying in a school over the last five years
 - the increase in the price of an ice cream at the same shop in the last three years
 - the average time spent by each student eating, studying, and watching television
- Evaluate the statement: 'Chart formatting options in Excel 2013 are excessive. A few would have been enough.'
- Collect the required information from at least 5 of your classmates to create an Excel sheet to record their marks in English, Science, Mathematics, and Computer Science. Create at least three different types of charts to display this data. Make sure you use the chart formatting options in Excel 2013.

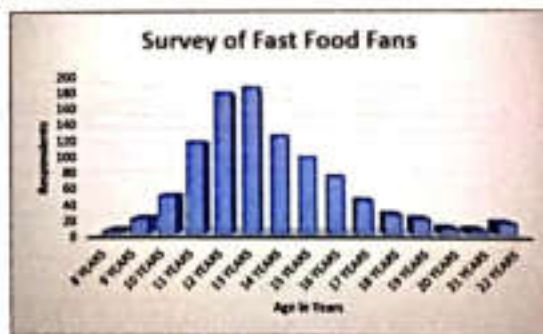
Application-Based Questions

- Murtaza wants to create a chart for the data given alongside. But he does not know which chart is suitable for the data.

	Pass Percentage
Year 1	98.7
Year 2	99.2
Year 3	97.8

- What option should he click in the **Charts** group on the **INSERT** tab?
- List the steps to create a suitable chart.

- Consider the column chart on the right of a survey of fast food fans in different age groups.



- Name the age group having the maximum number of fast food fans.
- Name the age groups where the number of respondents is less than 60.

- Mohid has drawn a column chart for the data on the right. But, later on he decided that a line chart would be better than a column chart.

Class	Boys	Girls
VI	32	18
VII	41	9
VIII	27	23
IX	35	15
X	29	21

- What should he do to change the chart type?
- How can he move the chart to a new worksheet?

- d. Rehan does not have much time to create a chart for a presentation.
- What is the shortcut method of creating a chart?
 - Write the steps to draw a pie chart using the method suggested in step i.

Marks	No. of Students
91–100	20
81–90	13
71–80	10
61–70	5
0–59	2



IN THE LAB

1. Fatima's father owns a garment factory. He wants her to draw a pie chart for the data given below;

Region	Sales (in Lacs)
North	20
East	15

Region	Sales (in Lacs)
South	30
West	18

The pie chart should show the percentage of sales in the four regions. Use **Quick Layout** and **Chart Styles** on the **DESIGN** tab to format the pie chart. Write the steps to do this task.

2. Saad's father runs a computer coaching centre. He wants Saad to draw a column chart but he drew a bar chart for the data given on the right. Using the **Change Chart Type** feature, convert the bar chart into a column chart:
Write the steps to do the above task.

Course	No. of Students	
	Full Time	Part Time
Multimedia	26	6
Hacking	20	3
Networking	15	5
Business Computing	10	2
Computer Science	25	5

3. The science teacher has asked the students of class VII to create a combo chart for the data given below.

Month	Temperature (in Fahrenheit)	Precipitation (in Inches)
Jan	15	18
Feb	27	12
Mar	45	32
Apr	58	29
May	64	21
Jun	72	6
Jul	79	10
Aug	83	15
Sep	78	12
Oct	57	8
Nov	42	10
Dec	33	10

- Help them create the chart in a new sheet named **Combo chart**.
- Add a chart title, axis titles, and a legend to the chart.
- Apply **Text Fill** and **Shape Fill** features to the chart.

- The Computer Science teacher has asked Maham to create column sparklines for the data given in the worksheet on the right.

Help her to create the chart and also change the colour to one of her choice.

	Sales in Lacs			
Name	Quarter I	Quarter II	Quarter III	Quarter IV
Safdar	13	18	25	20
Anoosha	15	20	19	21
Naufil	22	25	29	31
Deena	21	17	24	22
Waqar	28	25	21	18
Naael	30	32	25	28
Darwish	27	30	32	29

GROUP PROJECT

Scattering pies and doughnuts! How are scatter charts, pie charts, and doughnut charts used? Carry out some research and see what amusing uses you can find. (You can, of course, create your own!) Gather together your findings and present them to the rest of your class. Select the best way to present your research to have the maximum impact (PowerPoint?). You want everyone to remember the important differences. (Try presenting your data in the wrong chart and who knows what it will look like! But you will make the point that it is important to select the correct graph style to go with the data being displayed).

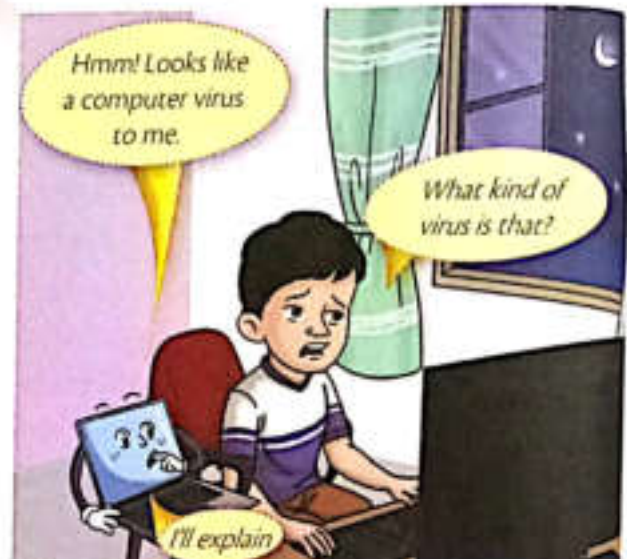


TEACHER'S NOTES

- Discuss how pictorial representation of data is helpful and why charts are important.
- Explain the different types of charts and help the students get a good idea of what chart type is suitable for what type of data.
- Demonstrate how to draw a graph and show its various components.
- Give students time to practice charts and explore various chart options on their own.

Chapter 3

Computer Viruses



A computer virus is a software program that has the ability to make copies of itself, and to attach itself to other programs or files.

A virus may or may not be destructive. In some cases, viruses can erase data or corrupt programs on the computer. Viruses are written by expert computer programmers and are intended to run on computer systems without the user's knowledge.

In the same way that biological viruses enter our body and attack certain cells, computer viruses enter a computer system and attach themselves to an item like the startup area (boot record) or an executable file (a file with a .exe extension).

Most viruses stay active in the memory until you turn off the computer. When you do so, the virus is removed from the computer's memory, but not from the file(s) or the disk it has infected. So, the next time you use your computer the virus program is activated again. It may then attach itself to more programs and/or files.

In this Chapter

- What Does a Computer Virus Do?
- Types of Computer Viruses
- Malware
- Preventing Virus Infections
- Antivirus Software

WHAT DOES A COMPUTER VIRUS DO?

A virus tries to take control of the computer system it has infected. It makes copies of itself and tries to carry out the often harmful tasks that it is programmed to do. This process can happen so quickly that the user is not even aware that a virus is present in the computer. Some viruses are programmed to activate themselves at a certain date/time. Such viruses check the system clock continuously, and create havoc when the set time or date arrives.



Viruses can also infect new files created on the infected computer, or the contents of USBs (or any removable storage media) that are inserted into such a computer. They attach copies of themselves to these new files and/or files on the storage media.

What a Virus Can Do

Different viruses do different things. A computer virus could be capable of any of the following:

- It can infect executable program files such as word processors, spreadsheets, and operating systems.
- It can infect disks by attaching itself to special programs on the hard disk, called boot records. These are the programs that the computer uses to start itself up.
- It can infect files that are attached to email messages or copied to disks and USBs. In this manner, it can spread from one computer to another.

What a Virus Cannot Do

There are certain things no program can do. A computer virus is a program; hence, it cannot do the following:

- It cannot infect files on write-protected discs, such as CD-ROMs.
- It cannot infect computer hardware such as monitors and keyboards. It infects only software.

Warning Signals

When you experience strange behaviour such as screen distortion, or characters not appearing on the screen when typed, then it is possible that a virus has affected the programs that control the display or the keyboard. If you are unable to open files, probably a virus is responsible. The computer's hard disk is not physically damaged, but the data and programs stored on it may be corrupted or damaged.



Did you Know?



Commwarrior-A was the first known cell phone virus. It appeared in March 2005.

Here are some of the most common signs of a virus attack:

- The computer runs slower than normal.
- Applications take longer to load or do not work properly.
- Unusual error messages appear on the screen.
- You notice changes in file size.
- You notice that the hard disk has more files than it had earlier.
- The computer often freezes or stops responding.
- The computer restarts on its own.
- You see distorted menus and dialog boxes.

Did you Know?

A Class 9 student, Richard Skrenta, wrote the computer virus **Elk Cloner** in 1981. It attached itself to Apple II computers and spread via floppy disks. Every 50th time that the computer booted, the virus made the computer display a short poem that began with the words 'Elk Cloner: The program with a personality'.

How Does a Computer Virus Spread?

Computer viruses spread from one computer to another by the transfer of infected data through emails, USBs, or other sources.

Viruses become active when you start an infected application or start your computer from a disk that has infected system files. Once the virus is in the computer's memory, it usually infects any application you run.

Different viruses behave in different ways. Some stay active in the memory until the computer is shut down. Others stay active only as long as the infected application is running.

TYPES OF COMPUTER VIRUSES

Computer viruses can be categorised in different ways. One of them is by their **infection targets**. If we group viruses by their target, we can divide viruses into the following categories:

Program Viruses

Program viruses infect program files which have extensions like .COM, .EXE, .SYS, .DLL, .OVL, and .SCR. Program files are attractive targets for computer viruses because they are widely used and have relatively simple formats to which viruses can attach themselves. The virus becomes active when the infected file is executed.

Examples of program viruses are Acid Rain, Alien.298, Amoeba.A, Crazy.A, Umbrella.3173, Sunday, and Cascade.



Boot Viruses

Boot viruses infect the boot records of hard disks and floppy disks. Generally, boot viruses are considered more dangerous than program viruses.

Examples of boot viruses are Danish Boot, Devil.941, Eek (b), Disk Killer, Michelangelo, and Stoned virus.



Macro Viruses

A **macro** is a set of commands written by the user to be executed later. For example, if you execute a set of commands often in MS Excel or MS Word, you can save that set of commands as a macro.

A macro virus uses the macro language for its program. These viruses infect data files. For example, MS Word and MS Excel files are susceptible to macro virus attacks, as these programs allow the use of macros. Macro viruses spread rapidly, as users share infected documents. Examples of such viruses are Melissa, Concept, and Nuclear.



Did you Know?

Melissa Virus was released on 26 March 1999 and was designed to infect macros in documents used by MS Word 97 and 2000. It propagated by emailing itself to the first fifty addresses in the address book of MS Outlook (the email program that is a part of MS Office).

MALWARE

Malware is short for **malicious software**. The word refers to any program that infiltrates and harms a computer without the user's consent.

Malware is a general term that includes computer viruses, worms, Trojan horses, spyware, and spam. Malware can slow down computers and networks; it can be annoying, or it can be actively destructive.



Worms

A **computer worm** is a program capable of reproducing and spreading itself to another computer system, usually by means of a computer network.

Worms spread without any human action, and thus differ from viruses. Viruses spread only when the user does something, like running an infected program or attaching an infected file.

A worm emails copies of itself to other computers, infects them, and then uses the address book of the infected computer to spread further.

Computer worms usually do not cause direct damage to programs and files. However, they consume large amounts of memory and/or network bandwidth, thus slowing down the computer and making it almost impossible for the user to work. Examples of computer worms are CodeRed, Sircam, and ILOVEYOU.



Trojan Horses

A **Trojan horse** is a program that appears useful, but is actually programmed to pass the user's data to someone else.

Trojan horses attempt to steal and pass on confidential information such as passwords and credit card numbers. They do not reproduce by infecting other files or by self-replicating like viruses and worms.

A Trojan horse enters a computer system because a user installs it under the wrong impression that it is a useful and harmless program. When a Trojan horse is activated, it typically changes existing desktop icons or creates new ones.

It may also delete important system files. Its main aim, however, is to steal sensitive information stored on the infected computer. Some popular Trojan horses are Netbus, SubSeven, Beast, and Zeus.



Spyware

Spyware refers to computer programs that secretly gather information about the user and relay it to advertisers or other interested parties. They are also called spybots or tracking software.

Spyware is often installed without the user's consent when:

- The user downloads something from the Internet.
- The user clicks on something in a popup window that appears while browsing.

Spyware can consume a lot of memory, making the computer very slow and difficult to work with. The biggest problem with spyware is that it can steal your information and misuse your computer.



Spam

Spam refers to unsolicited, unwanted email. It may carry advertisements or serve as a means of spreading malware like viruses and worms. Some ways of avoiding spam are:

- Do not give your email address to unknown people.
- Use the spam filter of your email program to block unwanted emails.
- Delete spam mails without reading them.



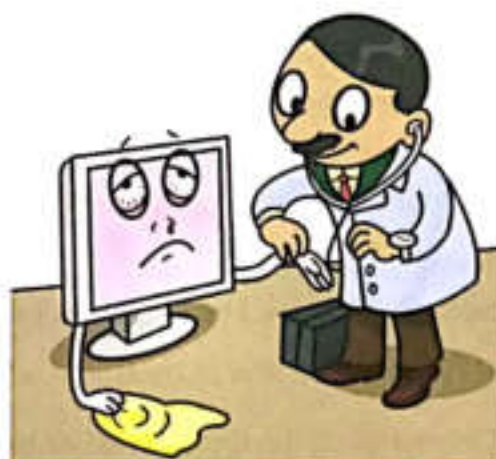
PREVENTING VIRUS INFECTIONS

Here are some basic rules to avoid virus infections:

- Restrict access to your system, both offline and online.
- Only allow trustworthy users to use the system.
- Never use an unknown disk in your system unless it comes from a trustworthy source and you are sure that it is virus-free.
- Install and use antivirus software and keep it updated.
- Keep programs and data on separate disks, if possible.
- Scan the files that you download from the Internet.
- Never click on a link or attachment in an email, unless the email is from a trusted source.
- Install an anti-spyware program that operates against malware and spyware and keep it updated. Examples of such programs are Ad Aware SE and Windows Defender.
- Install a free firewall program to help block unwanted Internet traffic that can cause problems. Make sure that the firewall is always on.
- If you get a malicious script from a web page and you do not know what to do, or if a window appears asking if you want to allow an automatic install, click NO.

Top Tip

Since no security method is perfect, it is important to back up your files regularly.



Did you Know?

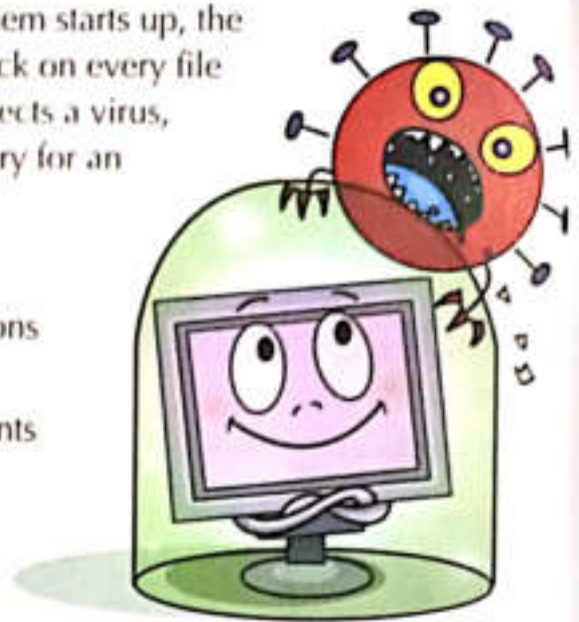
A firewall is a software program that helps keep out hackers, viruses, and worms that try to infect your computer over the Internet.

ANTIVIRUS SOFTWARE

Antivirus software refers to applications designed to detect and remove viruses from computer systems. However, certain types of viruses are difficult to remove and the files damaged by

them may be lost forever. Whenever the computer system starts up, the antivirus software starts automatically and keeps a check on every file that is opened or run and on all Internet traffic. If it detects a virus, it will try to remove the virus. The following is necessary for an antivirus program to be effective:

- It should run in the background at all times.
- It should be kept updated so it recognises new versions of malicious programs.
- It should have the capability to scan email attachments and files as they are downloaded from the Internet.
- The user should run full disk scans periodically. This checks all the files on a computer system.



Some popular antivirus programs are:

- McAfee VirusScan
- Norton AntiVirus
- Kaspersky AntiVirus
- Quick Heal Total Security
- Microsoft Security Essentials

Quick Heal AntiVirus

Let us study the Quick Heal Total Security system in more detail to understand how an antivirus program helps to secure your system.

To start Quick Heal Total Security, click **Start** ▶ **All Programs** ▶ **Quick Heal Total Security** ▶ **Quick Heal Total Security**.

Or

Double-click the **Quick Heal Antivirus** icon in the Windows system tray.

Or

Right-click the **Quick Heal Antivirus** icon in the Windows system tray and select **Open Quick Heal Total Security**.

Quick Heal main Window

The Quick Heal Total Security main window appears (Fig. 3.1).



Fig. 3.1 Main window of Quick Heal Total Security

The main window has three sections:

- The top section has the following menu options:

Settings	Enables you to customise and configure settings. You can decide settings for automatic update, full system scan, etc.
Tools	Includes various tools, such as clean-up and restore tools and a track cleaner. These tools prevent virus infection and help diagnose problems.
Reports	Allows you to view the activity reports of the Scanner, Virus Protection, etc.
Help	Provides information on how to use Quick Heal Antivirus and provides details about the version, virus database, etc.

- The middle section deals with protection options. Some of the options are:

Files and Folders	Helps you configure settings that protect files and folders against threats.
Emails	Allows you to configure settings related to threats that arrive by email, trusted email clients, and protection from spam.
Internet & Network	Enables you to configure settings for protecting the system when you are online.
External Drives & Devices	Allows you to configure settings related to threats from CDs, USB, external disks, etc.

- The bottom section has the following options:

News	Provides you with the latest news from Quick Heal.
Scan	This provides various scanning options, like Full System Scan, Custom Scan, Memory Scan, and Boot Time Scan.

System Scanning

To perform a full system scan, click **Scan** ▶ **Full System Scan**. The scan process will begin (Fig. 3.2).

The scan statistics and reports are provided upon completion of the scan (Fig. 3.3). Review the scan report and click **Close**.



Fig. 3.2 Full system scan in progress



Fig. 3.3 Scan statistics and reports

Updating Virus Definitions

By **virus definitions** we mean the database of viruses that an antivirus software scans for. This database needs to be updated regularly, because new viruses are being developed and released all the time. If the virus definition file is not updated, antivirus software will not know about new viruses and will not be able to catch them.

Updates for **Quick Heal Total Security** are posted regularly on its website. These updates contain information for the detection and removal of newly discovered viruses. By default, **Quick Heal Total Security** is set to update itself automatically from the Internet without the user's intervention. The only requirement is that the computer should be connected to the Internet.

Free Antivirus Software

Nowadays, free antivirus programs such as AVG and Avast are becoming popular. **Microsoft Security Essentials** is another free security application that many people use. **Microsoft Security Essentials** comes free with genuine Windows operating system. You can use **Microsoft Security Essentials** to protect your computer against viruses, spyware, and other malicious programs. It is easy to install and use, and it runs efficiently in the background. Updates happen automatically.

Top Tip

Before installing any antivirus software, it is preferable to uninstall any other antivirus software already running on your computer. Running more than one antivirus program on a computer may negatively affect the performance of the computer.

Tricky Terms

Computer Virus a software program that has the ability to make copies of itself and to attach itself to other applications or files

Antivirus Software an application designed to

detect and remove viruses from computer systems

Virus Definitions the database of viruses that an antivirus software scans for

Memory Bytes

- Computer viruses usually intend to harm a computer system without the user's knowledge. A virus only affects software and not hardware.
- Computer viruses spread from one computer to another when infected files are transferred through emails, floppy disks, or other means.
- Based on their target, computer viruses are of three types: program viruses, boot viruses, and macro viruses.
- A virus infection can be prevented by following a few basic rules, including the use of a good antivirus program.
- Virus definitions should be updated regularly so that the antivirus software can detect new viruses.



EXERCISES



Objective Type Questions

1. Choose the correct option.

- a. A computer virus may be capable of
 - i. Infecting executable files.
 - ii. Infecting disks by attaching itself to special programs on the hard disk, called boot records.
 - iii. both i. and ii.
 - iv. none of the above
- b. Which of the following are the signs of a virus attack?
 - i. The computer runs slower than normal.
 - ii. There is a change in file size.
 - iii. The computer restarts on its own.
 - iv. all of the above
- c. A computer virus can spread through
 - i. Emails
 - ii. USB
 - iii. Both i. and ii.
 - iv. none of these
- d. Program viruses infect files that have the extension
 - i. .COM
 - ii. .EXE
 - iii. .SYS
 - iv. all of these
- e. Which of the following is a boot virus?
 - i. Michelangelo
 - ii. Sunday
 - iii. Acid Rain
 - iv. none of these
- f. Which of the following are infected by a macro virus?
 - i. .exe files
 - ii. Boot records
 - iii. Data files
 - iv. none of these
- g. refers to computer programs that secretly gather information about the user and relay it to other interested parties.
 - i. Worm
 - ii. Spyware
 - iii. Virus
 - iv. none of these
- h. refers to unsolicited mail.
 - i. Spam
 - ii. E-mail
 - iii. Mail
 - iv. none of these

Descriptive Type Questions

1. Answer the following.

- a. Name the type of virus that infects data files.
- b. What is the name given to a database of viruses that an antivirus software scans for?
- c. Define a computer virus. How can it harm your computer?
- d. Mention any three precautions you should take for protecting your computer from virus infections.
- e. How does a computer virus spread from one computer to another?
- f. Analyse how boot, macro, and program viruses affect the workings of your computer. Which in your opinion is more harmful? Give reasons for your answer.

- g. McAfee Virus Scan and Microsoft Security Essentials are two popular anti-virus programs. Find out more about their features and justify why you would choose one over the other.
- h. On page 45 of Keyboard Book 7 there is a list of a number of measures you can take to prevent virus infections. Create a fun chart to show how each of these measures helps your computer system.

Application-Based Questions

- a. Sania noticed a few unwanted mails in her email inbox.
 - i. What is the term given to such mails?
 - ii. How can these mails harm her computer?
 - iii. Mention two ways she can avoid such mails.
- b. Dawood noticed some strange behaviour when he switched on the computer. He noticed that unusual error messages were appearing on the screen, and that the computer was running slower than normal.
 - i. What must have happened to the computer?
 - ii. Mention two other signs of that event.
 - iii. Suggest two basic rules which will help Dawood avoid such an event.
- c. Imran's computer is infected by a computer virus. His teacher suggested that he should install a special type of software to detect the virus and then remove it.
 - i. What is the name given to that special software?
 - ii. Give any two examples of such software.
 - iii. Mention any two points that should be followed to keep that special program effective.
- d. Identify the types of viruses that infect the following types of files:
 - i. .EXE
 - ii. An Excel document
 - iii. Boot records of a hard disk



IN THE LAB

1. Irfan has learnt in school how to scan a computer using an antivirus software. He can now easily scan his computer at home for viruses. Scan your computer too, using an antivirus software. Mention the name of the antivirus software you have used, the options available in the program, and the results you got.
2. Nashrah has been asked by her computer teacher to create a presentation on 'Types of Computer Viruses'. Help her create a presentation of five slides.
3. Ghazanfar's father wants to purchase an antivirus software. He has asked Ghazanfar to search for various antivirus software using the Internet. Help him collect the required information and create a presentation on at least five different antivirus software.

4. The students of Class VII have been asked to make a project report on 'Computer Viruses' giving details of what computer viruses are, how they spread, what should be done to protect computers from viruses, etc. Make a similar report in Word 2013.

GROUP PROJECT

Malware alert! It is always best to know what malwares do and know how to prevent them. Find out as much as you can about three different malwares. (Be careful not to get attacked in the process!) How do they work and what damage can they cause? Are there examples of damage caused? How can they be stopped and prevented? It is important to make others aware of your findings. Create your own style of presentation about your findings. It needs to be memorable – perhaps some role play would help?

TEACHER'S NOTES

- The importance of using antivirus software and the importance of updating virus definitions could be explained.
- It would be useful to discuss in class the different methods employed by cyber criminals and how to successfully avoid becoming a victim.
- A demonstration of how to scan a computer using an antivirus software and how to update virus definitions could also be useful.

Chapter 4

Loops and Graphics in Small Basic



In class 6, you have already learnt about some statements in Small Basic. This chapter will discuss looping statements and the **graphics** features available in Small Basic.

In computer programming, a **loop** is used to repeat a block of statements a number of times.

There are two looping statements available in Small Basic:

- For...EndFor
- While...EndWhile

For...EndFor

The **For...EndFor** statement provides an easy way to create a loop. It is used to repeat a block of statements a specified number of times. This looping statement is preferred when the number of repetition is known.

In this Chapter

- For...EndFor
- While...EndWhile
- GraphicsWindow

Consider the following program to print the numbers 1 to 5:

```
For A = 1 To 5
    TextWindow.WriteLine (A)
EndFor
```

Explanation

1. Initially the variable A is assigned the start value 1.
2. The computer checks whether the value of variable A is less than or equal to the end value 5. If true, it executes the statements between **For** and **EndFor**. Then the value of variable A is incremented (i.e. increased) by 1. The computer again checks the value of variable A.
3. If false, it gets out of the **For...EndFor** looping statement.

The output will appear as shown in Figure 4.1.

The step-by-step execution of the program can be explained as given below.

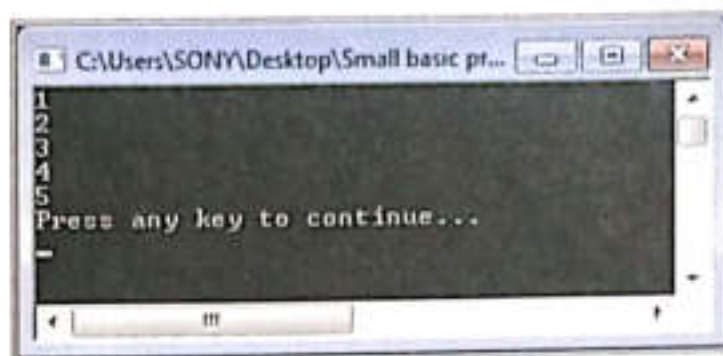


Fig. 4.1 Output of **For...EndFor** loop

A	Condition	True or False	What happens?
1	1 <= 5	T	The statement between For...EndFor is executed. The value of A (1) is printed on the screen. The value of A is increased by 1, becomes 2.
2	2 <= 5	T	The statement between For...EndFor is executed. The value of A (2) is printed on the screen. The value of A is increased by 1, becomes 3.
3	3 <= 5	T	The statement between For...EndFor is executed. The value of A (3) is printed on the screen. The value of A is increased by 1, becomes 4.
4	4 <= 5	T	The statement between For...EndFor is executed. The value of A (4) is printed on the screen. The value of A is increased by 1, becomes 5.
5	5 <= 5	T	The statement between For...EndFor is executed. The value of A (5) is printed on the screen. The value of A is increased by 1, becomes 6.
6	6 <= 5	F	The For...EndFor loop ends

Step

If you want the variable value to be incremented by some number other than 1 (may be positive or negative), you can use the **Step** command in the **For** statement.

Consider the following code:

```
For A = 1 To 20 Step 3
    TextWindow.WriteLine (A)
EndFor
```

Here, the value of A is incremented by 3 after every loop. The output is shown in Figure 4.2. If you do not use **Step**, the value of A is incremented by the default value of 1.



Fig. 4.2 Output of For...EndFor with Step

The step value can also be a negative number. In this case the start value is greater than or equal to the end value. Consider the following code:

```
For A = 20 To 1 Step -4
    TextWindow.WriteLine (A)
EndFor
```

The output will appear as seen in Figure 4.3.



Fig. 4.3 Output of For...EndFor with negative Step

You can also use a decimal number as the step value. Consider the following code:

```
For A = 1 To 5 Step 0.5
    TextWindow.WriteLine (A)
EndFor
```

The output will appear as shown in Figure 4.4.



Fig. 4.4 Output of For... EndFor with a decimal number in Step

EXAMPLE 1

Write a Small Basic program to print the sum of the first N natural numbers. The value of N is entered by the user.

SOLUTION

```
TextWindow.Write("Enter the number ")
Number = TextWindow.ReadNumber()
S = 0
For I = 1 To Number
    TextWindow.WriteLine (I)
    S = S + I
```

```
EndFor
TextWindow.WriteLine(" ")
TextWindow.WriteLine("Sum of first "+
Number +" Natural numbers = " + S)
```

The output will appear as given in **Figure 4.5**.

while...EndWhile

The **While...EndWhile** loop is used when the loop count is not known beforehand. The condition after **While** evaluates to either true or false.

The statements between **While...EndWhile** loop are repeatedly executed until the condition becomes false.

Consider the following code to print the numbers 1 to 15 incremented by 4.

```
Number = 1
While Number <= 15
    TextWindow.WriteLine (Number)
Number = Number + 4
EndWhile
```

The output will appear as seen in **Figure 4.6**.

Let us understand the step-by-step execution of this program.

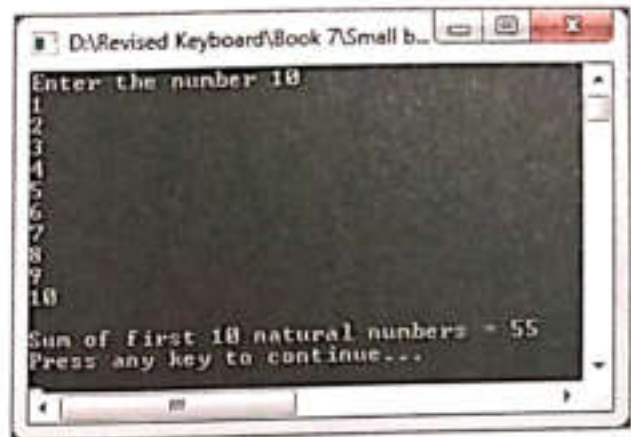


Fig. 4.5 Output of Example 1



Fig. 4.6 Output of **While...EndWhile** loop

	Condition	True or False	What happens?
1	1 <= 15	T	The statement between While...EndWhile is executed. The value of Number (1) printed on screen. The value of Number is increased by 4, becomes 5.
2	5 <= 15	T	The statement between While...EndWhile is executed. The value of Number (5) printed on screen. The value of Number is increased by 4, becomes 9.
3	9 <= 15	T	The statement between While...EndWhile is executed. The value of Number (9) printed on screen. The value of Number is increased by 4, becomes 13.
4	13 <= 15	T	The statement between While...EndWhile is executed. The value of Number (13) printed on screen. The value of Number is increased by 4, becomes 17.
5	17 <= 15	F	The statement While...EndWhile ends.

EXAMPLE 1

Anna wants to write a program to print the square and cube of numbers 5 to 9. Can you help her with the program code?

SOLUTION

```
i = 5
TextWindow.WriteLine ("Number " + "Square " + "Cube")
While i <= 9
    S = i * i
    C = i * i * i
    TextWindow.Write (" " + i)
    TextWindow.Write (" " + S)
    TextWindow.WriteLine (" " + C)
    i = i + 1
EndWhile
```

The output is shown in Figure 4.7.

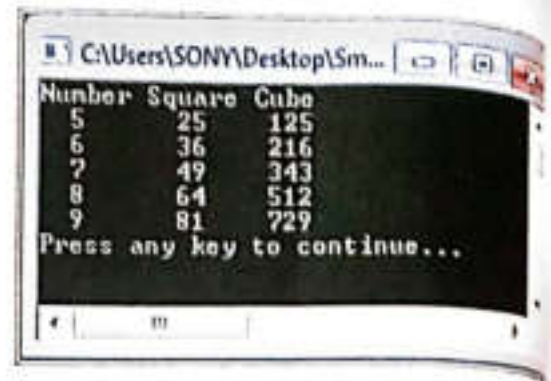


Fig. 4.7 Output of Example 1

EXAMPLE 2

Azam wants to write a program to print the reverse of a number entered by the user. What would be the code for this program?

SOLUTION

```
TextWindow.Write("Enter the number ")
Number = TextWindow.ReadNumber()
OriginalNumber = Number
RevNumber = 0
While Number <> 0
    R = Math.Remainder(Number,10)
    RevNumber = RevNumber * 10 + R
    Number = Math.Floor(Number/10)
EndWhile
TextWindow.WriteLine(" ")
TextWindow.WriteLine("Original Number = " + OriginalNumber)
TextWindow.WriteLine("Reverse Number = " + RevNumber)
```

The output will appear as shown in Figure 4.8.

Till now, we have worked with the TextWindow object, which is used for input and output of text-based information. Let us now take up the GraphicsWindow object.

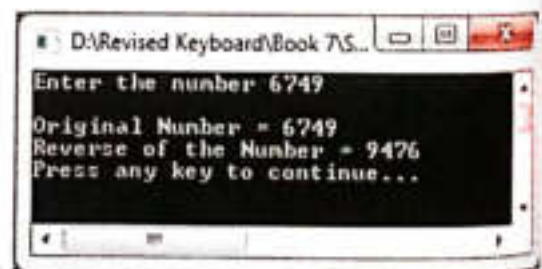


Fig. 4.8 Output of Example 2

GraphicsWindow

The `GraphicsWindow` object is used to draw lines, shapes, and text in many colours. The coordinates used by the graphics window are shown in Figure 4.9.

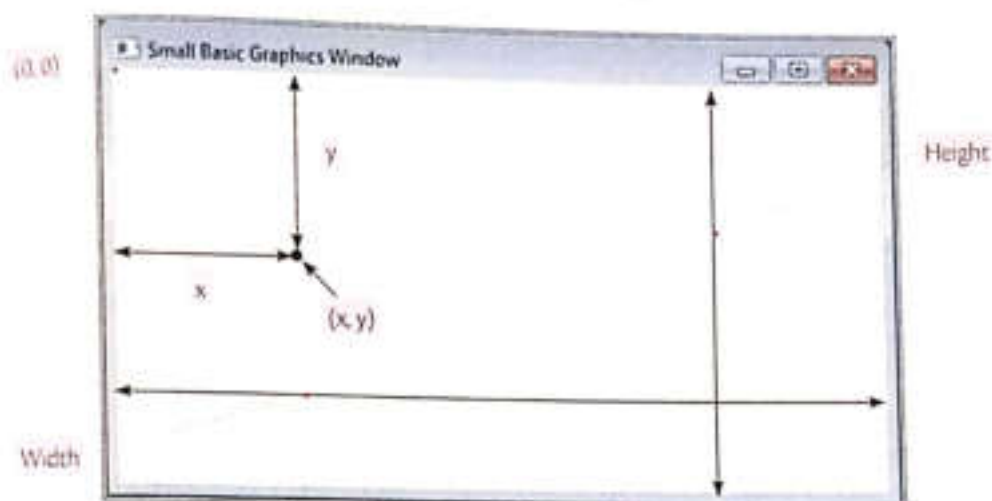


Fig. 4.9 The Graphics Window in SmallBasic

The window is **Width** pixel wide and **Height** pixels high. The two values of the coordinates identify the pixel in the window. At the top left corner, the x and y coordinates are (0,0). The x co-ordinate increases from left to right. The y co-ordinate increases from top to bottom. The properties of the graphics window with their default values are given below.

GraphicsWindow Properties with Examples	Explanation	Default Value
<code>GraphicsWindow.Width = 400</code>	It sets the width of the graphics window to 400 pixels.	624
<code>GraphicsWindow.Height = 600</code>	It sets the height of the graphics window to 600 pixels.	444
<code>GraphicsWindow.Title = " Example Program"</code>	It sets the title of the graphics window to Example Program	Small Basic Graphics Window
<code>GraphicsWindow.BackgroundColor = "Yellow"</code>	It sets the background colour of the graphics window to yellow	White
<code>GraphicsWindow.PenColor = "Red"</code>	It sets the colour of the pen used to draw shapes on the graphics window to red.	Black
<code>GraphicsWindow.PenWidth = 3</code>	It sets the width of the pen used to draw shapes on the graphics window to 3.	2
<code>GraphicsWindow.BrushColor = "Pink"</code>	It sets the colour of the brush which is used to fill shapes drawn on the graphics window to pink.	SlateBlue

You can also type text in the graphics window. The font used to type text in the graphics window is specified by four different properties as mentioned below.

GraphicsWindow Properties with Examples	Explanation	Default Value
GraphicsWindow.FontName = "Arial"	It sets the font to Arial.	Tahoma
GraphicsWindow.FontSize = 22	It sets the font size to 22.	12
GraphicsWindow.FontBold = "true"	It has two values—true and false. The true value formats the font in bold.	true
GraphicsWindow.FontItalic = "true"	It has two values—true and false. The true value formats the font in italics.	false

Graphics Window Methods

The methods (or commands) allowed in the graphics window are the following:

Methods	Explanation
DrawLine (x1, y1, x2, y2)	It draws a line from one point (x1, y1) to another (x2, y2) using the current pen.
DrawRectangle (x, y, w, h)	It draws a rectangle (width w, height h) on the screen at (x, y) using the current pen.
DrawTriangle (x1, y1, x2, y2, x3, y3)	It draws a triangle using three points and the current pen.
DrawEllipse (x, y, w, h)	It draws an ellipse (width w height h) at (x, y) on the screen using the current pen.
FillRectangle (x, y, w, h)	It fills the rectangle (width w, height h) on the screen at (x, y) using the current brush.
FillTriangle (x1, y1, x2, y2, x3, y3)	It fills the triangle connecting the three points on the screen using the current brush.
FillEllipse (x, y, w, h)	It fills an ellipse (width w, height h) on the screen at (x, y) using the current brush.
DrawText (x, y, text)	It draws a line of text on the screen at the specified location (x, y) using brush and font properties.

EXAMPLE 1

Write a program to print "Fun with Graphics Window" in "Blackadder ITC" font, size 40, bold and italic, and blue colour on the output screen. The width and height of the window should be 440 pixels and 150 pixels, respectively, with pink as the background colour.

SOLUTION

```
GraphicsWindow.Width = 440
GraphicsWindow.Height = 150
GraphicsWindow.BackgroundColor = "Pink"
GraphicsWindow.FontName = "Blackadder ITC"
GraphicsWindow.FontSize = 40
GraphicsWindow.FontBold = "true"
GraphicsWindow.FontItalic = "true"
GraphicsWindow.Brushcolor = "Blue"
GraphicsWindow.DrawText(20, 40, "Fun with Graphics Window")
```

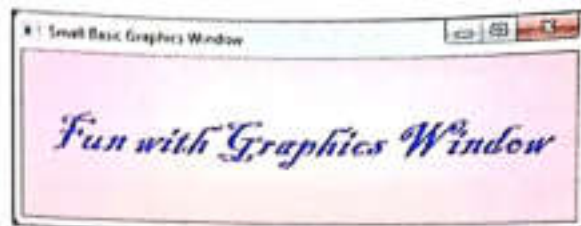


Fig. 4.10 Output of Example 1

The output will appear as shown in Figure 4.10.

EXAMPLE 2

Write a program to draw lines in red colour of differing width in the output window. The width and height of the window should be 400 pixels and 420 pixels, respectively, with greenish yellow as the background colour.

SOLUTION

```
GraphicsWindow.Title = "Lines of Different Width"
GraphicsWindow.Width = 400
GraphicsWindow.Height = 420
GraphicsWindow.BackgroundColor = "GreenYellow"
GraphicsWindow.PenColor = "Red"
y1 = 20
y2 = 20
For I = 1 To 10 Step 0.5
    GraphicsWindow.PenWidth = I
    GraphicsWindow.DrawLine (30, y1, 380, y2)
    y1 = y1 + 20
    y2 = y2 + 20
EndFor
```



Fig. 4.11 Output of Example 2

The output will appear as given in Figure 4.11.

EXAMPLE 3

Create a program that draws a circle with a red border and Lime as the fill colour. The background colour of the window is Coral. The text "Circle" should be printed below the figure.

SOLUTION

```
GraphicsWindow.Title = "Circle"  
GraphicsWindow.Width = 400  
GraphicsWindow.Height = 290  
GraphicsWindow.BackgroundColor =  
"Coral"  
GraphicsWindow.PenWidth = 4  
GraphicsWindow.PenColor = "Red"  
GraphicsWindow.DrawEllipse(100, 20,  
200, 200)  
GraphicsWindow.BrushColor = "Lime"  
GraphicsWindow.FillEllipse (100, 20,  
200, 200)  
GraphicsWindow.FontSize = 36  
GraphicsWindow.FontBold = "true"  
GraphicsWindow.FontItalic = "true"  
GraphicsWindow.DrawText(140, 240, "Circle")
```

The output will appear as shown in Figure 4.12.

Note: The **Ellipse** command is used to draw a circle; thus, in this case, the width and height will be equal.

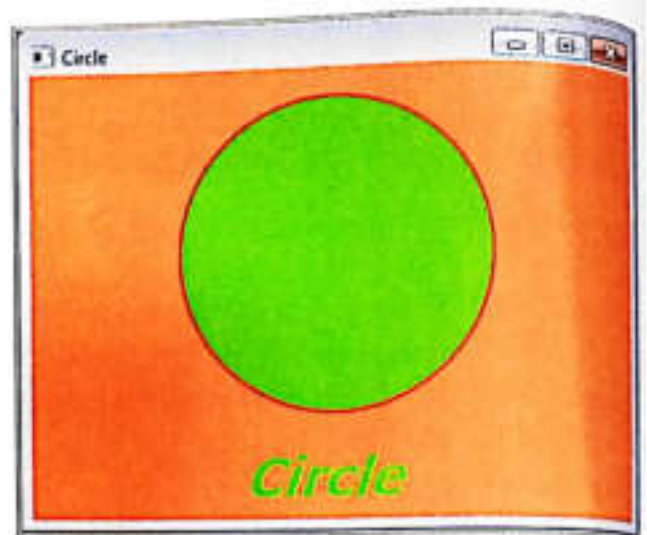


Fig. 4.12 Output of Example 3

PRACTICE TIME



The Computer Science teacher wants the students of Class VII to write a program in Small Basic that will draw a blue-coloured triangle with a yellow border. The background colour of the window should be green. Also the text "Triangle" should be printed below the figure. Can you help them with the code?

SOLUTION

Let us give the title "Triangle" to the graphics window and take the width and height of the window as 400 pixels and 300 pixels, respectively. The code would be written as follows:

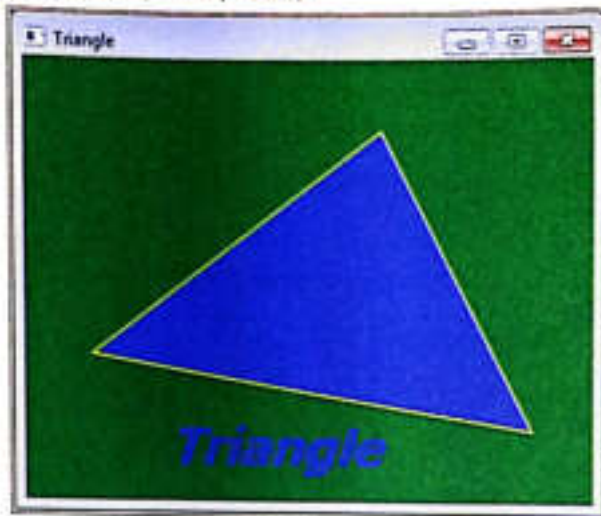
```
GraphicsWindow.Title = "Triangle"  
GraphicsWindow.Width = 400  
GraphicsWindow.Height = 300  
GraphicsWindow.BackgroundColor = "Green"  
GraphicsWindow.PenWidth = 3
```

```

GraphicsWindow.PenColor = "Yellow"
GraphicsWindow.DrawTriangle (250, 50, 50, 200, 350, 250)
GraphicsWindow.BrushColor = "Blue"
GraphicsWindow.FillTriangle (250,
50, 50, 200, 350, 250)
GraphicsWindow.FontSize = 36
GraphicsWindow.FontBold = "true"
GraphicsWindow.FontItalic = "true"
GraphicsWindow.DrawText (100, 240,
"Triangle")

```

The output is shown in the figure given alongside.



Tricky Terms

Loop repeat a block of statements a certain number of times

GraphicsWindow an object used to draw lines and shapes, as also text in Small Basic

Memory Bytes

- There are two looping statements in Small Basic – **For...EndFor** and **While...EndWhile**.
- The **For...EndFor** loop is used to repeat a block of statements a specific number of times.
- The **While...EndWhile** loop is executed as long as the condition is true. If the condition is false, the loop is terminated.
- The default value of **Step** in **For...EndFor** is 1. You can give a positive, a negative, or decimal value to the **Step** command.
- The **GraphicsWindow** object is used to draw lines and shapes, and also print text in Small Basic.
- The properties of **GraphicsWindow** are **Width**, **Height**, **Title**, **BackgroundColor**, **PenColour**, **PenWidth** and **BrushColor**.
- The font properties of **GraphicsWindow** are **FontName**, **FontSize**, **FontBold** and **FontItalic**.
- The methods that can be used with **GraphicsWindow** are **DrawLine**, **DrawRectangle**, **DrawTriangle**, **DrawEllipse**, **FillRectangle**, **FillTriangle**, **FillEllipse**, and **DrawText**.

EXERCISES

Objective Type Questions

1. Choose the correct option.

- The loop used when the number of repetition is not known beforehand is
i. While...EndWhile ii. For...EndFor iii. Both i. and ii. iv. none of these
- What would be the output for the following program?

```
For I = 20 To 1 Step -7  
    TextWindow.Write (I)  
EndFor
```


i. 20 13 6 ii. 7 14 iii. 20 14 7 1 iv. Error
- The command to get a pen of width 5 pixels is
i. GraphicsWindow.BrushWidth = 5 ii. GraphicsWindow.Brush = 5
iii. GraphicsWindow.Width = 5 iv. GraphicsWindow.PenWidth = 5
- The command to get the colour used to fill a figure is
i. GraphicsWindow.PenColor = "Yellow"
ii. GraphicsWindow.BrushColor = "Yellow"
iii. GraphicsWindow.Color = "Yellow"
iv. GraphicsWindow.BackgroundColor = "Yellow"
- The method to draw a square is
i. DrawTriangle() ii. DrawRectangle() iii. DrawEllipse() iv. DrawLine()

Descriptive Type Questions

1. Answer the following.

- What are the four properties of font in GraphicsWindow?
- Explain the While...EndWhile loop with an example.
- What is the difference between PenColor and BrushColor properties of GraphicsWindow?
- Write the code to print "Enjoy Small Basic" with the following specifications in GraphicsWindow:
i. Font—Times New Roman ii. Size—22 iii. Bold and Italics
- Explain the four properties of the GraphicsWindow object—Title, Height, Width, BackgroundColor—in detail.
- Compare the two loops you have learned about in this chapter. In your opinion which one would be more useful in a program which has to execute a number of instructions over and over again?
- Evaluate the use of looping in programming.
- Create a geometrical pattern using as many features as you can in the graphic window in Small Basic.

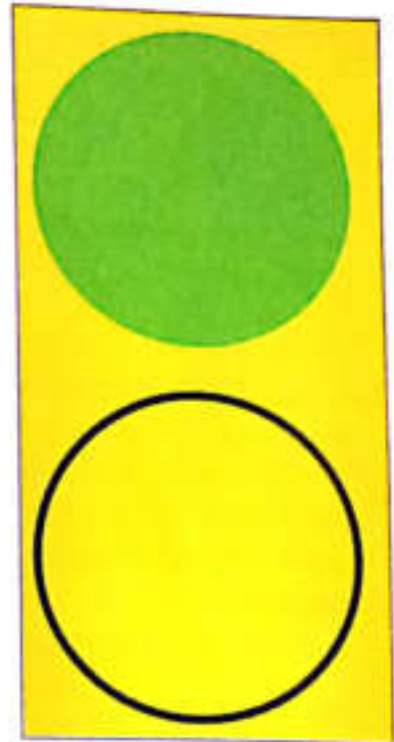
Application-Based Questions

- a. Consider the following code and answer the questions given below.

```
For I = 20 To 5 Step -4
    TextWindow.WriteLine (I)
EndFor
```

- What will be the output of the code?
 - Write the same code using While...EndWhile.
- b. Write the code to draw circles of the following description:

- Width—400 pixels
- Height—400 pixels
- BackColor—Gold
- PenColor—Black
- PenWidth—5
- DrawEllipse (100,250,200,200)
- BrushColor—Lime
- FillEllipse (100,20,200,200)

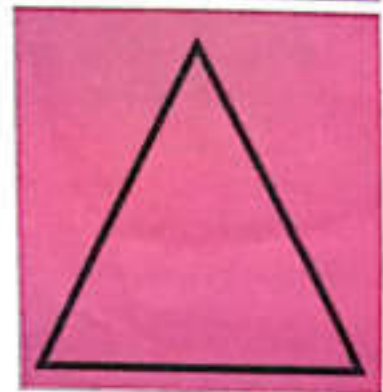


- c. Aman wants to draw a triangle with a black outline.

The code he has written is:

```
GraphicsWindow.Title = "Triangle"
GraphicsWindow.Width = 400
GraphicsWindow.Height = 400
GraphicsWindow.BackgroundColor = "Fuchsia"
GraphicsWindow.PenWidth = 5
GraphicsWindow.PenColor = "Black"
GraphicsWindow.DrawTriangle(200, 100, 300, 300,
100, 300)
```

If you have to fill the triangle with blue colour, what will be the additional line or lines of code required?



- d. Consider the following description:

- Coordinates of line 1 = (50, 75) – (150, 350)
- Coordinates of line 2 = (125, 75) – (50, 350)
- Width of the Pen = 8
- Title of the window—Draw Lines
- Height of the window—400
- Width of the window—200
- Background colour—OrangeRed

Using the description given above, write the program code for the figure given alongside.





IN THE LAB

1. The Computer Science teacher has asked the students of Class VII to write a program in Small Basic to print the table of any number entered by the user. The output should look as shown on the right. What will be the code for this output?
2. Her class teacher has asked Laila to write a program in Small Basic that will calculate the percentage of attendance in a month. The input to the program is the total number of days in a month and the number of days the student is present. The program should stop when the user enters -1. Can you help Laila in writing the program?

Formula: Number of days the student is present / Total number of days in a month \times 100

3. The Science teacher of Class VII has assigned the students to write a program that converts temperature in Fahrenheit to temperature in Celsius for a range entered by the user.

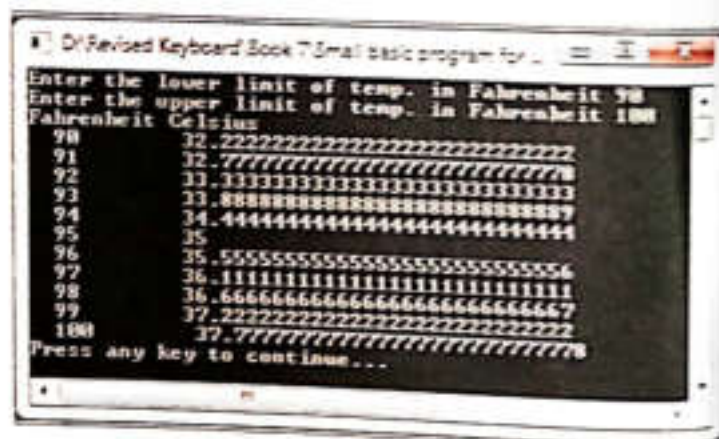
Hint: Celsius = (Fahrenheit - 32) * 5/9

The output should look as shown alongside. Create the code for this output.

4. Write a Small Basic code to display a filled rectangle with the text "Rectangle" below it as shown alongside.
5. Try the following code and see what figure you get.

- a.

```
GraphicsWindow.BackgroundColor = "Maroon"
GraphicsWindow.PenColor = "White"
GraphicsWindow.PenWidth = 1
GraphicsWindow.Width = 400
GraphicsWindow.Height = 400
For I = 1 To 200 Step 5
    GraphicsWindow.DrawRectangle(200 - I,
    200 - I, I * 2, I * 2)
EndFor
```



```

b. GraphicsWindow.BackgroundColor = "Orange"
   GraphicsWindow.PenColour = "White"
   GraphicsWindow.PenWidth = 1
   GraphicsWindow.Width = 400
   GraphicsWindow.Height = 400
   For I = 1 To 200 Step 5
       GraphicsWindow.DrawEllipse(200 - I, 200 - I, I * 2, I * 2)
   EndFor

```

GROUP PROJECT

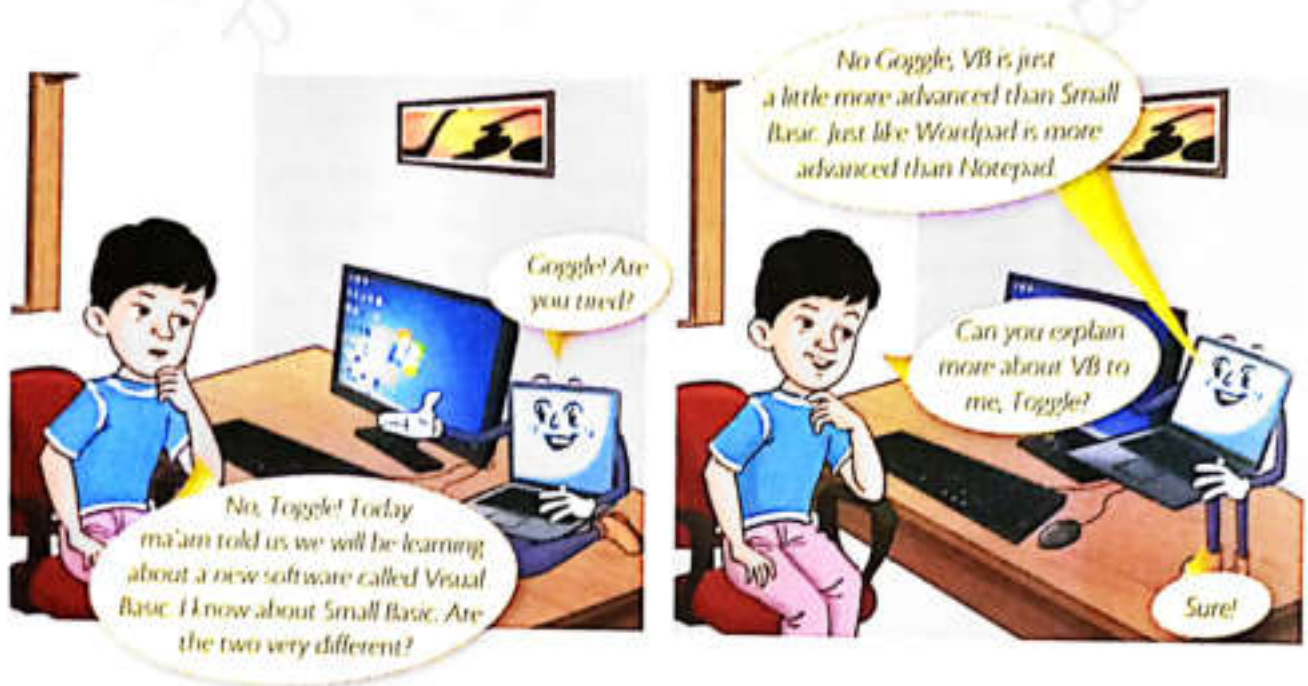
You have been asked to give a Computer Science presentation at the next Parents meeting. Your topic is to demonstrate different types of loops in Small basic, Visual basic, and QBasic. Although you want to impress everyone with your knowledge, it is also important to engage your audience. How will you go about carrying out this task? Share ideas together and remember to listen to each other's opinions. Prepare your presentation to highlight the similarities and differences of the loops. Can you use cartoons? Can you use animation? Can you use drama? Can you use PowerPoint?

TEACHER'S NOTES

- The meaning and use of loops could be explained with real-life examples.
- The best way to learn programming is to write lots of programs. Thus, students should be given enough time to practice programming.
- Explain the difference between the two types of output windows—TextWindow and GraphicsWindow—to the students.
- Demonstrate how to draw figures and print text by taking some examples.
- Briefly explain the difference between PenColor and BrushColor.

Chapter 5

Introduction to Visual Basic



You have learnt quite a bit of Small Basic by now. As you know, Small Basic programs are executed one command after another (i.e. sequentially). You type in the commands (or methods) and you see the output of a program in a **TextWindow** (working with text) or a **GraphicsWindow** (working with lines and shapes) object.

Visual Basic (VB) is similar to Small Basic but has many more features.

Visual means that it uses a Graphical User Interface (GUI) to create programs, and **Basic** means that the language is based on the BASIC programming language.

In this chapter, you will learn Visual Basic 2013 Express. It is a version of Visual Basic that Microsoft supplies free for students and beginners.

In this Chapter

- Graphical User Interface
- Getting Started with Visual Basic
- Visual Basic Window
- Developing an Application
- Working with Variables

GRAPHICAL USER INTERFACE

Visual Basic has a Graphical User Interface (GUI). As the name suggests, GUI software uses windows, icons, buttons, menus, dialog boxes, etc. All these are called controls. All programs written with Visual Basic have a Graphical User Interface. So Visual Basic has a GUI environment for writing programs.

Event-Driven Programming

Visual Basic programming is event-driven programming. An **event** is an **action**. For example, clicking the mouse, double-clicking the mouse, moving the mouse, selecting an item from a list, etc., **are all actions**. When the user performs an action on a graphical component, we say an event has occurred.

In event-driven programming, the program responds to events. It does not run step-by-step as in Small Basic. The user may click on any control at any time, so each control is programmed independently. We write the code that will be executed in response to different actions (events).

GETTING STARTED WITH VISUAL BASIC

To start Visual Basic, the steps are:

1. Click **Start** ► **All Programs** [Fig. 5.1(a)] ► **Visual Studio 2013** [Fig. 5.1(b)] ► **VS Express 2013 for Desktop** [Fig. 5.1(c)].



Fig. 5.1 Steps to start VS Express 2013 for Desktop

2. The Visual Studio screen appears (Fig. 5.2).
3. After a few seconds, the **Start Page – Microsoft Visual Studio Express 2013 for Windows Desktop** window appears (Fig. 5.3).



Fig. 5.2 Visual Studio screen

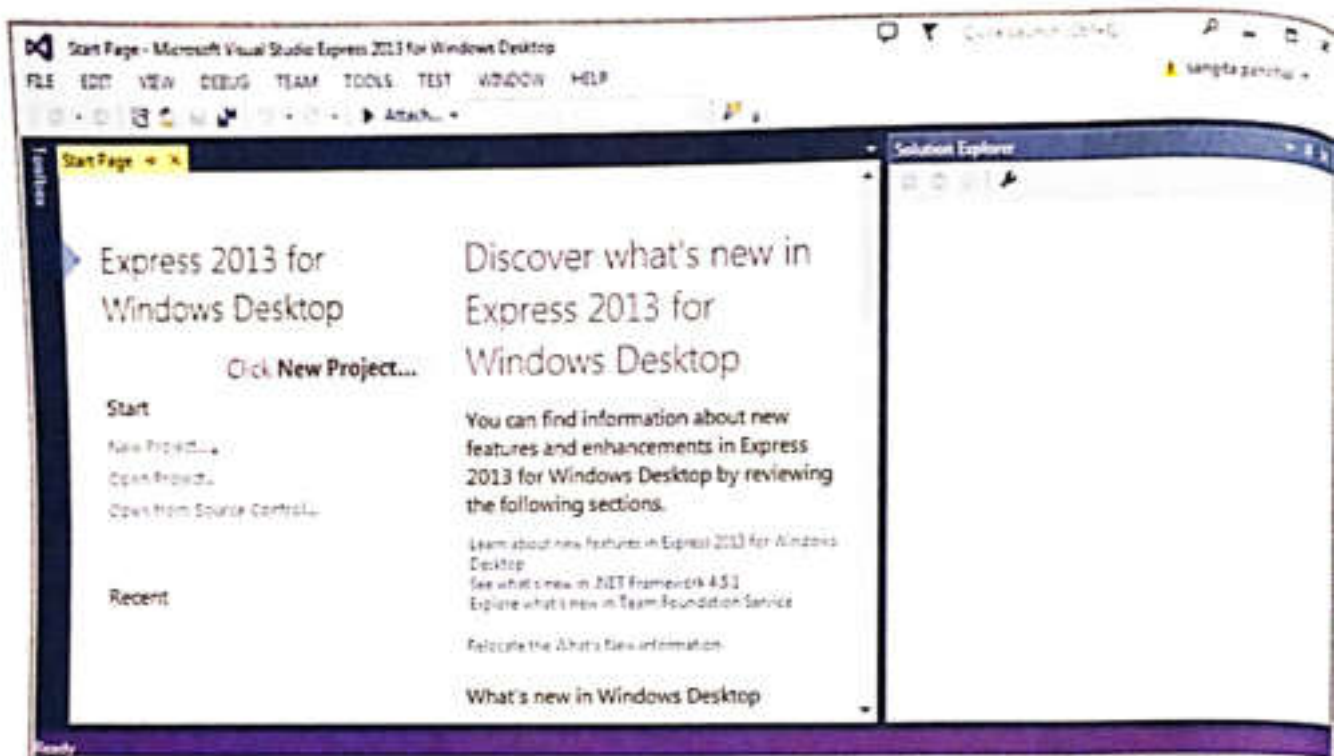


Fig. 5.3 Start Page – Microsoft Visual Studio Express 2013 for Windows Desktop

4. Under **Start**, click **New Project....** This will open the **New Project** screen. Under **Installed Templates**, click **Visual Basic** (Fig. 5.4).

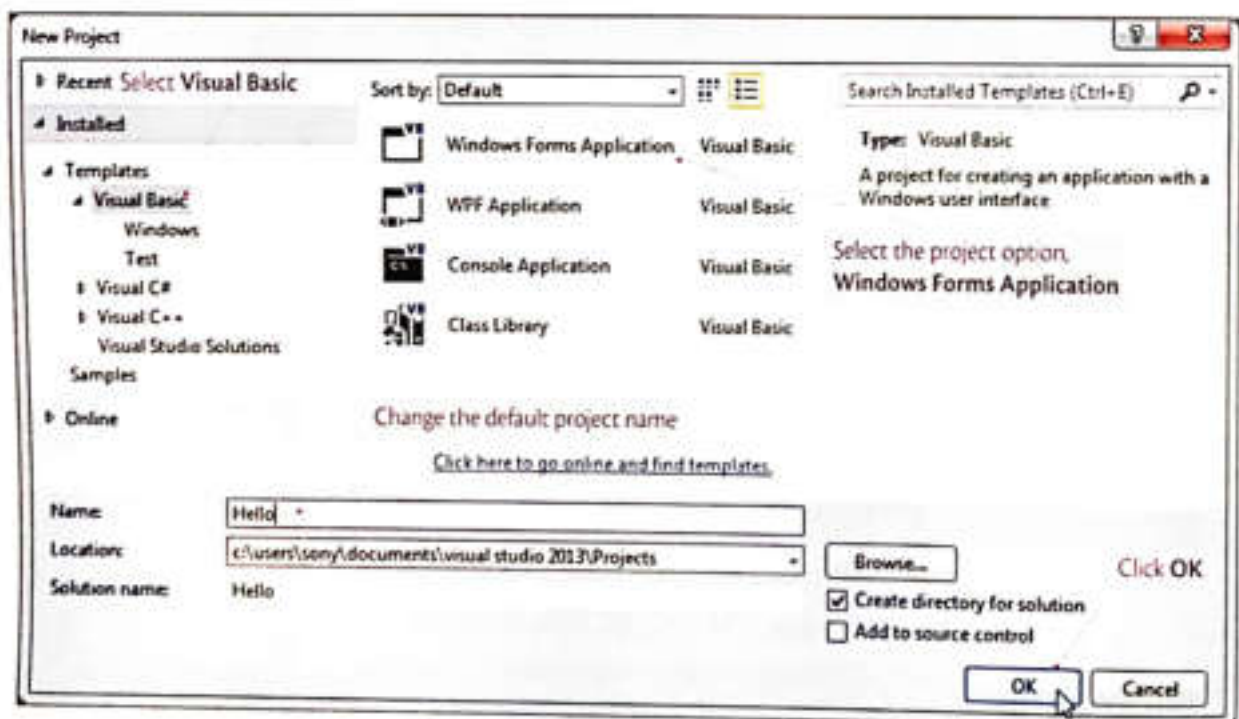


Fig. 5.4 New Project window

5. Select **Windows Forms Application** in the middle pane. At the bottom of this window, change the default project name **WindowsApplication1** to a more meaningful name, say 'Hello' and click OK.
6. The Integrated Development Environment window appears (Fig. 5.5). Visual Basic is referred to as an **Integrated Development Environment (IDE)** software, because all the tools required for the development of a project are available on one screen.

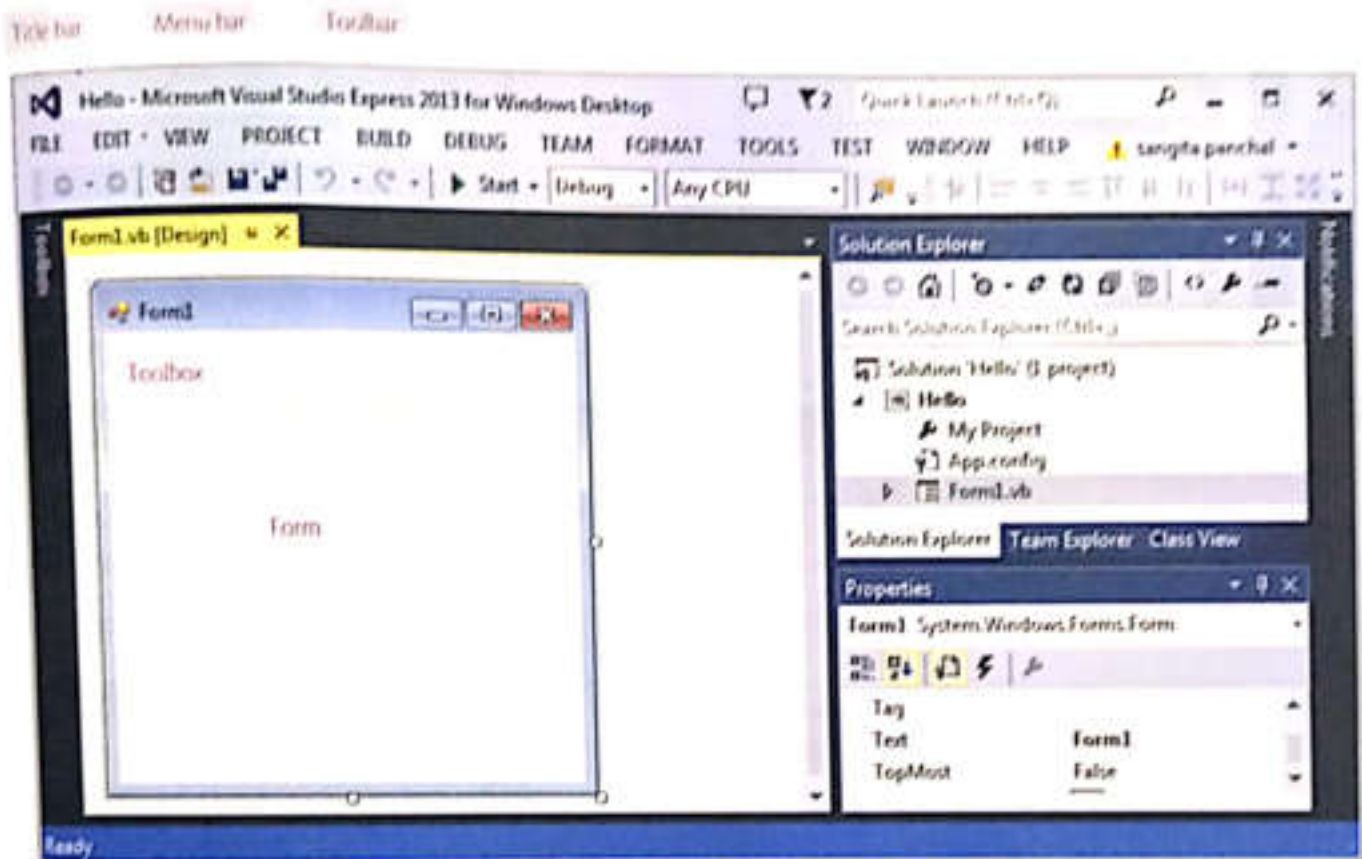


Fig. 5.5 Integrated Development Environment (IDE) window

VISUAL BASIC WINDOW

The Visual Basic IDE window integrates many different functions, such as designing, editing, compiling, and debugging (removing errors).

It has the following areas:

- An empty form
- The **Toolbox** tab
- The **Solution Explorer** window
- The **Properties** window

Click the **Toolbox** tab. The **Common Controls** menu of the **Toolbox** will appear (Fig. 5.6).

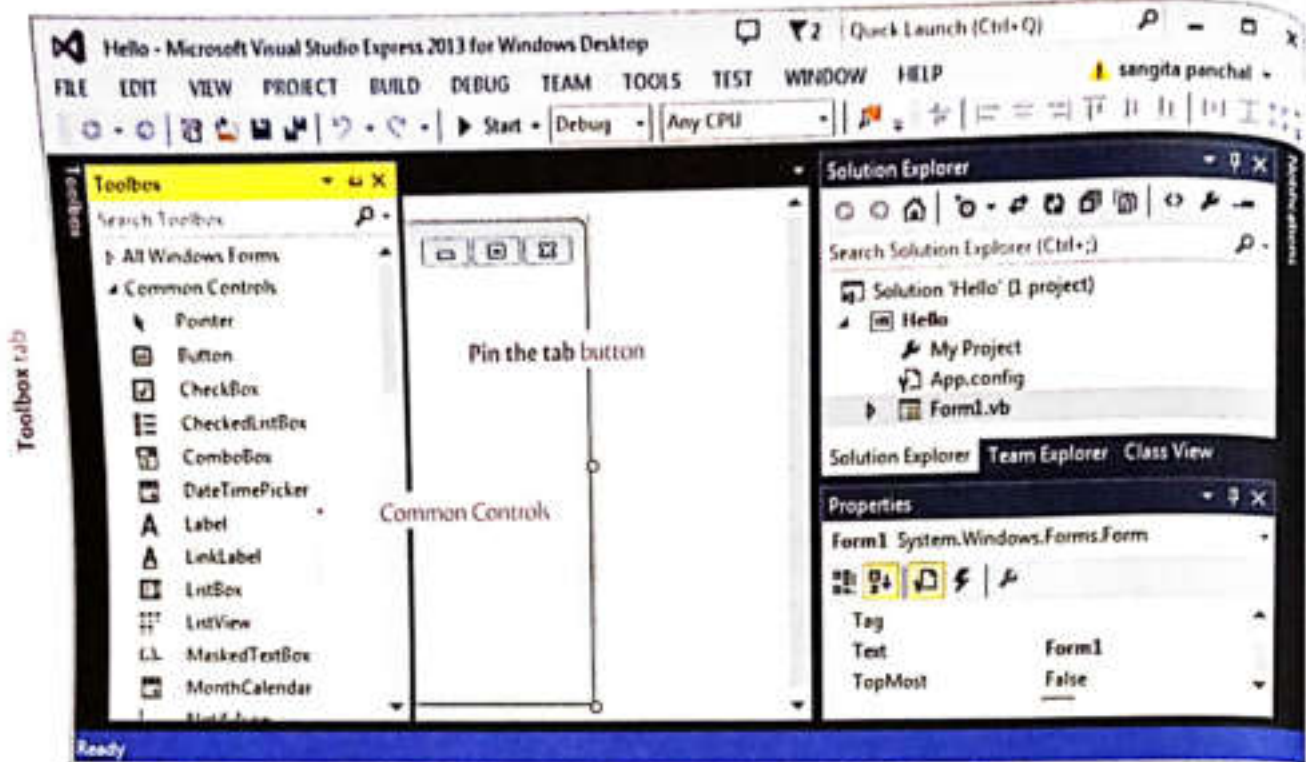


Fig. 5.6 IDE window with Toolbox

Click the **Pin the tab** button, the form will move to the right so that the **Toolbox** and the form are visible together (Fig. 5.7).

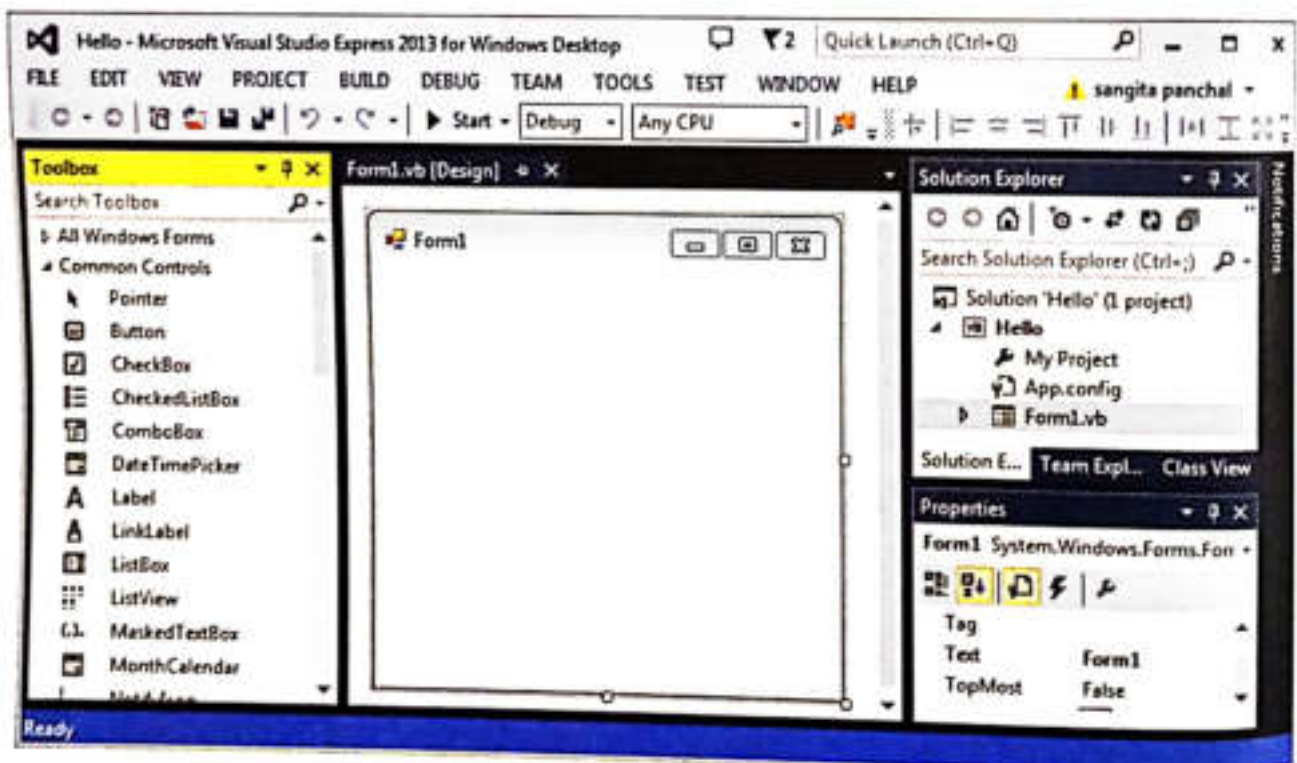


Fig. 5.7 Pinned Toolbox with the form in the middle

Components of the Visual Basic Window

The Visual Basic window has many components, as you can see in Figure 5.5 and Figure 5.6.

Title Bar: The title bar at the top of the window displays the title of the project (Fig. 5.8). By default, VB names your projects WindowsApplication1, WindowsApplication2, etc. The name shown here is 'Hello' as per the change we had made in Point 5 on page 69.

Top Tip

If you do not see the Toolbox, Solution Explorer, or Properties window, click the **View** menu. Select the required option from the submenu.

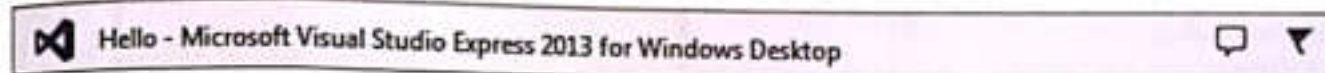


Fig. 5.8 Title Bar

Tabs Above the Form: The tab at the top of the form contains the words **Form1** and **[Design]**. This means that the application has one form and is currently in **Design** mode (Fig. 5.9).

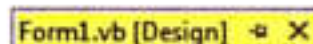


Fig. 5.9 Form tab

Menu Bar and Toolbar: The **menu bar** consists of many drop-down menus. Clicking on any option of the menu bar makes it active. The **toolbar** has buttons that provide shortcuts to some menu options (Fig. 5.10).

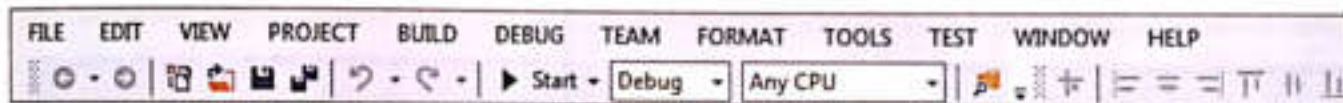


Fig. 5.10 The Menu bar and Toolbar

Form Window: The **Form** window is the primary work area that forms the background of the application. The user can place objects on the form (Fig. 5.11).

Toolbox: The **Toolbox** contains the **controls**. Controls are GUI components that can be added to the form. Some commonly used controls are **Label**, **Button**, **ComboBox**, **ListBox**, **PictureBox**, and **TextBox** (Fig. 5.12).

Solution Explorer: The **Solution Explorer** window displays a list of all the forms in the current project (Fig. 5.13).

Properties Window: A form can have many controls on it. Every control is associated with some properties.

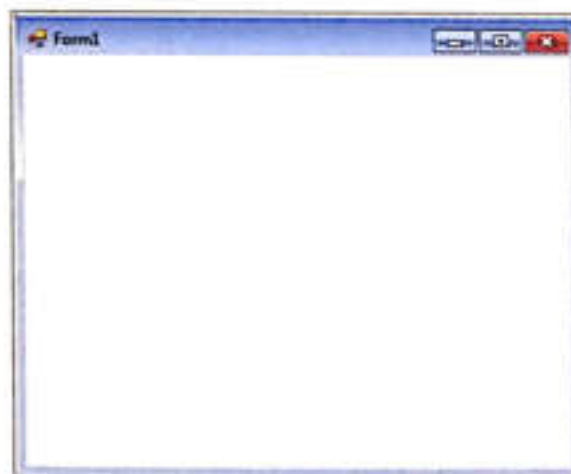


Fig. 5.11 Form window

Top Tip

If no control is selected, the **Properties** window will display the **Form** properties.

The form also has its own properties. The **Properties** window lists the **properties** of the selected control or of the form (Fig. 5.14).



Fig. 5.12 Toolbox

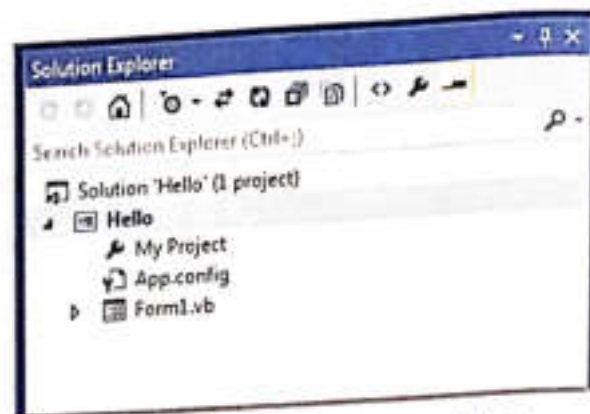


Fig. 5.13 Solution Explorer window

Displays properties category-wise

Displays properties in alphabetical order

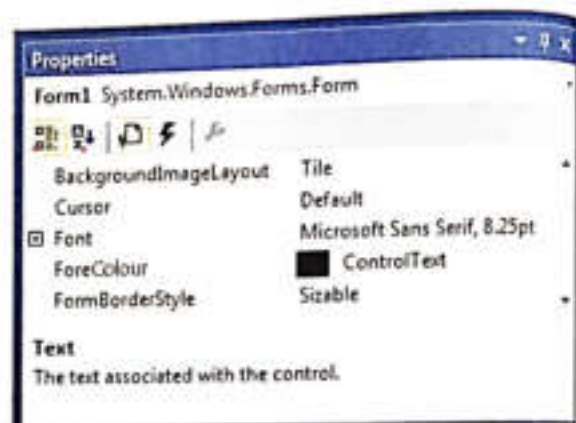


Fig. 5.14 Properties window

Click the appropriate button in the **Properties** window to display **properties** alphabetically or by category.

DEVELOPING AN APPLICATION

In VB, you can use the following steps to develop an application:

1. Create a form.
2. Place controls on the form.
3. Set properties for the controls.
4. Add code to the controls to handle the events.

Every control is associated with its individual **Properties**, **Methods**, and **Events**.

Property: It is a named attribute of a control. For example, **text boxes** have properties named **Colour**, **Font**, **Enabled**, **Visible**, etc.

Method: It is an action that can be performed on a control.

Event: A button supports various **events** such as **click**, **double-click**, **mouse over**, etc. When an event occurs, a particular bit of code is executed. In event-driven programming, you write the code to be executed when an event occurs.

Placing Controls on the Form

You can add a control to a form by using one of these methods.

First Method

1. Double-click on the control in the **Toolbox**. Here the control chosen is a **Button**. By default, buttons are named Button1, Button2, etc.
2. The control appears at the top-left corner of the form (Fig. 5.15). To change the position of the control, click on it, hold down the left mouse button, and drag it to the new location (Fig. 5.16).
3. To resize the control, drag the **resize pointers** on its edges or corners.

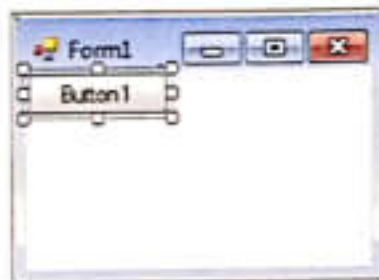


Fig. 5.15 Control added to form

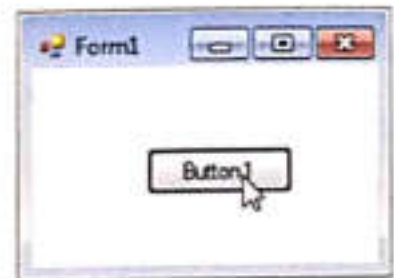


Fig. 5.16 Dragged to new location

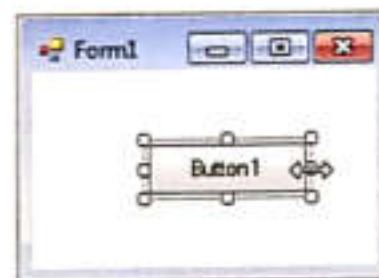


Fig. 5.17 Resize horizontally

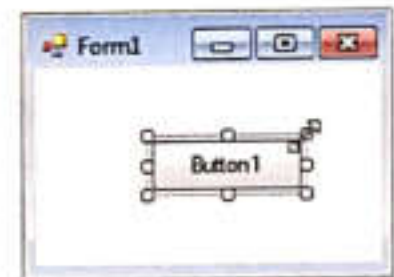


Fig. 5.18 Resize diagonally

- Drag the edges pointer for changing the size either horizontally or vertically (Fig. 5.17).
- Drag the corner pointers for changing the size diagonally (Fig. 5.18).

Second Method

1. Click on the control in the **Toolbox**, and with the left mouse button pressed down, drag and drop it onto the form.
2. As in the first method, reposition the control by holding down the left mouse button and dragging it to a new location. To resize the control, drag one of its edges or corners.

Deleting a Control

To delete a control on the form, select it by clicking it once and press **DEL**.

Creating and Executing a VB application

Let us now understand how to create and execute a VB application. Suppose we wish to display the message 'Visual Basic is interesting!' on the form.

The steps to create, execute, and save a VB application that does this are:

1. Click **New Project...** on the **Start** page. The **New Project** window appears.
2. Under **Installed ► Templates**, click **Visual Basic**. Select **Windows Forms Application** in the middle pane. At the bottom of this window, change the default project name **WindowsApplication1** to some other name, say **Message**, and click **OK**. The IDE window will appear.
3. Notice the name of the project, **Message**, in the title bar. The project has one form, named **Form1** by default. Make sure **Form1** is selected.
4. Add a **Button** control to the form.
5. Select the form and make the following changes in the **Properties** window:
 - To change the title displayed on the form: Click the box to the right of **Text** in the **Properties** window and type **Message** (Fig. 5.19). Notice that it appears on top of the form.
 - To change the background colour of the form: Click the box to the right of **BackColor**. A drop-down menu arrow will appear. Click the arrow and select **Highlight** (Fig. 5.20).
6. Select the button control by clicking it, and make the following changes in the **Properties** window:
 - Change **Text** to **DisplayMessage** (Fig. 5.21).
 - Click the box to the right of **Font**, and then on the button with three dots (Fig. 5.22).
 - The **Font** window will appear (Fig. 5.23). Set **Font** to **Tahoma**, **Font style** to **Bold** and **Size** to **12**. Click **OK**. Notice that the default font is **Microsoft Sans Serif**.
7. Follow these steps to write the code:
 - Double-click the button control. The code window will appear (Fig. 5.24). It already has a code template. You will add your own code to this.

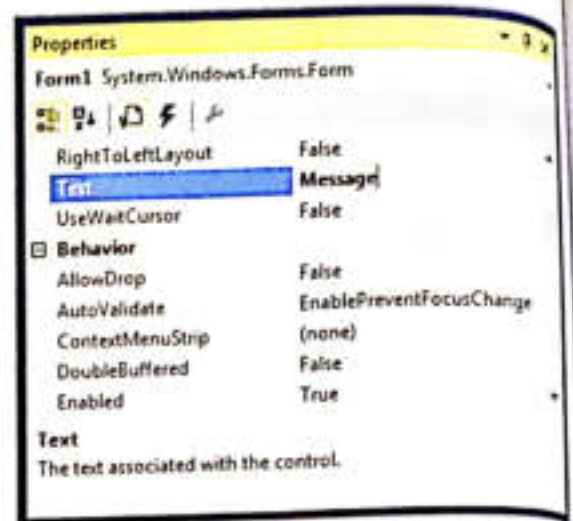


Fig. 5.19 Text property of the form

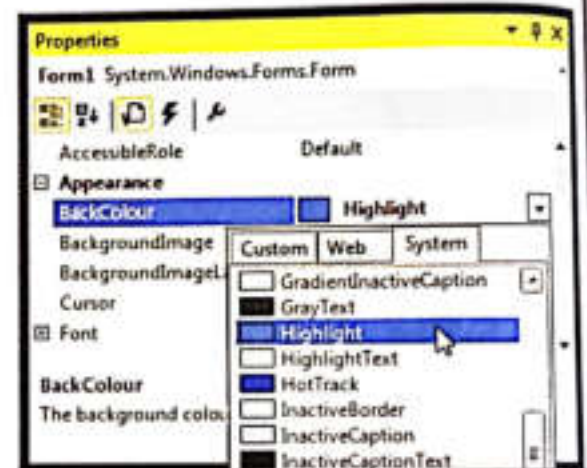


Fig. 5.20 BackColor property of the form

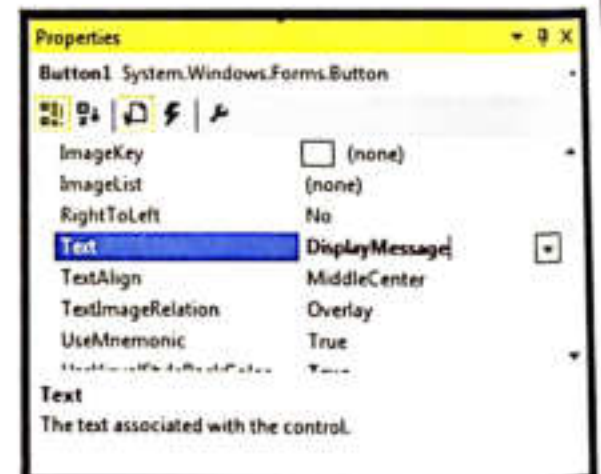


Fig. 5.21 Text property of the Button

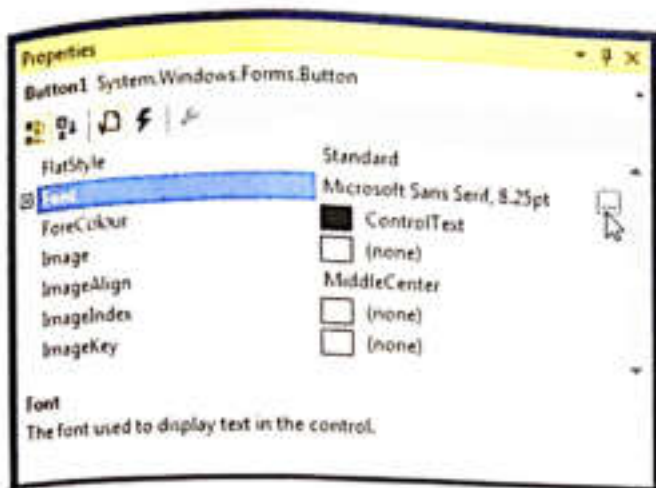


Fig. 5.22 Changing the font

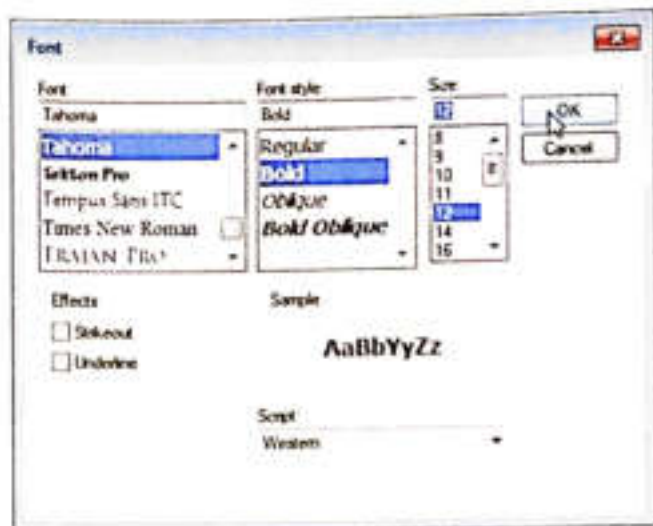


Fig. 5.23 Font dialog box

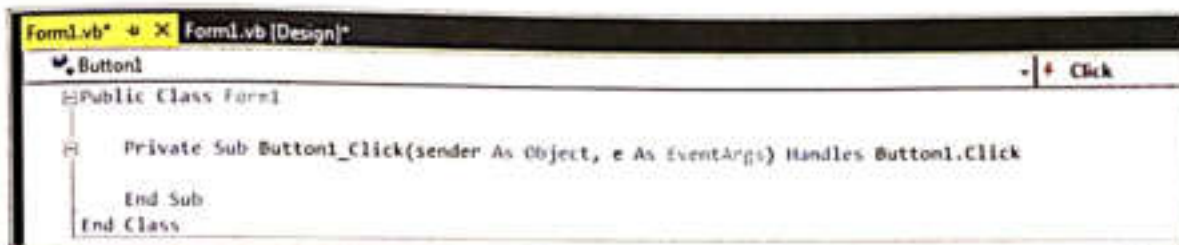


Fig. 5.24 The code window

- Type the code between the lines **Private Sub** and **End Sub** as shown in Figure 5.25.

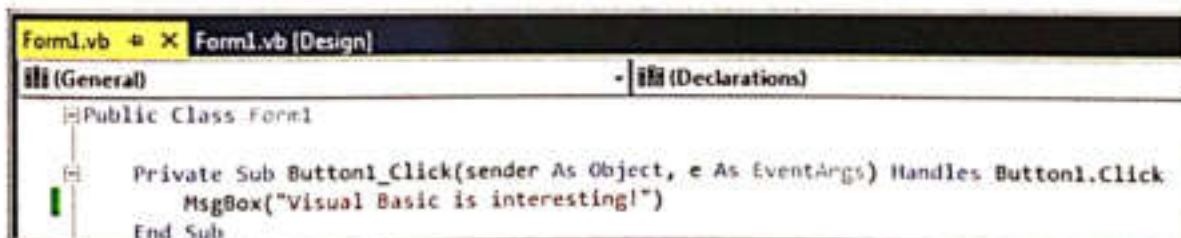
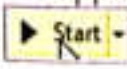


Fig. 5.25 Visual Basic code

- To save the VB application, select **FILE ► Save All**. This first saves the form and then the project. The file extension for forms is .vb. The extension for projects is .vbproj.
 - To run the application, Click **DEBUG ► Start Debugging**. Or Press **F5**. Or Click the **Start** button  on the toolbar.
 - This will run your first Visual Basic program. A form titled **Message** with a single button labeled **DisplayMessage** will appear on the screen (Fig. 5.26).
- Click the button and it will display a message box stating Visual Basic is interesting! (Fig. 5.27).

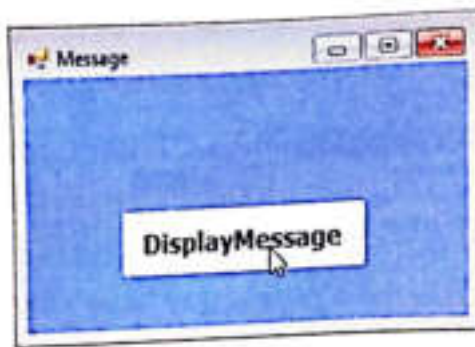


Fig. 5.26 Output of the program

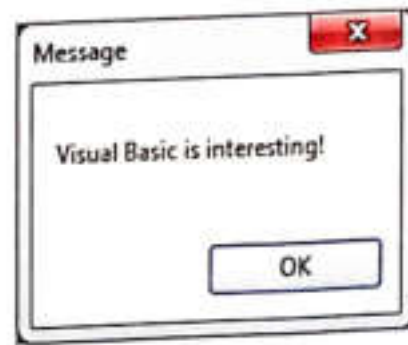


Fig. 5.27 Message Box

11. Click **OK** to return to the form. Close the project by clicking **FILE ► Close**. Now you can start a new project by selecting **FILE ► New Project**.
12. Click **FILE ► Exit** to exit from Visual Basic.

PRACTICE TIME



Ayesha wants to do something interesting with Visual Basic programming. She wants to view a website using the WebBrowser control. Can you help her with the code?

SOLUTION

1. Click **Start ► All Programs ► Visual Studio 2013 ► VS Express 2013 for Desktop**
2. The Visual Studio screen appears. After a few seconds, the **Start Page – Microsoft Visual Studio Express 2013 for Windows Desktop** window will open.
3. Under **Start**, click **New Project....**
4. The **New Project** screen appears. Under **Installed ► Templates**, click **Visual Basic**.
5. Select **Windows Forms Application** in the centre pane. At the bottom of this window change the project name to web Browser. Click **OK**. The Integrated Development Environment window appears.
6. Add the controls—**Label**, **TextBox**, **Button**, and **WebBrowser**—on the form by double-clicking the controls. Drag the controls to the required positions so that the form looks as shown in Figure 5a.
7. Change the **Text** property of **Button1** to **GO**.
8. Change the **Text** property of **Label1** to **URL**.



Fig. 5a

9. Select the **Label1** and **Button1** controls using the **CTRL** key and change the **Font** properties **Font Style** and **Font Size** to **Bold** and **12**, respectively.

```
Public Class MyWebBrowser
    Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
        WebBrowser1.Navigate(TextBox1.Text)
    End Sub
End Class
```

Fig. 5b

10. Double-click the button. This will open the code window. Write the code between the **Private Sub** line and the **End Sub** line as shown above (Fig. 5b).
11. Select **FILE ► Save All** to save the project.
12. Click **DEBUG ► Start Debugging** or press **F5** to run the application.
13. The form will appear on the screen. Type <http://www.oup.com> and click the **GO** button. The Website called will appear in the **WebBrowser** control (Fig. 5c).

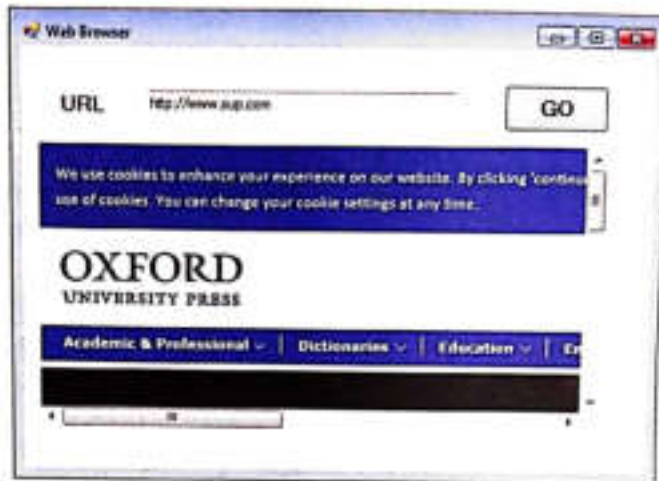


Fig. 5c

WORKING WITH VARIABLES

Variables are the areas of computer memory allocated to hold data. You have already used variables in Small Basic. Now, let us see how to work with variables in Visual Basic.

Table 5.1 shows some examples of valid and invalid variable names.

Table 5.1 Valid and invalid variable names in VB

Valid Variable names	Invalid Variable names
Simple_Interest	Student.Name
EmployeeName	2ndTerm
Num1	Paper I

Variable Names

A **Visual Basic** variable name:

- must be less than 255 characters
- should not contain spaces or periods (.)
- must not begin with a digit

Declaring Variables

One has to **declare variables** before using them by assigning **names** and **data types**. The general format of declaring a variable is:

`Dim VariableName As DataType`

For example:

```
Dim StuName As String
Dim Total As Integer
Dim Percentage As Single
```

There are many data types in Visual Basic but we will only discuss three here:

- **String:** It holds alphabetic characters, numeric numbers, and special characters with which calculations cannot be performed.
- **Integer:** It holds whole numbers.
- **Single:** It holds whole or fractional numbers.

You can declare multiple variables in one line, separating each with a comma:

```
Dim StuName As String, Total As Integer, Percentage As Single
```

You can declare more than one variable of the same data type like this:

```
Dim Num1, Num2, Num3 As Integer
```

Assigning a Value to a Variable

After declaring a variable using the `Dim` statement, one can assign a value to that variable using an assignment statement. The general format of an assignment statement is:

```
Variable = Constant or  
Expression
```

For example: `A = 100` or
`A = B * C`

Arithmetic Operators

The arithmetic operators used in Visual Basic are shown in Table 5.2.

Table 5.2 Arithmetic operators in VB

Operator	Operation	Examples
+	Addition	$15 + 31 = 46$
-	Subtraction	$78 - 34 = 44$
*	Multiplication	$5 * 6 * 2 = 60$
^	Exponent	$5 ^ 2 = 25$
/	Division	$11 / 4 = 2.75$
\	Integer Division (discards the decimal places)	$20 \setminus 3 = 6$
Mod	Modulus (returns the remainder from an integer division)	$20 \text{ Mod } 6 = 2$

Creating an Application with Numeric Variables

Let us now create an application to add two numbers as an example.

1. Add the following controls to the form:
 - Three TextBox controls: two to enter the two numbers, and one that will show the output.
 - Four Label controls, to display the heading, and captions for entering two numbers and output.
 - One Button control
2. Set the properties of the controls as described in Table 5.3.
Resize Button1 as necessary. After setting the properties, the form will look as shown in Figure 5.28.

Table 5.3 Properties for the form and its controls

Controls	Properties
Label1	Text: Add Two Numbers, Font: Bold, 14,
Label2	Text: Enter First Number, Font: Bold, 12
Label3	Text: Enter Second Number, Font: Bold, 12
Label4	Text: Sum, Font: Bold, 12
TextBox1	BorderStyle: FixedSingle
TextBox2	BorderStyle: FixedSingle
TextBox3	BorderStyle: FixedSingle, Enabled: False
Button1	Text: Add, Font: Bold, 14

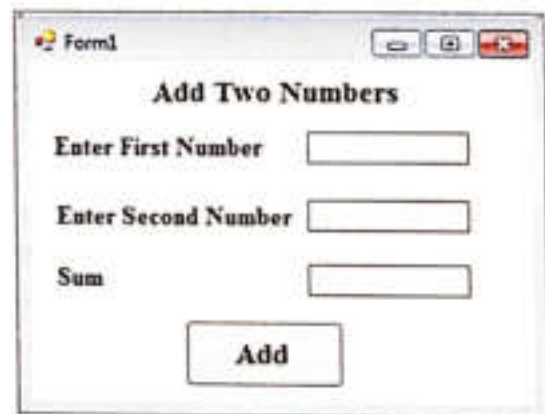


Fig. 5.28 Form with controls

3. Double-click the **Add** button. This will open the code window.
The cursor will be between the **Private Sub** and **End Sub** lines. Enter the code as follows (Fig. 5.29).

```
Public Class Form1
    Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
        TextBox3.Text = Val(TextBox1.Text) + Val(TextBox2.Text)
    End Sub
End Class
```

Fig. 5.29 Program code for adding two numbers

Note: Data entered in a text box is of the string data type. The **Val** function converts it into a number so that it can be used for addition.

4. Select **File ► Save All** to save the project.
5. Press **F5** to run the program. Enter numbers in the text boxes (Fig. 5.30) and click **Add**. The sum of the numbers will appear in the text box next to **Sum** (Fig. 5.31).



Fig. 5.30 Enter data

Fig. 5.31 Output after clicking the Add button

PRACTICE TIME



Maaz's father owns a garment shop that is giving 15% discount on the purchase amount. He wants Maaz to make a program in Visual Basic to calculate the discount and net amount on a given purchase amount. The purchase amount is entered by the user. On clicking a **Display** button, the discount (15% of purchase amount) and the net amount (purchase amount – discount) should be calculated and displayed. Can you help Maaz in this task?

SOLUTION

1. Start **Microsoft Visual Basic 2013 Express** and create a **Windows Forms Application** named 'Discount Calculation'.
2. Place four Label controls, three TextBox controls, and three Button controls on the form.
3. Set the following properties for the form and the controls. The form will look as shown in Figure 5d.

Controls	Properties
Label1	Text: Discount Amount and Net Amount Calculator, Font: Bold, 14
Label2	Text: Purchase Amount, Font: Bold, 12
Label3	Text: Discount Amount, Font: Bold, 12
Label4	Text: Net Amount, Font: Bold, 12
TextBox1	
TextBox2	Enabled: False
TextBox3	Enabled: False
Button1	Text: Display, Font: Bold, 14
Button2	Text: Clear, Font: Bold, 14
Button3	Text: Exit, Font: Bold, 14

Fig. 5d Form after setting properties

4. Double-click the button to get the code template. Add the lines as shown in **Figure 5e**.

```
Public Class Form1
    Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
        Dim Amount, Discount, NetAmount As Single
        Amount = Val(TextBox1.Text)
        Discount = 15 / 100 * Amount
        NetAmount = Amount - Discount
        TextBox2.Text = Discount
        TextBox3.Text = NetAmount
    End Sub

    Private Sub Button2_Click(sender As Object, e As EventArgs) Handles Button2.Click
        TextBox1.Text = ""
        TextBox2.Text = ""
        TextBox3.Text = ""
    End Sub

    Private Sub Button3_Click(sender As Object, e As EventArgs) Handles Button3.Click
        Close()
    End Sub
End Class
```

Fig. 5e

5. Select **FILE ► Save All** to save the VB application.
6. Press **F5** to run the application.
7. Enter **Purchase Amount** (**Fig. 5f**) and click the **Display** button. The **Discount Amount** and **Net Amount** are calculated and displayed in the respective text boxes (**Fig. 5g**).

Form1

Discount Amount and Net Amount Calculator

Purchase Amount 12500

Discount Amount

Net Amount

Display Clear Exit

Fig. 5f Enter the data

Form1

Discount Amount and Net Amount Calculator

Purchase Amount 12500

Discount Amount 1875

Net Amount 10625

Display Clear Exit

Fig. 5g Output after clicking the **Display** button

8. Click the **Clear** button to clear the data in **TextBox1**, **TextBox2**, and **TextBox3**.
9. Click the **Exit** button to close the application.

Concatenation

With strings, you can use the + or the & operator for adding strings one after another. This is called **string concatenation**. To understand this concept, let us create a VB project to enter the first name, middle name, and the last name. On being clicked, the button will display the full name in the corresponding text box.

1. Start **Microsoft Visual Basic 2013 Express** and create a **Windows Forms Application** named "Concatenation Example".
2. Place five Label controls, four text box controls, and one button control on the form.
3. Set the properties for the form and controls as shown in **Table 5.4**. The form will now look as shown in **Figure 5.32**.

Table 5.4 Properties for the form and its controls

Controls	Properties
Label1	Text: Concatenation, Font: Bold, 14
Label2	Text: Enter First Name, Font: Bold, 12
Label3	Text: Enter Middle Name, Font: Bold, 12
Label4	Text: Enter Last Name, Font: Bold, 12
Label5	Text: Full Name, Font: Bold, 12
TextBox1	Enabled: False
TextBox2	
TextBox3	
TextBox4	
Button1	Text: Click, Font: Bold, 14

Fig. 5.32 Form after setting properties

4. Double-click the **Click** button to get the code template. Add a line as shown in **Fig. 5.33**.

```
Public Class Form1
    Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
        TextBox4.Text = TextBox1.Text + " " + TextBox2.Text + " " + TextBox3.Text
    End Sub
End Class
```

Fig. 5.33 Program code

5. Select **FILE ► Save All** to save the VB application.
6. Press **F5** to run the application.
7. Enter your First Name, Middle Name, and Last Name in the respective text boxes (**Fig. 5.14**) and click the **Click** button. The information will appear in the **Full Name** text box (**Fig. 5.35**).

Concatenation

Enter First Name:

Enter Middle Name:

Enter Last Name:

Full Name:

Fig. 5.34 Enter data

Concatenation

Enter First Name:

Enter Middle Name:

Enter Last Name:

Full Name:

Fig. 5.35 Output after clicking Click

Tricky Terms

Graphical User Interface (GUI) an interface that enables the user to interact with an application by using controls like icons, buttons, menus, dialog boxes, and windows

Event an action in a GUI application, like click, double-click, mouse over, etc.

Event-driven Programming programming in which the program responds to events that are actions performed by the user

Integrated Development Environment (IDE) a programming environment that integrates many different functions such as designing, editing, compiling, and debugging in a single window

Project a collection of files that will make up an application

Property a named attribute of an object

Method an action that can be performed on a control

Memory Bytes

- Visual Basic is an event-driven programming language with an integrated development environment for creating Windows applications.
- The main components of a Visual Basic window are the title bar, the menu bar, the toolbar, the form window, the Toolbox, the Properties window, and the Solutions Explorer window.

- The main steps in developing a Visual Basic application are: create form, place controls on the form, set properties of controls, and add code to controls to handle events.
- There are two methods of placing controls on a form: double-click the control in the Toolbox, or click the control in the Toolbox and drag it to the form.

- You can change the properties of controls on the form by using the Properties window.
- When you double-click a control, you get a code template.
- The code is written between the **Private Sub** and **End Sub** statements.
- To run the application you can press F5, select **DEBUG ► Start Debugging**, or click the **Start** button on the toolbar.

EXERCISES



Objective Type Questions

1. Choose the correct option.

- To run an application
 - Click F5
 - Click **DEBUG ► Start Debugging**
 - Click **Start** button on the Toolbar
 - all of these
- The programming code is attached with the
 - Label
 - Button
 - Box
 - all of these
- Which window will be the user interface when the program is running?
 - Properties
 - Solution Explorer
 - Form
 - Toolbox
- The control that is used to accept input from a user is the
 - Button
 - TextBox
 - Label
 - WebBrowser
- A window that lists the solution name, the project name, and all the forms used in a project
 - Form Window
 - Solution Explorer
 - Properties
 - Toolbox

Descriptive Type Questions

1. Answer the following.

- Name any four components of the Visual Basic IDE screen and their uses.
- What are the four steps in developing an application?
- What are the two ways of placing controls on a form?
- What is an assignment statement? Explain with an example.
- List all the arithmetic operators used in Visual Basic.
- Evaluate the usefulness of event driven programming such as that used in Visual Basic.
- Based on what you have already learned in Class 6, can you now analyse the differences between the MS Small and Visual Basic?
- Create a Visual Basic program which displays the output: 'I like programming'.

Application-Based Questions

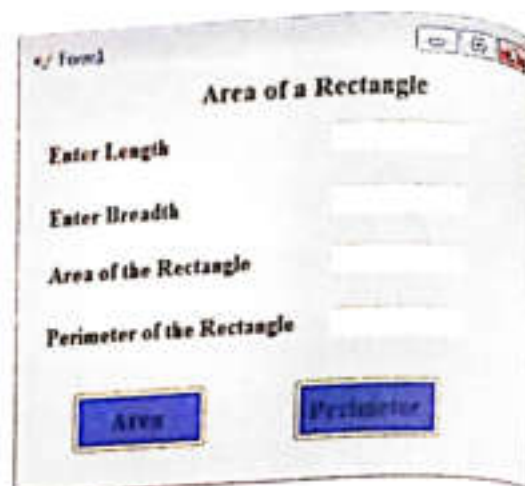
- a. When you open a new project, the IDE screen appears with one form called Form1.
 - i. Which property is used to change the text from "Form1" to "Calculator"?
 - ii. Which property is used to change the background colour of the form?
- b. Write the output for the following arithmetic operations:
 - i. $16 / 3$
 - ii. $16 \setminus 3$
 - iii. $16 \text{ Mod } 3$
 - iv. $5 \wedge 3$
- c. Write the programming statements for the following:
 - i. to declare three variables a, b, c of the Integer type
 - ii. to declare a variable a of Integer type, b of String type and c of Single type
- d. Name the controls used for the following:
 - i. to give a caption
 - ii. to accept value from a user
 - iii. to execute code on its click
- e. Write assignment statements for the following:
 - i. Assign a numeric value stored in TextBox1 to the variable Num.
 - ii. Assign your name to the variable MyName.



IN THE LAB

1. The Computer Science teacher has asked the students of Class VII to create a Visual Basic application to enter a number and display its square and cube on click of the **Display** button. Help them with the code and design your own interface.
Hint: $\text{Square} = \text{Number} * \text{Number}$
 $\text{Cube} = \text{Number} * \text{Number} * \text{Number}$
2. The Science teacher has asked the monitor to create an application that will convert the temperature given in Fahrenheit to temperature in Celsius on click of the **Display** button. The interface should look as given in the adjoining figure.
Can you do this task?
Hint: $\text{Celsius} = 5 / 9 * (\text{Fahrenheit} - 32)$

3. The Math teacher has asked Rehana to create a Visual Basic application that will input length and breadth of a rectangle in TextBox1 and TextBox2. On clicking the **Area** button, it should display the area in TextBox3. On clicking the **Perimeter** button, it should display the perimeter in TextBox4. The interface should look as seen in the figure given alongside.



4. The class teacher has asked Mohid to create an application that inputs marks obtained by a student, calculates the total and the average marks, and displays it on the screen upon clicking the **Calculate** button. Can you help Mohid in his task?
5. The Computer Science teacher has asked Mushtaq to create a Visual Basic application for entering the height in centimetres and displaying it in feet and inches. Help him create the code, and design your own interface.

Hint: Height in feet = Height in centimetres / 30.48

Height in inches = Height in centimetres / 2.54

GROUP PROJECT

A new language to master. Find out more about some different types of Computer Programming languages, such as C#, Javascript, and Python. Your research should include information on the development of each language, its common use, and its advantages and disadvantages. Complete a comparison chart which can be enlarged, printed off, and displayed above your computer to remind you of different ways of computer programming.

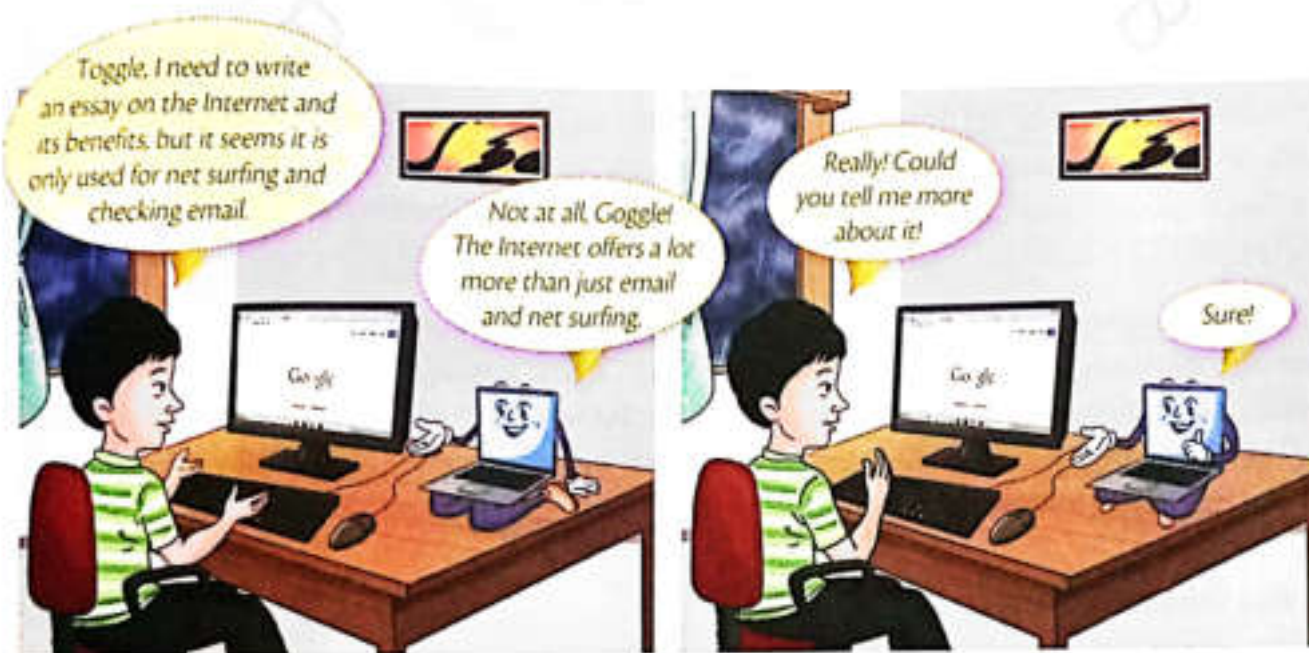


TEACHER'S NOTES

- The free Microsoft Visual Basic 2013 Express software can be downloaded from the website <http://www.microsoft.com/express/downloads>.
- The basic controls and their properties could be discussed with the students and their uses demonstrated before they try out creating programs on their own.
- How to create and run Visual Basic applications could be demonstrated to make students comfortable with the user interface.

chapter 6

Communication on the Internet



The Internet offers users several different ways of connecting with people. You already know about **email** and **web browsing**. The Internet also provides other means of communication and many more services.

In this chapter, you will learn about some of them.

CHAT, INSTANT MESSAGING, AND NEWSGROUPS

Chat programs and instant messaging let you communicate with other users instantaneously through text messages.

Newsgroups also allow you to interact with many other users, but communication is not instant.

In this Chapter

- Chat, Instant Messaging and Newsgroups
- Blogs and Web Feeds
- Social Networking: Facebook, MySpace, Twitter
- Other Services: E-Greetings, Online Gaming, and Online Telephony
- Cloud Computing and Online Sharing

Chat Rooms

A chat room is a service in which multiple users talk to each other in real time by posting messages, usually on a topic of common interest. Many websites offer chat room facilities. Some popular ones are ICQ.com, delphiforums.com, paltalk.com, teenchat.com, etc.

Did you Know?

Facebook Messenger is an instant messaging service that lets you chat with Facebook friends and other users.

Instant Messaging

Instant messaging (IM) is a communication service over the Internet that allows instant transmission of text-based messages from sender to receiver. Like online chat, instant messaging also offers text-based, two-way message exchange in real time. It is different from online chat in that IM is communication between known users, whereas online chat could also happen between unknown users.

Instant messaging is like a private chat room. It includes only those people whom the user has invited. It creates a list of all your friends, and when a new message arrives from any one of them, an alert pops up on your IM screen. Popular IM services include AOL Instant Messenger (AIM), Skype IM, Windows Live Messenger, Yahoo! Messenger, and Google Talk. IM services may require you to download a program or require only a browser.

Using Yahoo! Messenger

Let us use Yahoo! Messenger to understand how you can start a voice call, send a message, etc.

1. Connect to the Internet.
2. Download and install Yahoo! Messenger from [www.https://messenger.yahoo.com](https://messenger.yahoo.com)
3. Select **Start ► All Programs ► Yahoo! Messenger ► Yahoo! Messenger**.

Or

Double-click the **Yahoo! Messenger** icon on the **Desktop**. This will show the **Yahoo! Messenger** sign-in screen (Fig. 6.1).

4. Enter your Yahoo ID and password and click **Sign in**.
5. The 'Home' screen appears (Fig. 6.2).



Fig. 6.1 Yahoo! Messenger sign-in screen

6. To send an instant message, start a video call, voice call or to send an SMS, click **Actions** and select the desired option (Fig. 6.2).

Do's and Don'ts of Chat

While chatting can be fun and informative, these do's and don'ts are important.

Do's

- Use a chat nickname and not your real name.
- Check the terms, conditions, and privacy statement of the chat site before you begin chatting.
- Use decent language while talking.

Don'ts

- Do not reveal any personal information in a chat room.
- Do not agree to meet someone you have talked to only in a chat room.

Newsgroups

Newsgroups are similar to email, except that messages are not posted to somebody's mailbox but on a bulletin board where any member can read and respond to them. This allows a discussion to take place among several people.

A newsgroup may have several active discussions at one time.

The difference between newsgroups and chat rooms is that newsgroup communication is not instant. As with email, people read and write messages at their convenience.

There are thousands of newsgroups on the web. Newsgroups are organised into official category hierarchies of names and dots, which are read right to left.

For example, **alt.music.jazz** means the jazz music topic in the alt (alternate) category. Other categories are mentioned in Table 6.1.



Fig. 6.2 Starting chat

Table 6.1 Newsgroup categories

Category	Description
Comp	Computer-related topics
Misc	Miscellaneous topics
News	Newsgroup-related topics
Rec	Recreation, including sports, hobbies, etc.
Sci	Scientific topics
Soc	Social and cultural topics
Talk	Politics-related topics
Alt	Varied topics
Alt.binaries	Images and videos
Biz	Topics related to business, commerce, jobs, etc.

BLOGS

A **blog** or a **weblog** is a website on which articles are posted regularly and displayed in reverse sequential order, i.e. with the most recent entry first. Blog entries can have text, hypertext, images, and links to other web pages, video, audio, etc. A blog usually focuses on a particular area of interest. Some blogs, especially those of celebrities, discuss personal experiences.

Authoring a blog, maintaining a blog, or adding an article to an existing blog is called **blogging**. Individual articles on a blog are called **blog posts** or **entries**. Blogs are created through blog-publishing platforms offered by tech-based companies. For example, **Wordpress.com** is a popular blog-hosting platform owned by **Automattic**, a web development company. **Blogger**, owned by **Google**, is at present the most popular blogging platform.

Did you know?



The term **weblog** was coined by John Barger in 1997. In 1999, programmer Peter Merholz shortened **weblog** to simply **blog**.

College student, Justin Hall, created the first blog, **links.net**, in 1994. At that time, it was called a **personal homepage**.

WEB FEEDS

A **web feed** or **news feed** is a facility that informs you when a website you are interested in has new content. It is a good method of keeping up with blogs, news sites, and other sites. You see updates from many sites in a single place and don't need to visit multiple URLs. A program or website that allows you to keep up with new content from websites of your interest is called a **feed reader**. You tell the feed reader which sites you want to see; this is called **subscribing** to the website.

All sites do not provide web feeds. You can only subscribe to websites that provide a web feed. Feeds are often known as RSS (Really Simple Syndication). They are web pages designed to be read by computers rather than people.

Most browsers and email programs have feed readers built in them. Some other feed readers are as follows:

- Feedly (web-based, mobile devices)
- My Yahoo Reader (web-based)
- Omea Reader (standalone program)
- FeedReader (standalone program)
- Awasu (standalone program)

SOCIAL NETWORKING

A website that provides a virtual community for people to keep in touch with friends or share common interests is called a **social networking site**. **SixDegrees** was the first social networking site. It existed from 1997 to 2001. Then came **Friendster** in 2002, **Myspace** in 2003, **Facebook**

in 2004, and **Twitter** in 2006. Today, the most popular social networks are Facebook, Myspace, and Twitter. Let us learn more about them.

facebook

Facebook is a very popular social networking service (Fig. 6.3). It was founded by Mark Zuckerberg, who was a student at Harvard University, USA, in 2004. Initially, membership was for Harvard students only. Later it was extended to other universities, and then to the general public.



Fig. 6.3 Facebook login/sign up page

To use Facebook, you first register as a member. After that, you can fill in details in your personal profile. You can add other users as friends and exchange news, messages, photographs, etc. Users can also form common interest groups, for example, of colleagues, of school or college friends, etc. Many companies have set up their own Facebook pages. It helps to connect and communicate with clients and customers, especially young people.

In the future, Facebook plans to develop applications that allow people to share information in different ways. Facebook keeps adding new features, for example, location tagging, and mobile advertising.

Facebook is the most popular site today for uploading photos.

Did you Know?



LinkedIn is a social networking site focusing on professionals, including job seekers. It is the world's largest professional network and is growing rapidly.

Myspace

Myspace was started by Tom Anderson in July 2003 (Fig. 6.4). Between 2005 and 2008, it was the most popular social networking site. Myspace lets you create a personal profile that you share with family and friends. It has a strong focus on music sharing, with instant messaging and video-playing features. The site became slow and less user-friendly due to heavy advertising and slowly lost out to Facebook.

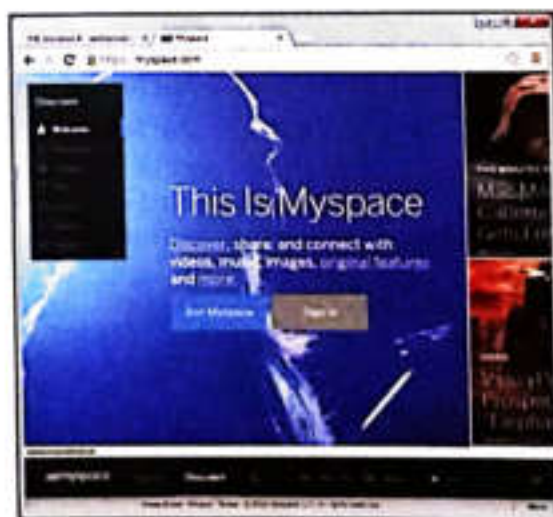


Fig. 6.4 Myspace home page

Myspace has plans to improve performance and speed, and to make the site more navigation-friendly. It also plans to help users express themselves through their individual tastes in music, photos, videos, and other art forms.

Myspace now has an enhanced visual design and also has a version for mobile devices.

Twitter

Twitter was created by Jack Dorsey in March 2006 (Fig. 6.5). It is a social networking service that allows you to communicate by sending short text messages, up to 280 characters long, to your friends or followers. These messages are called tweets. Most people use Twitter to inform others about the latest happenings in their lives. However, it has also played a larger social role by helping organise protests. A good example was the 2011 Egyptian movement that led to the overthrow of the Egyptian President, Hosni Mubarak. It was called a 'Twitter Revolution', because people used Facebook and Twitter to organise and coordinate the mass movement.

In the future, Twitter plans to add features for improved security. Twitter has also been successfully used to inform people about live TV events. They have also launched a feature called **Twitter Amplify**, used by companies to advertise their products.



Fig. 6.5 Twitter sign in/sign up page

OTHER SERVICES

The Internet has transformed the way we entertain ourselves, how we keep in touch with friends, and many other things. Let us learn about some more Internet features.

E-Greetings

You already know that you can send mail over the Internet (email). We can also send greeting cards or e-greetings over the Internet. These are some websites that allow you to send e-greetings:

- <http://www.egreetings.com>
- <http://www.123greetings.com>
- <http://www.americangreetings.com>

Let us see, as an example, how to send a birthday e-card through 123greetings.com.

1. Open the website www.123greetings.com (Fig 6.6).



Fig. 6.6 Home page of www.123greetings.com

2. Type 'Birthday' in the **Search** text box and click **Go**. You will see cards available in the selected category (Birthday).

Note: You could also click the Birthday tab in the card categories.

3. Click the card you wish to send. The card page shows you the full version of the e-card (Fig. 6.7).
4. To send the card, click the **Send** button. Then follow the steps to select the friends and send the card.

Top Tip

If you want to send an e-card to many people or add a message to the card, click on **Send this card to multiple recipients**.



Fig. 6.7 Full version of the e-card

Online Gaming

Online gaming means playing any type of virtual game over the Internet or over a computer network. Online games can be divided into these broad categories:

- Shooter
- Simulation
- Role playing
- Action-adventure
- Strategy

Requirements of online gaming:

- High-speed Internet connection
- Gaming control devices, e.g., Xbox, Playstation, joystick
- Gaming software
- Proper hardware
- Latest Flash and Web browser versions

Some **multiplayer games** are heavy games that must first be installed on the local computer. They are then played over the Internet with other players. Examples are Need for Speed and Call of Duty. A **Massive Multiplayer Online Role-Playing Game (MMORPG)** is a multiplayer game with a huge number of players from around the world, in which players take on roles in a virtual world. Such heavy games are usually developed by a studio and then published by a company.

Multiplayer games played on browsers have to be light, since they are downloaded from a website and stored in the browser cache. Games like FarmVille, CastleVille, CityVille, and Mafia Wars are not installed on the local computer, and can therefore be called purely online games.

Online Telephony

Online telephony, or Internet telephony, is a technology that allows users to make telephone calls over the Internet. You can talk to somebody who is using a computer, or you can make domestic or international calls from your computer to a telephone. When you make a call to a phone, your call goes over the Internet to a local telephone network and then to the telephone you are calling. The only requirements for online telephony are that your computer needs an Internet connection, speakers, and microphone. Calls made over the Internet are much cheaper than international phone calls.

Skype is the most popular Internet telephony software. With Skype, computer-to-computer calls are free. Calls from Skype to a telephone number are not free, but rates are quite low. The Skype software is available for free download from the website www.skype.com.

File Transfer Protocol (FTP)

File Transfer Protocol is the simplest and most secure way to exchange files over the Internet. When you download a file from a website, you are using the Internet to transfer the file from the other computer to your computer. That is why there is a T (Transfer) in FTP. FTP servers can be public or private. Public FTP servers do not require a login and password, whereas private FTP servers do. An FTP address looks like an http or website address, except that the prefix is **ftp://** instead of **http://**.

How FTP Works

FTP works on a **client-server** model. A **client program** lets the user access information and services on the **server computer**. Follow these steps to access an FTP server:

1. Open the FTP website. A dialog box appears, asking you to enter the username and password.
2. After connecting to the FTP server, use Windows Explorer to upload, download, or delete files.

CLOUD COMPUTING AND ONLINE SHARING

Cloud computing is a technology that uses the Internet and central remote servers (computers) to hold data and applications. It allows organisations and users to use applications without installing the software. They can access their files and data from any computer with Internet access. Centralised storage, memory, and processing allow efficient and cost-effective computing.

ThinkFree, **Google Apps**, **Google Drive**, and **Microsoft Office 365** are examples of cloud computing services. Office 365 is an online service for organisations. It offers email, shared calendars, the ability to create and edit documents, instant messaging, conferencing, and more. **ThinkFree Online** gives access to a set of office programs without needing to install them on your personal computer. You can write, save, share, and open office documents online.

Cloud computing has enormous potential. It is expected that, by 2020, most people will use

online software applications and save their files online, rather than depending on software and files on their personal systems.

An **online file sharing** service provides a way to store and access information in the 'cloud' rather than locally on a hard drive. This information could be anything: documents, presentations, data, photos, videos, etc. The advantage of using an online sharing service is that you do not have to support and maintain the data and computers yourself.

Information in an online file sharing service can be accessed from any device with an Internet connection, including smartphones and tablets, and by anyone who has data access rights. Some examples are **OneDrive** for any document, **Picasa** for photos and images, and **YouTube** for videos. Let us take them up one by one.

OneDrive

OneDrive (previously called **Windows Live SkyDrive**) is a password-protected storage area in the cloud, like an online hard disk, hosted by Microsoft Corporation (Fig. 6.8). You can use it to store your files, and access them any time you are online. Users can choose which files they want to share with contacts, make public, or keep private. They can control permissions and decide who can view and/or edit shared documents. OneDrive provides 15 GB of free storage and you can pay to get more.



Fig. 6.8 OneDrive opening screen

Picasa

Picasa is a free photo-management software from Google. The Picasa program lets you:

- View and organise all the photos on your computer.
- Edit and add effects to your photos.
- Share the photos on web albums in the Picasa Web Albums site.

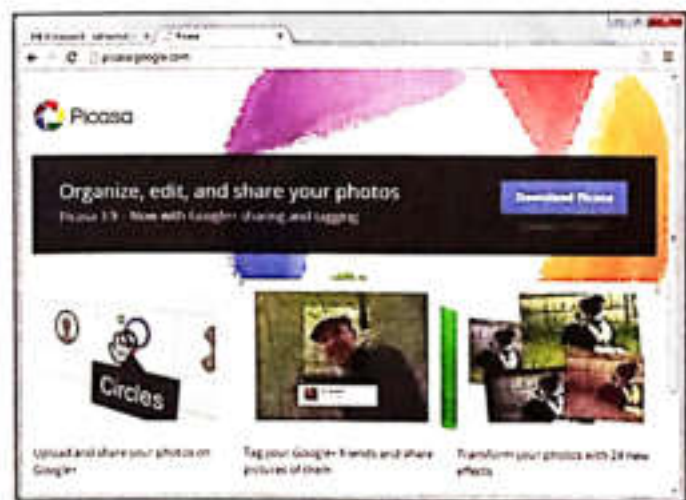


Fig. 6.9 Picasa home page

Picasa Web Albums is a website where you can store and share photos. The Picasa program and the Picasa Web Albums, site work together. Follow these steps to use Picasa:

1. Download the Picasa program from picasa.google.com and install it (Fig 6.9).

2. Double-click the Picasa shortcut on the Windows Desktop to start Picasa.
3. Picasa scans the computer and displays all the pictures it finds, organised by folder. Picasa can also import photos from many sources: camera, CD, memory card, scanner, webcam, etc. Picasa saves these imported photos on your computer and displays them automatically.
4. The **Upload** button lets you transfer photos to your Picasa Web albums account.

Using a photo sharing service like Picasa has two advantages:

- It allows easy photo sharing.
- It provides online backup.

Email is cumbersome if you have many photos to show to your friends. It is better to put them somewhere on the Internet, set up security so that you can control who sees them, and then tell your friends where to find them. Keeping photos online ensures that the photos are safe even if something goes wrong with your computer.

YouTube

YouTube allows people to discover, watch, and share self-created videos. The founders of YouTube were Steve Chen, Chad Hurley, and Javed Karim. At a dinner party in San Francisco, they got the idea of starting a site to allow sharing of video clips that were too big for email. This led to the birth of YouTube in February 2005. In 2006, Google purchased it for \$1.65 billion.

Many companies now use YouTube for launching and advertising their products. Every minute, 24 hours of video is uploaded on YouTube. It is believed that an average Internet user daily spends at least 15 minutes on YouTube.

Did you Know?

Javed Karim posted the very first YouTube video in April 2005. The 18-second video, entitled 'Me at Zoo', shows Karim and some elephants.

Tricky Terms

Chat Rooms websites offering online chat facilities

Newsgroup a group that posts messages on an online bulletin board where anyone can read and respond

Blog website on which articles are posted regularly and displayed in reverse sequential order

Blogging authoring a blog, maintaining a blog, or adding an article to an existing blog

Blog Posts individual articles on a blog

Feed Reader a program or website that allows you to keep up with new content from websites of your interest

Online Gaming playing any type of game through the Internet or over a computer network

Online Telephony technology that allows users to make telephone calls over the Internet

Cloud Computing technology that uses the Internet and central remote servers (computers) to hold data and applications

Memory Bytes

- Chat programs let you communicate with other users instantaneously through text messages.
- A blog or a weblog is a website on which articles are posted regularly and displayed in reverse sequential order.
- A **Web feed** (or **news feed**) is a facility that informs interested readers of new content on a website.
- A social networking website provides a virtual community for people to keep in touch with friends or share common interests.
- Many websites allow you to send e-greetings over the Internet.
- Online gaming means playing any type of virtual game over the Internet or over a computer network.
- Cloud computing allows organisations and users to use applications without installing the software on their systems.
- An online file sharing service provides a way to store and access information, such as documents, data, photos, and video, in the cloud.

EXERCISES

Objective Type Questions

1. Choose the correct option.

- Which of the following are feed readers?
 - Google Reader
 - My Yahoo Reader
 - both i. and ii.
 - none of these
- Which of the following was the first social networking site?
 - SixDegrees
 - Facebook
 - Twitter
 - none of these
- Individual entries on a blog are called
 - Posts
 - Blog posts
 - Blogging
 - none of these
- Which of the following should be kept in mind while chatting?
 - Use a chat nickname and not your real name.
 - Use decent language while talking.
 - Do not reveal any personal information in a chat room.
 - All of the above.
- Which of the following lets you communicate with other users instantaneously through text messages?
 - Chat programs
 - Instant messaging
 - both i. and ii.
 - none of these

- f. Popular instant messaging programs include
i. Skype IM ii. Windows Live Messenger
iii. Yahoo! Messenger iv. all of these
- g. Facebook was founded in
i. 1994 ii. 2004 iii. 2010 iv. none of these
- h. Twitter was created by
i. Jack Dorsey ii. Tom Anderson iii. Mark Zuckerberg iv. none of these

Descriptive Type Questions

1. Answer the following.

- What are the advantages of using an online sharing service?
- What is the use of Picasa?
- Name any two online games.
- Give any two examples of cloud computing services.
- What do you mean by online telephony?
- What is social networking? Name any two social networking sites.
- What are feed readers?
- Mention any two things that you should not do while chatting.
- List three of your favourite forms of communication on the Internet. Give at least two advantages and two disadvantages of each of these.
- Ahmed's older brother uses the Internet to communicate with his friends on Facebook, Twitter, and appropriate chat rooms. In order to create his account, Ahmed's brother has to provide basic personal information. List some of the safety hazards that he may face due to sharing his personal information.
- Practice writing a blog on the importance of communicating wisely on the Internet. Your word limit is 200 words.

Application-Based Questions

- The Computer Science teacher has prepared assignments for students of Class VII. She wants to ensure that all the students receive the assignments. What would be one of the ways to share the files?
- Yameen recently visited New York with her family. She took pictures using a digital camera. She wants to share these pictures with her friends. Which Internet service service(s) can she use for this task?

- c. Insia forgot to send birthday greetings to her friend Maaz. Which Internet service can she use to wish him on his birthday? Suggest any one site she can use for this purpose.
- d. Hammad's sister has gone to the USA for higher studies. Suggest a popular Internet service he can use to call her.



IN THE LAB

1. Your school recently organised some inter-school competitions. You have been given the responsibility to share the pictures of various competitions with other participant schools. Select an Internet service for this task. List the steps needed to upload the photos.
2. Using an Internet service, send New Year greetings to two of your friends.
3. Search the Internet and find two relevant websites for each of the following:
 - a. Online file sharing
 - b. Online gaming
 - c. Internet telephony
 - d. Photo sharing
4. Waleed has been asked by his Computer Science teacher to create a blog where students can post some interesting facts about animals, plants, etc. Help him with this task. What could be a possible title for this blog? Also create a relevant blogpost.

GROUP PROJECT

Blogging time! Let the fun begin! As a group find out how to create a blog in WordPress or Blogger and create one for your group think of an interesting name for the blog first. Select an interesting topic that you all feel passionate about and also one that you think other people will want to read and enjoy. Consider what needs to go in your first blog. Do you need to introduce your topic as well as yourselves? How many words should it be? How do you make sure you haven't written anything offensive or silly by mistake? Make sure you include at least one visual to support your ideas. Best of luck at the start of your blogging journey.



TEACHER'S NOTES

- Spend some time telling the students about online safety and the dangers of befriending strangers. Tell them to be careful and protect their own privacy and that of their friends, family, school, etc.
- Online bullying on social networking sites is a serious problem among children and young adults. If possible, the school counsellor should speak to the children about this.
- Discuss the advantages of e-greetings, cloud computing, and online sharing.
- Discuss the uses of Picasa, OneDrive, YouTube, and FTP in different situations.

Chapter 7

More Tools in flash



In Class 6, you learnt about some Flash CS3 Tools, like the **Line Tool**, the **Oval Tool**, the **Rectangle Tool**, etc.

In this chapter, we will discuss some advanced features of Flash.

PEN TOOL

The **Pen Tool** is used for drawing precise paths like straight lines and smooth curves. You can also adjust the angle and length of straight-line segments and the slope of curves.

Straight lines can be created by simply clicking on the stage, while curved lines can be created by clicking and dragging.

The steps to use the **Pen Tool** are:

1. Select the **Pen Tool**.

In this Chapter

- Pen Tool
- Eyedropper Tool
- Importing a Picture
- Transforming Objects
- Working with Text

- Click on the stage to set the first point.
- Click again to set the second point and keep clicking to set more points. Flash automatically connects the points as you set them.
- You can leave the path open or create a closed shape (Fig. 7.1).

- To complete an open path, double-click the last point or click the **Pen Tool**.
- To close a path, position the pointer over the first point. A small circle will appear next to the pen tip. Click to close the path. Unlike Flash 8, **Flash CS3** does not automatically fill the closed path with colour. Fill colours have to be applied separately.

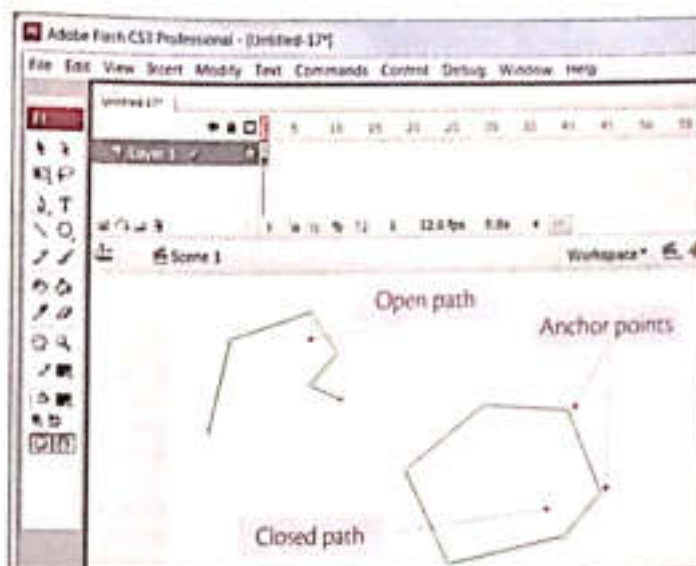


Fig. 7.1 Using Pen Tool

EYEDROPPER TOOL

The **Eyedropper Tool** is used to pick up colours and style from existing lines, brush strokes, and fills. You then apply these colours and styles to other objects. The **Eyedropper Tool** is linked to the **Paint Bucket/Ink Bottle Tool**. You pick a colour from one object with the **Eyedropper Tool** and fill the same colour in another object with the **Paint Bucket/Ink Bottle**. The steps for using the **Eyedropper Tool** are:

- Select the **Eyedropper Tool**. You will notice that the pointer changes to an eyedropper.
- Click the line or fill from where you wish to copy the formatting.
- You will notice that the pointer changes to an ink bottle if you select a line colour, or to a Paint Bucket if you select a fill colour.
- Click the line or fill to which you wish to apply the copied formatting (Fig. 7.2).

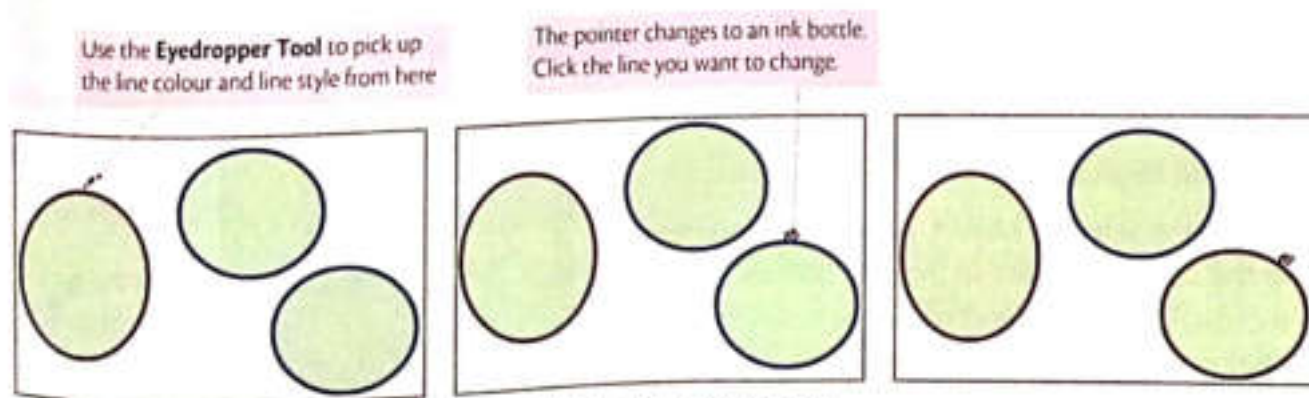


Fig. 7.2 Using Eyedropper Tool

IMPORTING A PICTURE

To import clip art or any other image from your computer:

1. Select **File ► Import ► Import to Stage**.
2. The **Import** dialog box appears (Fig. 7.3).
3. Select the drive and folder. Select the picture you want to insert and click **Open**.

The image will be added to the stage. Now you can work with it in the same way that you work with other objects.

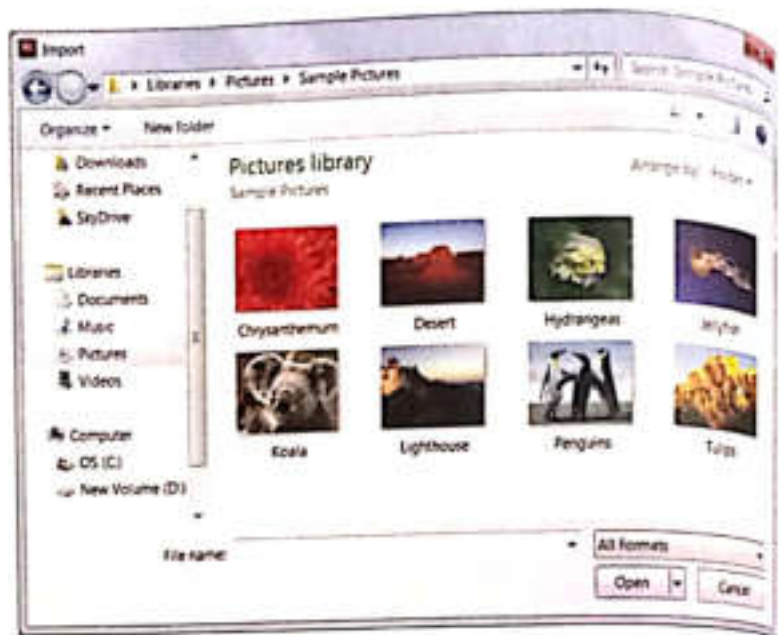


Fig. 7.3 Import dialog box

TRANSFORMING OBJECTS

Once you have an object on the stage, you can transform it in various ways. You can move it, rotate it, or change its shape and size. If a gradient was applied to the object, you can change the gradient in various ways.

Free Transform Tool

The **Free Transform Tool** is used to move, rotate, or scale an object. To scale an object means to increase or decrease its size. Let us consider an example to understand how to use this tool.

1. Draw a figure on stage or import a picture.
2. Select the object and click the **Free Transform Tool**.
3. As you move the pointer over different parts of the selection, it changes to indicate which transformation function is available.

Moving an Object

To move the selected object, position the pointer over the selected object so that the pointer changes to a cross. Drag the object to a new position with the left mouse button pressed (Fig. 7.4).

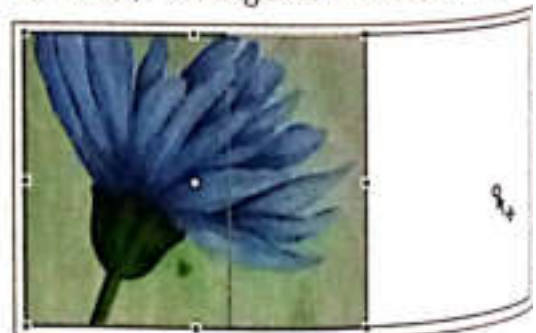


Fig. 7.4 Moving an object

Rotating an Object

To rotate the selected object, position the pointer over one of the four corner handles. When the pointer changes to a curved arrow, click and drag to rotate the object (Fig. 7.5).

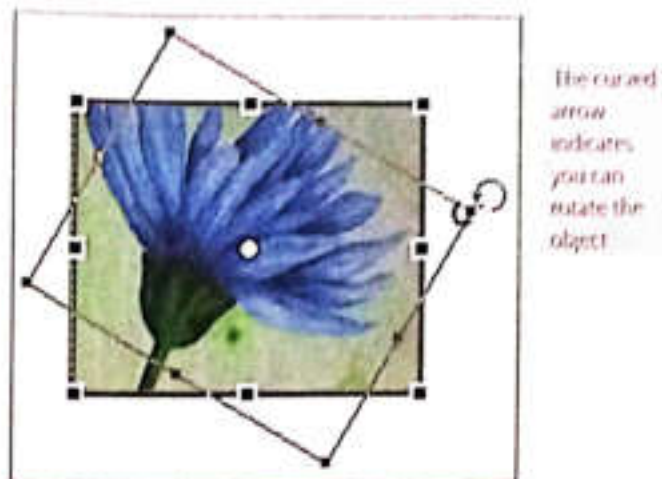


Fig. 7.5 Rotating an object

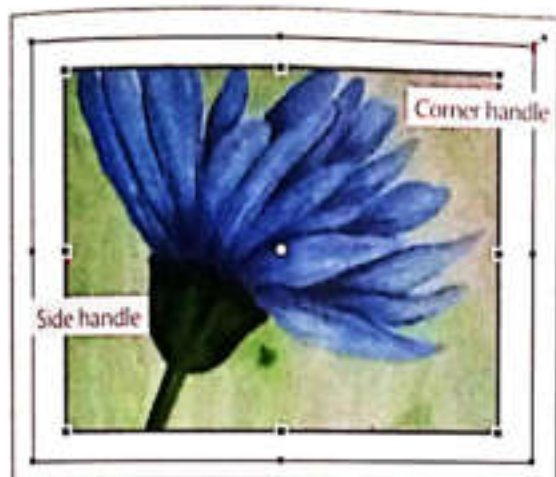


Fig. 7.6 Scaling an object

Scaling an Object

To scale the selected object in two dimensions, drag a corner handle diagonally.

To scale the object in a single direction, drag one of the side handles in the desired direction (Fig. 7.6).

Gradient Transform Tool

After you have applied a gradient to an object, you can transform the gradient by adjusting its size, direction, or centre. To modify the gradient fill of an object, first select the **Gradient Transform Tool**. Then click on the object that is filled with the gradient.

Linear Gradient

An object filled with a linear gradient looks as shown alongside (Fig. 7.7a).

Notice the boundary around the object.

The line on the right has a **rotation handle** and a **width adjustment handle**.

You can change the gradient fill in any of the following ways:

- To reposition the centre point of the gradient fill, click and drag the centre point. You will be able to drag the point only after the cursor changes to a four-arrow cursor pointing left and right, up and down. Bring the cursor to the circular handle at the centre point for this to happen (Fig. 7.7b).

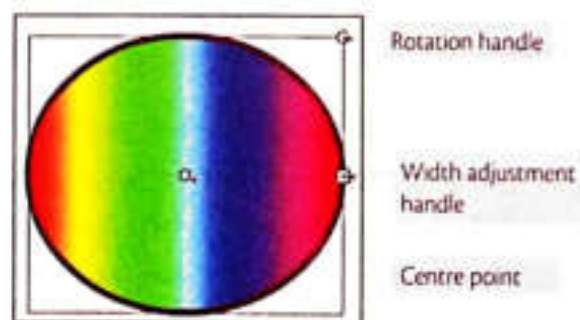


Fig. 7.7a Linear gradient fill

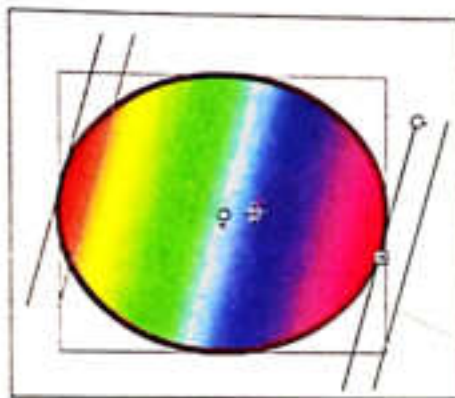


Fig. 7.7b Changing the centre point of the gradient fill

Four-arrow cursor

Click and drag the centre point

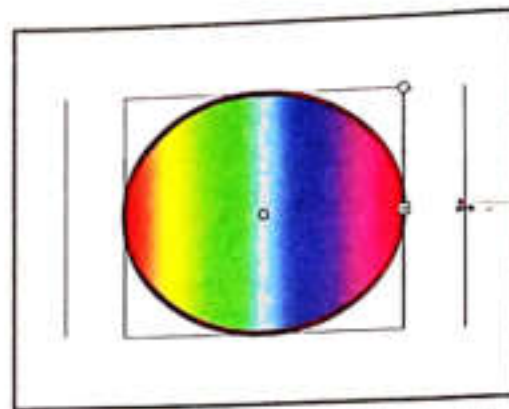


Fig. 7.7c Changing the width of the gradient fill

Drag the width adjustment handle left or right

- To change the width of the gradient fill, drag the width adjustment handle to the left or right. Note that only the gradient is resized, not the object (Fig. 7.7c).
- To rotate the gradient fill, drag the circular rotation handle clockwise or anti-clockwise (Fig. 7.7d).

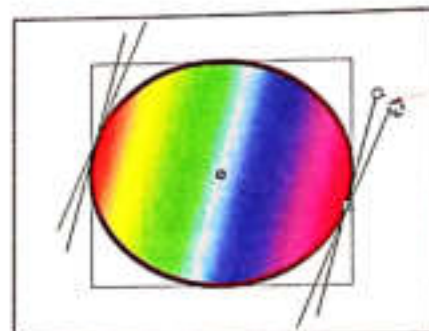


Fig. 7.7d Rotating the gradient fill

Drag the rotation handle clockwise or anti-clockwise

Radial Gradient

When you select the **Gradient Transform Tool** and click on an object filled with a radial gradient, it looks as shown in the adjacent figure. Notice the ellipse around the object (Fig. 7.8).

As in the case of a linear gradient, you can drag the centre point to adjust the centre of the gradient. You can also drag the adjustment handles to change the size or radius of the gradient (Fig. 7.8).

Changing Colour or Transparency of an Instance

In Class 6, you learnt how to convert a drawing into a **symbol** and store it in a folder called **Library**. You know that an **instance** is an occurrence of a symbol. Each time you insert a symbol in a movie, you create an instance of that symbol.

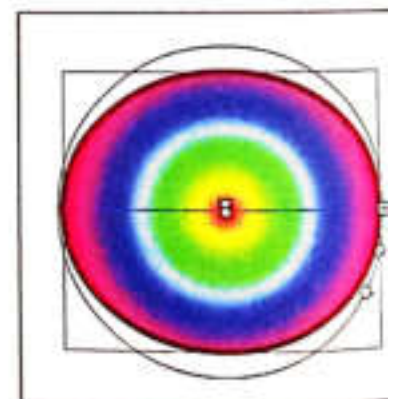


Fig. 7.8 Radial gradient

We can modify the colour properties of a particular instance or change its brightness or transparency. The steps are:

1. Use the **Selection (Arrow) Tool** to select an instance of the symbol.
2. To change the colour: Click the drop-down menu arrow for **Color** in the **Property inspector** window, choose **Tint**, and change the percentage (Fig. 7.9). A higher percentage gives a lighter colour and a lower percentage gives a darker colour.

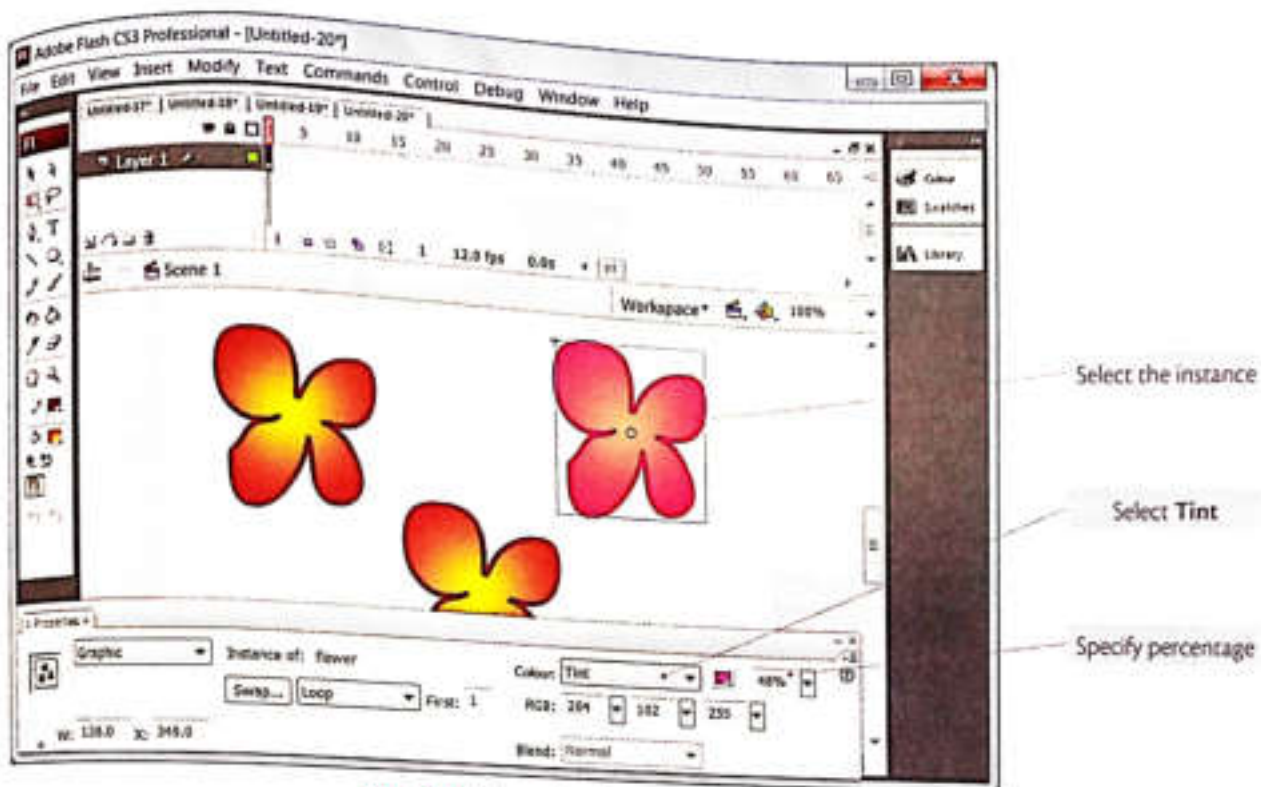


Fig. 7.9 Changing the colour of an instance

- To change the transparency: In the **Property inspector** window, click the drop-down menu arrow for **Color**, choose **Alpha**, and change the percentage (Fig. 7.10). For example, if you set it at 44%, the instance will look as shown in Figure 7.10.

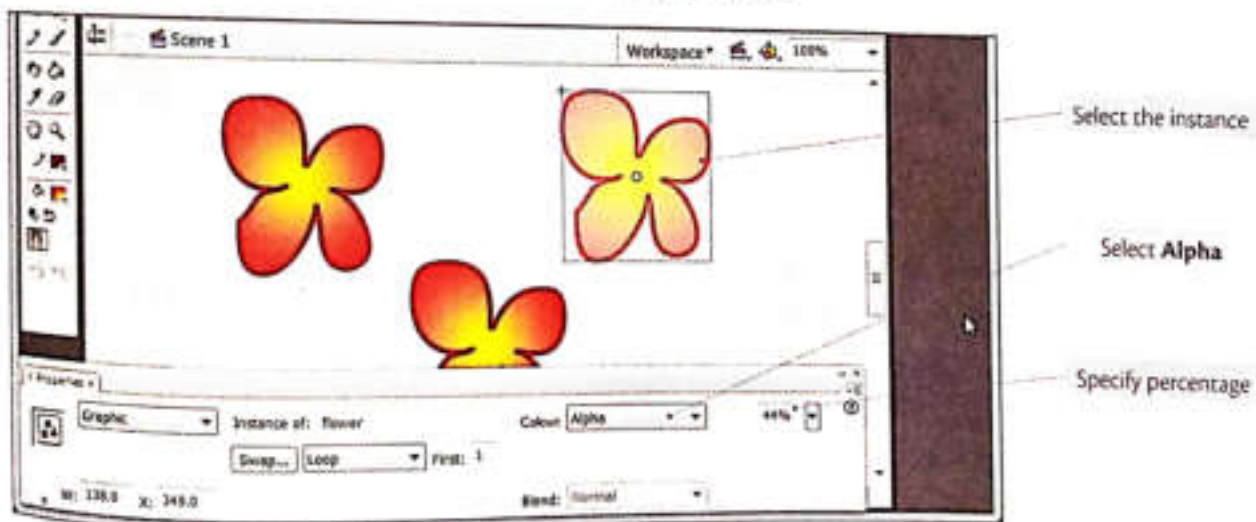


Fig. 7.10 Changing the transparency of an instance

Grouping Outlines and fill

When you draw an object, say a rectangle or a circle, Flash creates two objects: one is the outline and the other is the fill.

To move the object to a new position, you need to select **both the fill and the outline**. If you do not select both, only the selected part will move.

To solve this problem, it is good to group the outline with the fill and make the drawing a single object. (Fig. 7.11)

The steps to group the outline and the fill are:

1. Using the **Arrow Tool**, select both the outline and the fill.
2. Select **Modify ► Group**.

Fast forward

Group selected objects

CTRL + G

Break apart grouped objects

CTRL + B

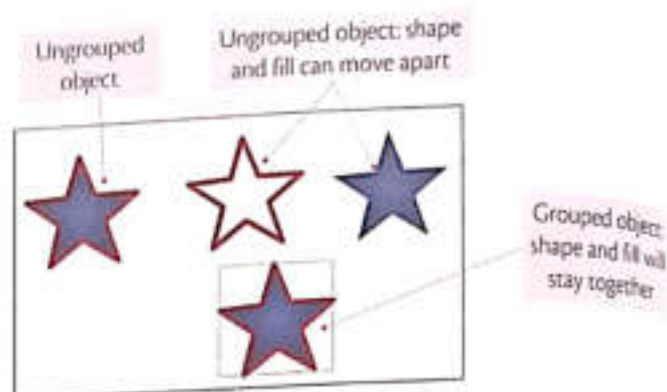


Fig. 7.11 Grouped and Ungrouped objects

Top Tip

To break apart a grouped object, select the object and then select **Modify ► Break Apart**

WORKING WITH TEXT

Flash allows you to add text to your movies. You can set various attributes for text: **style**, **font**, **size**, **colour**, **alignment**, etc. You can also create special effects by manipulating text, just like you manipulate other objects.

Text Tool T

The **Text Tool** is used for inserting text on the stage. Let us consider an example to understand how this tool is used.

1. Select the **Text Tool**.
2. Click on the stage and start typing. Notice that this creates an expanding one-line text block. As you type, the block gets wider. If you want text in the next line, just press ENTER.
3. You can also set the width of the text block. To do this, just resize the text box Manually. You will notice that the width is now fixed. Words wrap to the next line when they reach the edge of the text block.
4. To format the text, select the text block, and use the **Property inspector** to set font, font size, color, and other attributes for the text.
5. To change the orientation of the text, select the text block, and use the **Property inspector** to change text orientation from horizontal to vertical (Fig. 7.12).



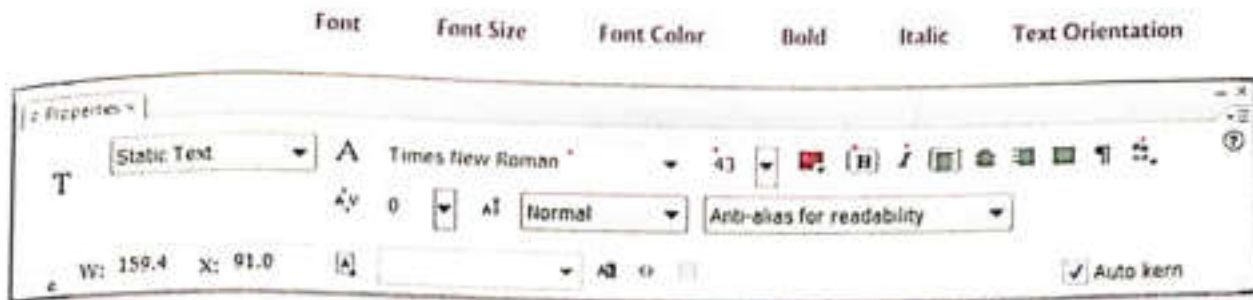


Fig. 7.12 Changing text properties with the Property inspector

Converting Text into Basic Shapes

Flash has a unique feature to convert text into a basic shape. You can then reshape a character using the **Selection Tool**. You can also fill characters with a gradient. However, after converting text to a shape, you can no longer edit it as text.

1. Select the text.
2. Select **Modify ► Break Apart**. This breaks the single text block into multiple text blocks. Each character has its own separate text block. The text is in the same position.
3. Select **Modify ► Break Apart** once more. The characters can now be converted into shapes. They cannot be considered text any more. You can no longer change the font, font size, etc. In i and !, the dot, and the vertical line are separate characters.
4. Click outside the converted text to deselect the shapes. Now you can manipulate these shapes like any other shape. Move the pointer to the edge of one of the characters and drag to reshape it. You can use the **Paint Bucket Tool** to fill this reshaped character with another colour or gradient.

Have Fun!

Have Fun!

Have Fun!

Animating Text with Timeline Effects

Flash provides built-in **Timeline Effects** that help you create animations by simply selecting a few options. You can apply effects like **fade in**, **fade out**, **explode**, etc. Consider the following example to understand how to do this:

1. Create a new Flash document. Using the **Text Tool**, type Smile! on the stage.
2. Right-click the text. From the context menu that appears, select **Timeline Effects ► Effects** (Fig. 7.13). Then select the desired effect from the list. Or select **Insert ► Timeline Effects** and then select the desired effect from the list (Fig. 7.14).

Top Tip



Timeline Effects can be applied to a drawing object, a picture, or a symbol.

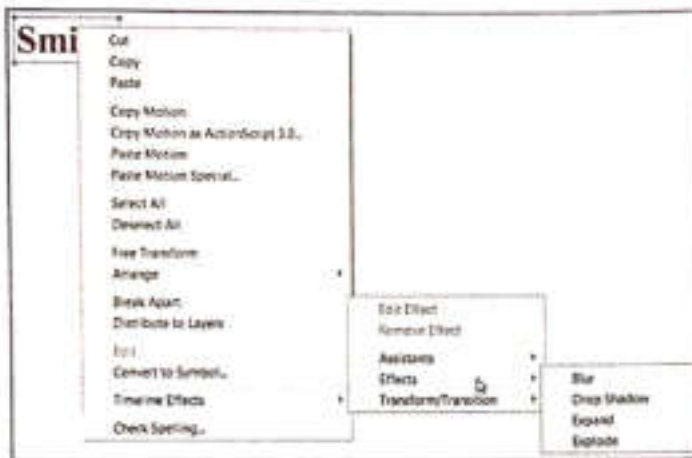


Fig. 7.13 Timeline Effects in the context menu

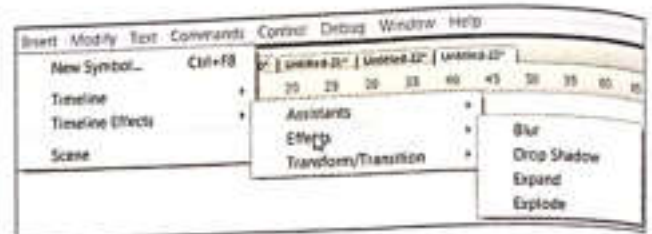


Fig. 7.14 Timeline Effects in the Insert menu

3. Choose an animation, for example, **Effects ► Explode**. The **Explode** dialog box appears. On the right, it shows a preview of the animation with default settings.

Change the settings if desired and click **OK** (Fig. 7.15).

4. Notice the change in the **Timeline** window (Fig. 7.16). It now has frames and animation.

5. Save the file.

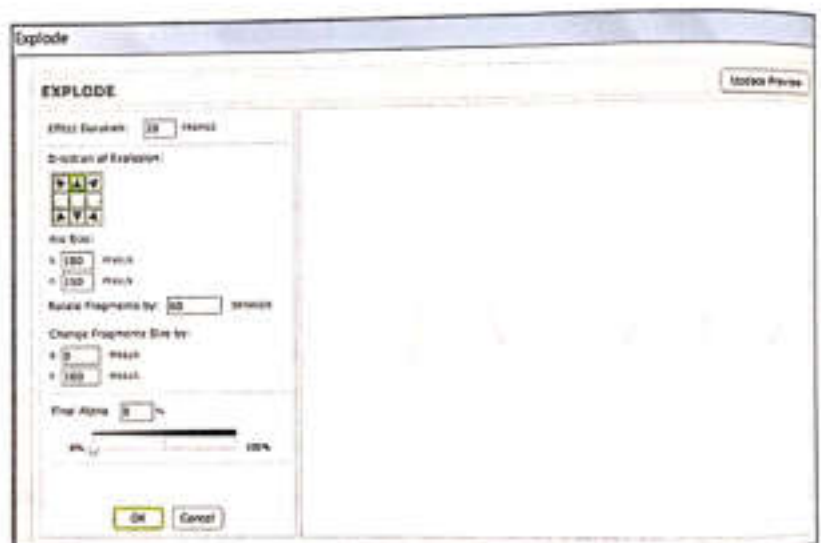


Fig. 7.15 Explode dialog box showing a preview

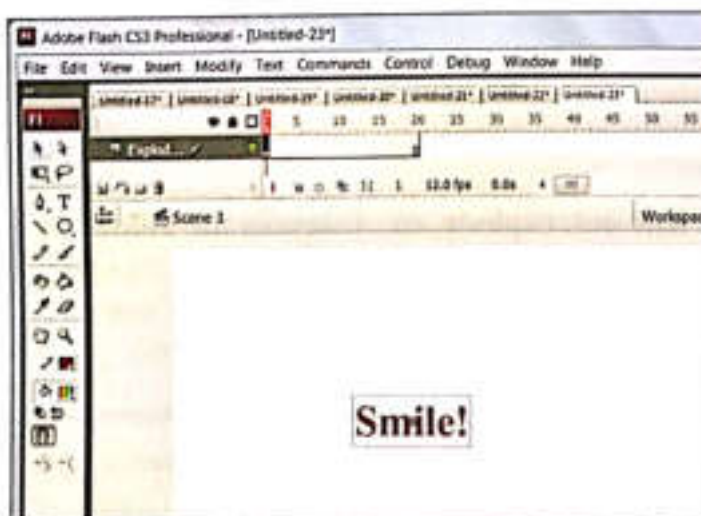


Fig. 7.16 Timeline Effect applied to the text

6. Press **ENTER** to play the movie. You can also press **CTRL + ENTER** to test the movie in a separate window.

Animating Text with Shape Tweening

Another simple method of animating text is to use **shape tweening**. The steps to apply shape tween to text are:

1. Create a new Flash document.
2. Select frame 1. Use the **Text Tool** to write '**Plan out your work**'.

3. Use the **Arrow Tool** to select the text and select **Modify ► Break Apart** (Fig. 7.17).
4. Select **Modify ► Break Apart** again.
5. Select frame 40 and insert a keyframe by pressing F6.
6. Delete the old text. Use the **Text Tool** again and enter the words 'and work out your plan' (Fig. 7.18).

You can also change the **font**, **colour**, and **size** of the text if you wish to.

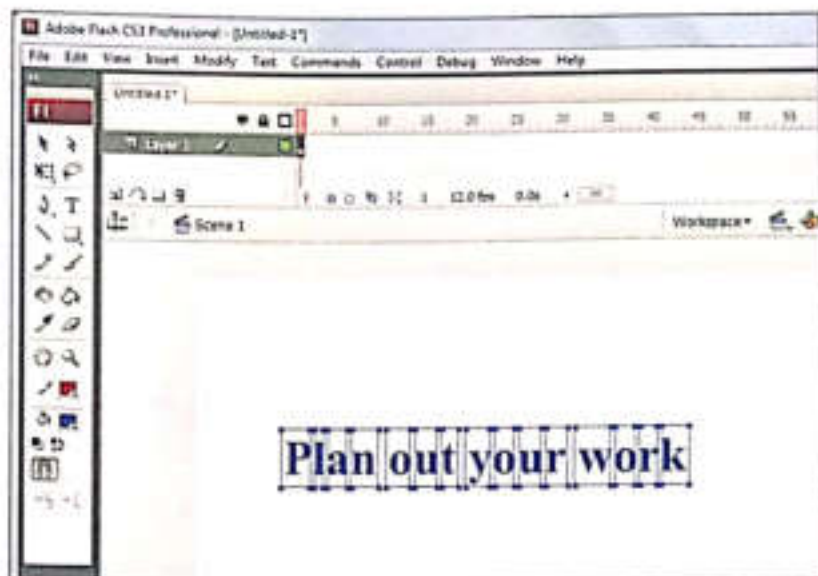


Fig. 7.17 Frame 1

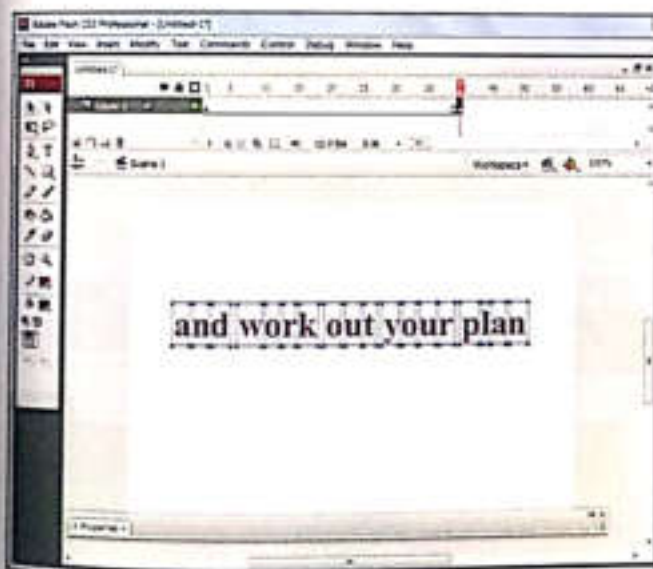


Fig. 7.18 Frame 40

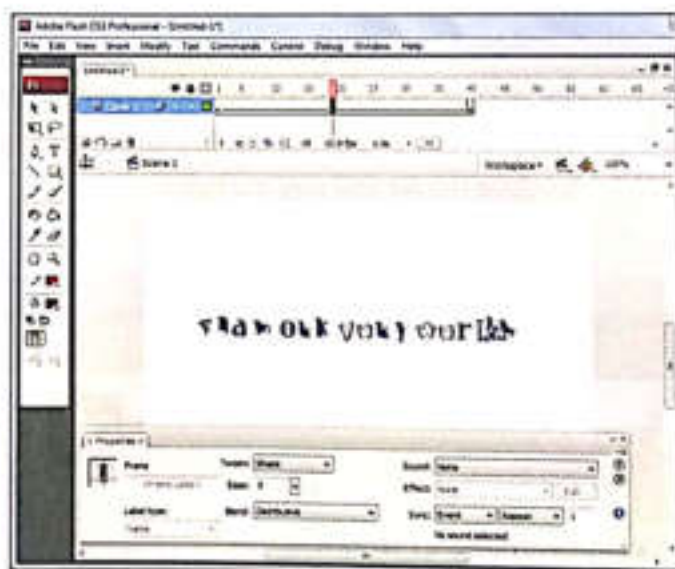


Fig. 7.19 Applying shape tween to the text

7. With frame 40 still selected, select the text with the **Arrow Tool**. As you did earlier, select **Modify ► Break Apart** twice.
8. Select any frame between frame 1 and frame 40. In the **Property inspector**, click the drop-down menu arrow of the **Tween** option and select **Shape** (Fig. 7.19).
9. Save the file and play the movie.

PRACTICE TIME



Asma has been assigned by her Computer Science teacher to create an animation to change the text 'Enjoying' into 'With Flash!'. How should she proceed? Could you help her with the steps?

SOLUTION

1. Create a new Flash document.
2. Select frame 1. Use the **Text Tool** to write "Enjoying" on the stage.
3. Use the **Arrow Tool** to select the text and select **Modify ► Break Apart**.
4. Select **Modify ► Break Apart** again.
5. Select frame 40 and insert a keyframe by pressing F6.
6. Delete the old text. Use the **Text Tool** again and enter the words 'With Flash!'.
7. With frame 40 still selected, select the text with the **Arrow Tool**. As you did earlier, select **Modify ► Break Apart** two times.
8. Select any frame between frame 1 and frame 40. In the **Property inspector**, click the drop-down menu arrow of the **Tween** option, and select **Shape**.
9. Save the file and play the movie.

Enjoying!

With Flash!

Computer Manners



The surroundings of the computer should be kept neat and tidy. It is a good idea to switch off the computer and keep the monitor, keyboard, and cabinet covered when not in use. Good-quality covers protect these devices against dust and damage.

Tricky Terms

Symbol a graphic image, animation, or button that is stored with a Flash movie. It can be used multiple times

Instance an occurrence (copy) of a symbol in a Flash movie

Library a folder in which symbols in a Flash movie are stored

Memory Bytes

- The **Pen Tool** is used for drawing precise paths such as straight lines or smooth curves.
- The **Eyedropper Tool** is used for acquiring colours and styles from existing lines, brush strokes, and fills and applying the same to other objects.
- You can import external pictures into your Flash movie.
- The **Free Transform Tool** is used to move, rotate, or scale an object.
- The **Gradient Transform Tool** is used to transform the gradient applied to an object.
- You can change the colour and transparency of an instance of a symbol.
- You can add text to Flash movies and change attributes like style, font, size, and colour.
- You can convert text to basic shapes.
- You can add simple animations by using **Timeline Effects**.

EXERCISES

Objective Type Questions

1. Fill in the blanks with the correct words.

instance corner Library animations Property

- Symbols are stored in the folder in a Flash document.
- An occurrence of a symbol on the Stage is called an
- You have to drag a handle to scale the object both horizontally and vertically.
- The inspector is used to set the text properties.
- You can add simple using Timeline Effects.

2. Choose the correct option.

- a. The Break Apart option is available on clicking the menu.
i. Modify ii. Edit iii. File iv. none of these
- b. You can apply Timeline Effects to a
i. Drawing object ii. Picture iii. Symbol iv. all of these
- c. Fade in, Fade Out, and Explode are examples of
i. Timeline Effects ii. Break Apart iii. Text options iv. none of these
- d. The keyboard shortcut to break apart a grouped object is
i. Ctrl + G ii. Ctrl + B iii. Shift + B iv. none of these
- e. When you draw an object, Flash creates which of the following objects?
i. Outline ii. Fill iii. Both i. and ii. iv. none of these
- f. To change the transparency, in the Property inspector, click the drop-down menu arrow of the Colour option and choose
i. Alpha ii. Tint iii. Colour iv. none of these
- g. The Free Transform Tool can be used for which of the following purposes?
i. Move ii. Rotate iii. Scale iv. all of these
- h. The Import option is available in the menu.
i. File ii. Modify iii. View iv. none of these

Descriptive Type Questions

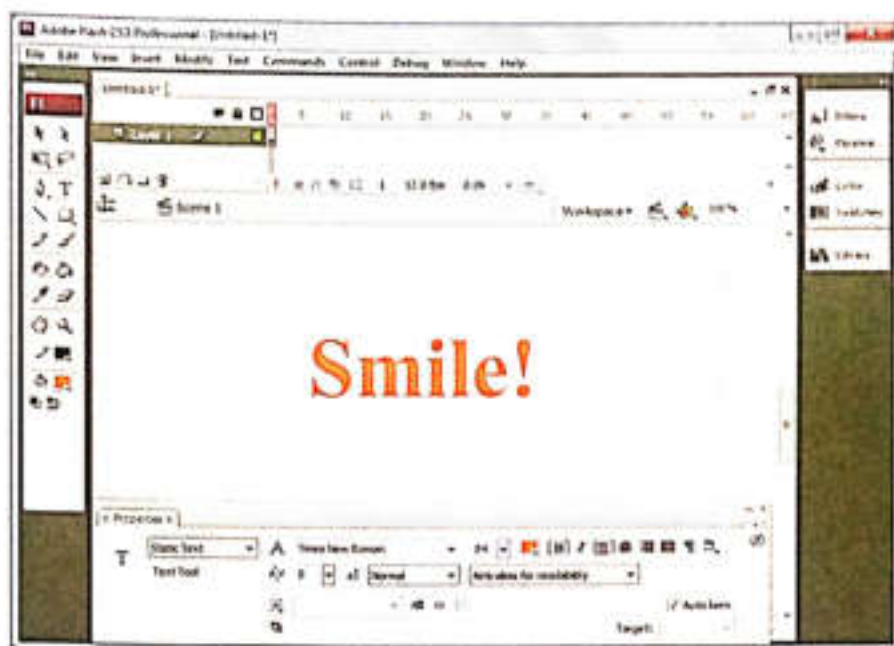
1. Answer the following.

- What is the use of the Pen Tool?
- How will you import a picture from your computer on to the Stage?
- Which tool will you use to rotate an object?
- How can you move an object from one position to another?
- How can you scale an object in a single direction?
- Name the folder in which symbols are stored.
- List the steps to group the outline and the fill of an object.
- Can you convert text into basic shapes? If yes, list the steps to do so.
- In Flash software, why is it important to be able to change text into basic shapes?
- Flash provides the user with the ability to work with colours in a number of different ways. Based on what you have learned, evaluate the use of different colour options in Flash and their importance.
- Create a short Flash document about your school, using as many of the tools you have learned about so far.

Application-Based Questions

a. Observe the adjoining figure and answer the following questions:

- Name the tool used to write the word 'Smile!' on the Stage.
- Can you convert this text into a basic shape? Name the menu and the option that will be used for this purpose.
- Which tool will you use to change the shape of the characters of this word?



b. Alvina has written her

favourite quotation in a Flash document. She wants to give some animation effects to the text.

- What are built-in animation effects in Flash called?
- Name the menu and the option that will be selected to give these animation effects.
- Name any two animation effects.

c. Umair has drawn a circle with a red outline and a yellow fill on the Stage in Flash. When she tries to move this circle to another position, she is able to move only the outline.

- Can you explain why she is not able to move the whole object?
- How can this problem be solved?
- Write the steps that will be required as a solution to this problem.

d. Shehla has collected pictures of butterflies. She now wants to use these pictures in a Flash movie.

- Name the menu and the option she will use for this purpose.
- Which tool will you use to change the size of these pictures?
- Can you rotate these pictures? List the steps.



IN THE LAB

- Amir has been asked to create a Flash document that contains his name. Then he has to apply a timeline effect to the text. Help him create the document. Then you may use shape tweening to convert Amir's name into your name.
- Ghazanfar has to create an animation in Flash in which he has to write the word "HAPPY" in the first frame and "NEW YEAR" in the 20th frame. Help him create the animation and select a timeline effect that you prefer.

3. Sania has designed pictures of flowers in Flash. Help her convert these into symbols and then store them in the Flash Library.
4. Usman has learnt how to convert text into basic shapes. He has written the name of his school and converted the characters into shapes. Do the same using the name of your school and convert the characters into different shapes. Also change the colour of the characters.

GROUP PROJECT

Enjoy playing with the time line effects. Create your own animated text using timeline effects (see pages 107–108 in Keyboard Book 7 if you need some help). How far can you go with this animation? What are the different choices you can make? How do you think you can use it in your school? Could animated text be used on a screen welcoming visitors?



TEACHER'S NOTES

- Before starting the chapter, briefly revise the tools already taught in Class 6.
- A demonstration of how to create symbols and instances, and then how to modify instances could be useful.
- Students should be encouraged to experiment with converting text to symbols and with applying different timeline effects.

Chapter 8

Animations in flash



In Class 6, you learnt how to create basic animations. You also learnt that a Flash movie consists of **frames**, which are the basic units of a Flash movie. We enter the content for each frame, after which Flash displays the frames in a series to play the movie.

THE TIMELINE AND LAYERS

The **Timeline** window helps to organise the contents of a Flash document. It contains layers for organising the contents on the Stage. Figure 8.1 shows the main elements of the Timeline.

The Timeline shows frames as a series of rectangles in each layer. Every fifth frame has the frame number. Frames with black dots are **keyframes**. The light red rectangle in the header, with a red frame and red vertical line below it, indicates the **Playhead**. That is the frame currently on the Stage. The frame rate shows the number of frames per second your animation will play.

In this Chapter

- The Timeline and Layers
- Animation with Motion and Shape Tweening
- Using a Masking Layer
- Animation using a Motion Guide
- Applying Filters
- Applying Timeline Effects
- Working with Sound

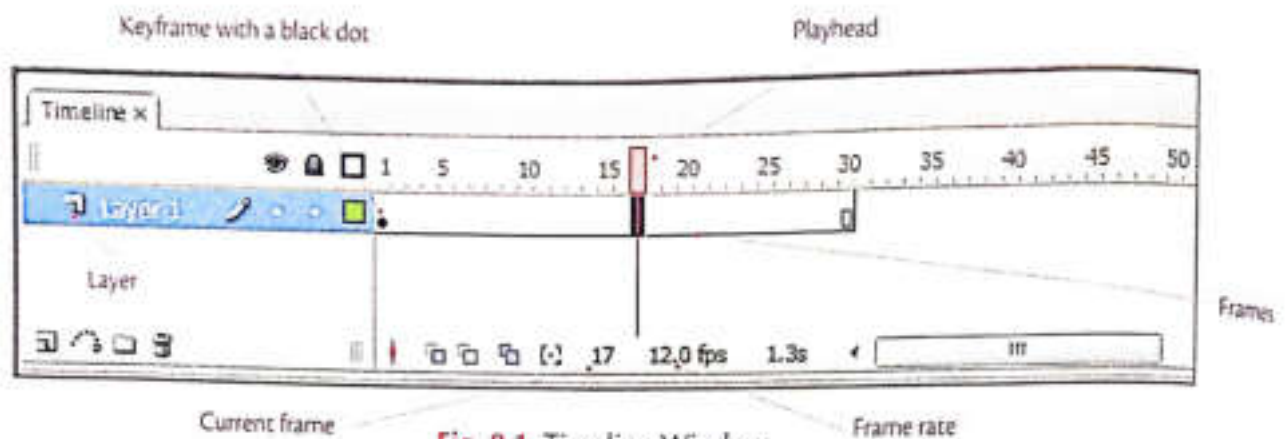


Fig. 8.1 Timeline Window

To insert a frame or keyframe:

1. Click on a rectangular placeholder where you want to insert a frame or keyframe.
2. Select **Insert ► Timeline ► Frame** Or **Insert ► Timeline ► Keyframe**



Understanding Layers

You can think of layers as transparent sheets stacked one on top of the other. You can rearrange the order of layers to set the order of objects in the movie, i.e. you can decide which object(s) should appear first (in the top layer) and which object(s) appear later (in a lower layer). You can draw, edit, and animate objects in one layer without affecting the objects on another layer.

Each new movie contains a single layer by default, but you can add as many layers as you want. The **Timeline** displays layers as rows. It provides options to insert, lock/unlock, or hide/unhide a layer (Fig. 8.2).

To select a layer, click on the layer name.

Inserting a layer

To insert a layer, select

Insert ► Timeline ► Layer

Or

Click **Insert Layer** at the bottom of the **Timeline** (Fig. 8.2).

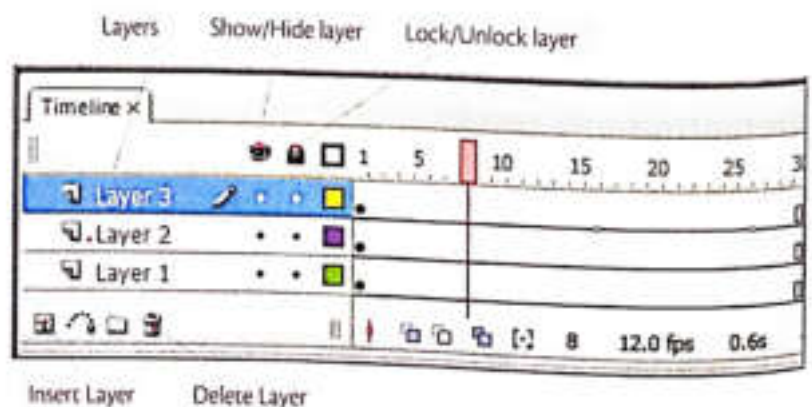


Fig. 8.2 Timeline with layers

Renaming a layer

To rename a layer, double-click the layer name and type the new name (Fig. 8.3).

Changing the Order of layers

When images on different layers overlap, objects in higher layers appear in front of objects in layers below them. To change the order of the layers, click the name of the layer you want to move and drag it to the required position.

Deleting a layer

When you delete a layer, you also delete all objects on the layer. To delete a layer, click the name of the layer and click the **Delete Layer** button at the bottom of the Timeline.

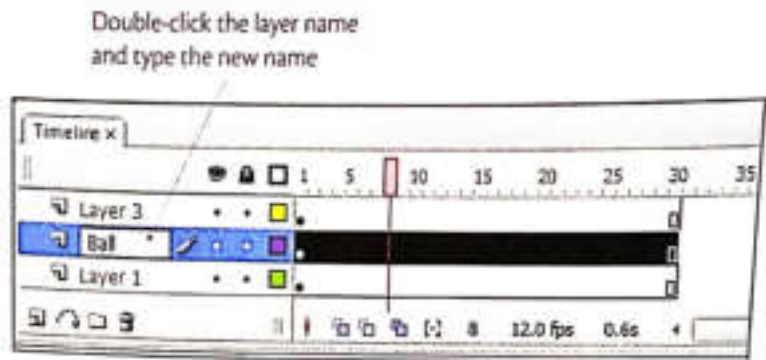


Fig. 8.3 Renaming a layer

ANIMATION WITH MOTION TWEENING AND SHAPE TWEENING

In Class 6, you learnt how to create motion tweening and shape tweening animations, separately. The example we will take up now will create an animation that includes both motion tweening and shape tweening.

1. Create a new Flash document.
2. Rename Layer 1 to Circle.
3. Click Frame 1. Select the **Oval Primitive Tool**, set fill colour to orange, and draw a circle (Fig. 8.4).
4. In the **Property inspector**, change the **Inner Radius**, **Start angle**, and **End angle** so that the shape looks as shown in Figure 8.5.

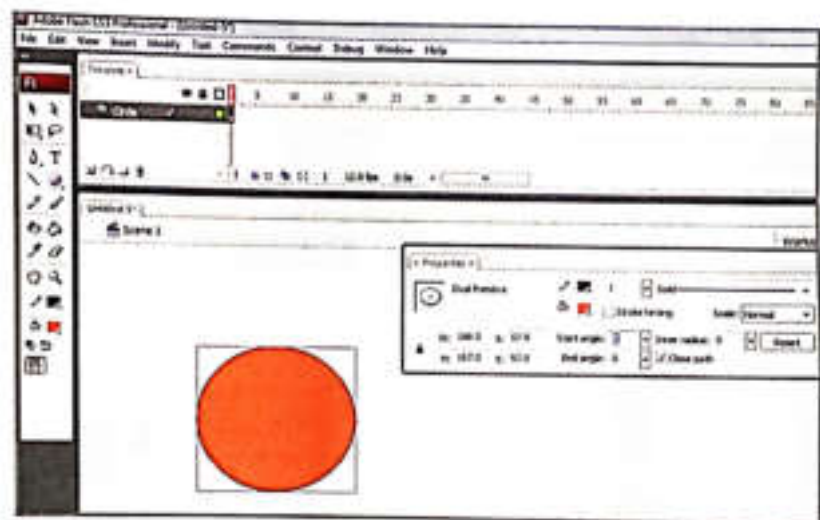


Fig. 8.4 Drawing a circle using Oval Primitive Tool

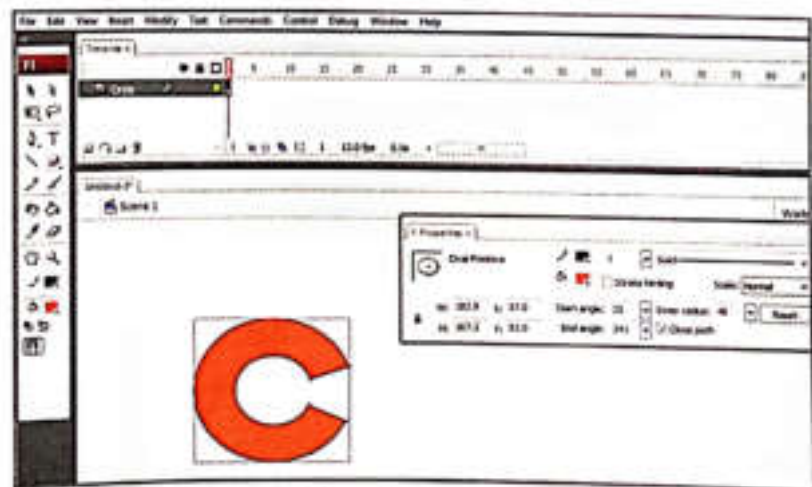


Fig. 8.5 Changed shape of the circle

5. Select frame 50 in the Timeline and insert a keyframe by selecting **Insert ► Timeline ► Keyframe**.

6. Change the colour and shape of the circle as shown in Figure 8.6.

7. Select any frame between 1 and 50. In the **Property inspector**, select **Shape** under **Tween** options.

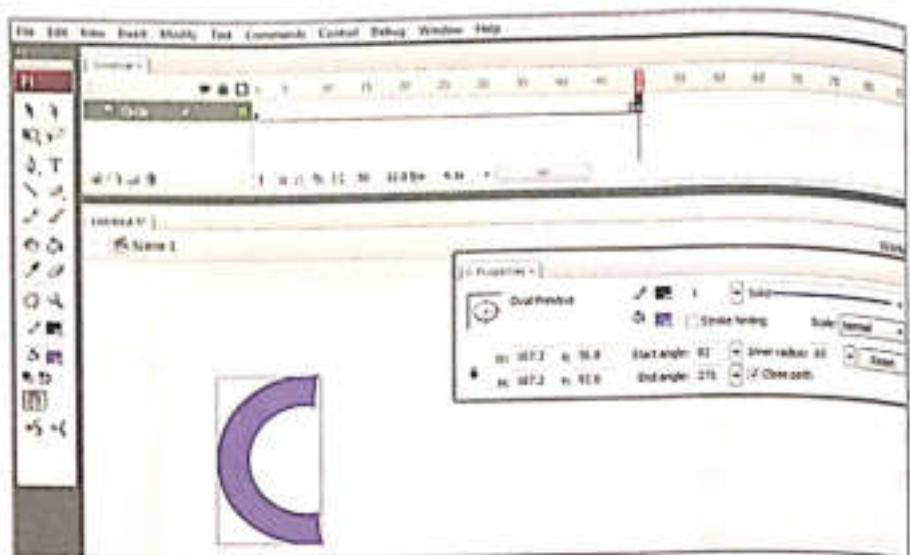


Fig. 8.6 Changing colour and shape of the circle in frame 50

8. Add a new layer by clicking **Insert Layer** at the bottom of the **Timeline**. Rename this new layer and give it the name **Ball**.
9. Click Frame 1 of the **Ball** layer and draw a circle using the **Oval Tool** at the position shown (Fig. 8.7).
10. Double-click in the circle to select both the outline and the fill. To group this object select **Modify ► Group**.
11. Select frame 50 of the **Ball** layer and insert a keyframe by selecting **Insert ► Timeline ► Keyframe**.

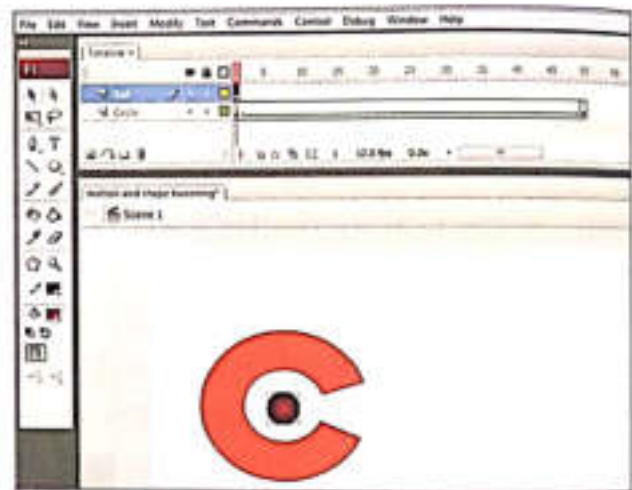


Fig. 8.7 Drawing a circle in Ball layer

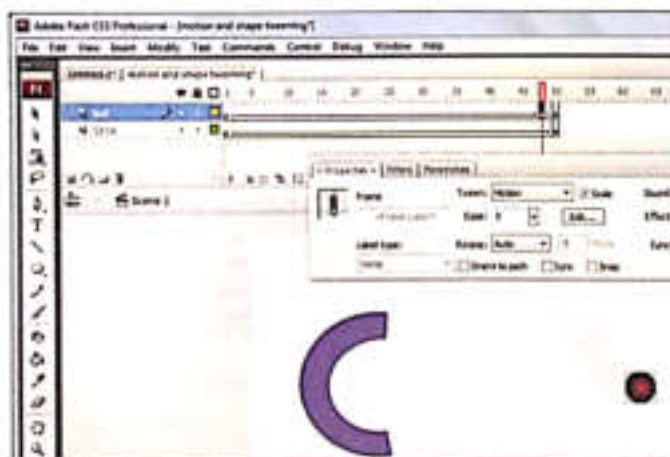


Fig. 8.8 Creating motion tween in Ball layer

12. With frame 50 of the **Ball** layer still selected, change the position of the ball.
13. Create a motion tween in the **Ball** layer: Select any frame between frame 1 and frame 50. In the **Property inspector**, click the drop-down menu arrow of the **Tween** option and select **motion** (Fig. 8.8).
14. Save the movie.
15. Play the movie by pressing **ENTER** or selecting **Control ► Play**.

Using the Onion Skin Feature

The **Onion Skin** feature lets you see the relative position of an object over several frames.

Turn on the onion skin feature by clicking the **Onion Skin** button at the bottom of the **Timeline** window (Fig. 8.9). You can control the number of frames by dragging the **Start Onion Skin** and **End Onion Skin** markers in the **Timeline**.

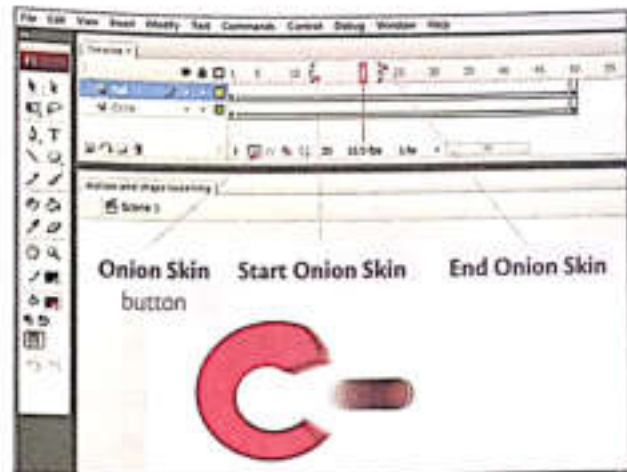


Fig. 8.9 Using Onion Skin

USING A MASKING LAYER

You can create special animation effects with the **Mask Layer** feature. You can think of a mask layer as a curtain with a hole in it. The curtain hides the layer behind it, except for the little bit you see through the hole.

Let us learn more about this feature with the help of an example:

1. Create a new Flash document.
2. Select **Modify ► Document** to display the **Document Properties** dialog box and change **Background color** to black.
3. Rename Layer 1 and give it the name Smile.
4. Select the **Text Tool** and choose your desired font, size, colour, etc. in the **Property inspector**. Type **KEEP SMILING!** on the stage (Fig. 8.10).
5. Click **Insert Layer** at the bottom of the **Timeline** to insert a new layer. Rename the new layer **Mask**.
6. Click frame 1 of the new **Mask** layer. Use the **Oval Tool** to draw a white-coloured oval that is bigger than the height of the text (Fig. 8.11). Convert it into a symbol.

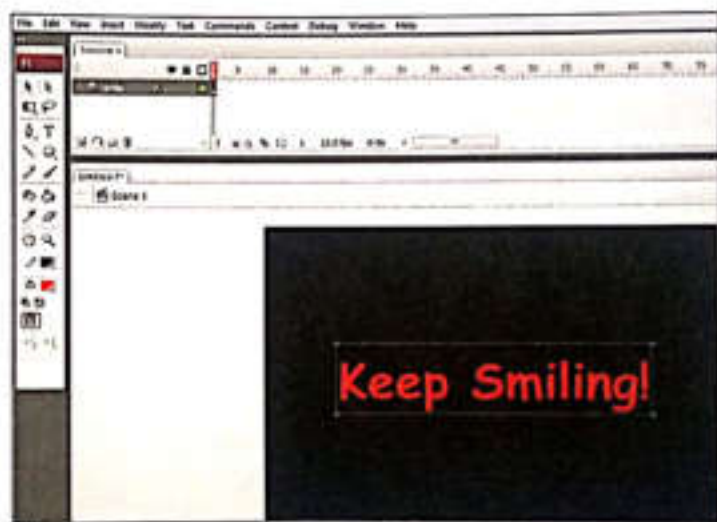


Fig. 8.10 Type this text using the Text Tool

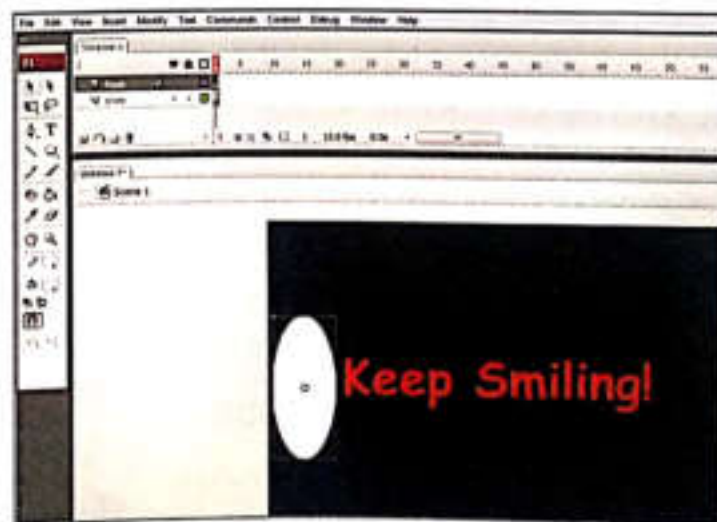


Fig. 8.11 Drawing a white oval

Top Tip



To convert a drawing into a symbol:

1. Select the drawing and press F8. The **Convert to Symbol** dialog box appears.
2. Type a symbol name, choose symbol type as **Graphic**, and click **OK**.

7. Select the Smile layer. Click frame 50 and press F6 to insert a keyframe.
8. Select the Mask layer. Click frame 50 and press F6 to insert a keyframe.
9. With the Mask layer selected, drag the oval symbol to the far end of the text (Fig. 8.12).
10. Create motion tween in the Mask layer: With the Mask layer selected, click any frame between frames 1 and 50 and choose **Motion** in the **Tween** option of the **Property inspector**.
11. To convert the layer named Mask into a Flash mask layer, right-click the layer name and select the **Mask** option in the context menu. This locks the Mask and Smile layers together. The Mask layer hides most of the Smile layer (Fig. 8.13). Notice the change in the layer icons.
12. Save the file and play the movie. You will notice that as the oval moves across the screen, the text behind it becomes visible. The oval in the mask layer acts like a hole in a curtain.

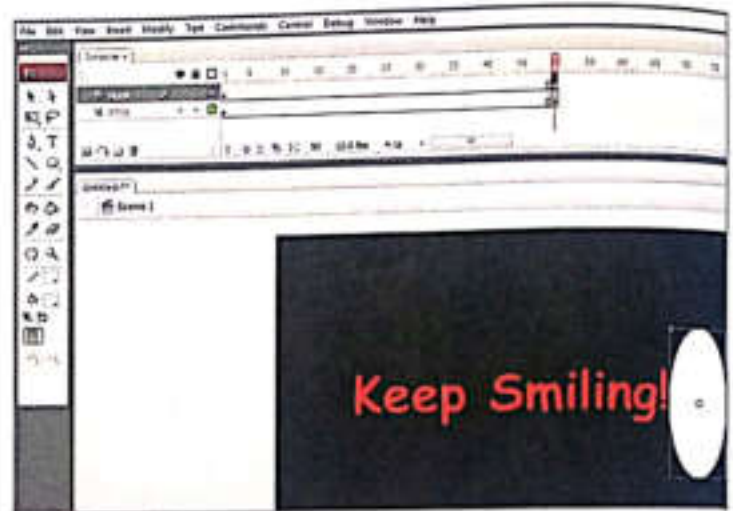


Fig. 8.12 Final position of the oval

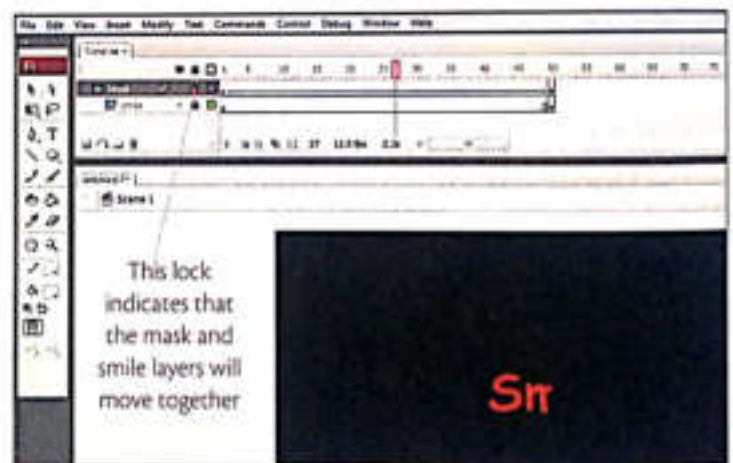


Fig. 8.13 Using a mask layer

Top Tip



The mask layer should always be above the layer that you want to mask.

ANIMATION USING A MOTION GUIDE

Flash also allows you to move an object on a definite curved path. For this, you have to use something called a guide layer. The guide layer has the motion guide, which is the path along which the object will move.

Let us take an example to learn more about motion guide animation:

1. Create a new Flash document.
2. Rename Layer 1 and give it the name Bird.
3. Click frame 1. Select **File ► Import ► Import to Stage** and import a picture of a bird (Fig. 8.14).
4. Click frame 50 and insert a keyframe by pressing F6.
5. To create a motion tween for the bird, click any frame between frame 1 and 50 and choose **Motion** in the **Tween** menu of the **Property inspector**.
6. Click **Add Motion Guide** in the **Timeline** window. This creates a motion guide layer above the Bird layer. The name of this layer is Guide: Bird.
7. With the Guide: Bird layer selected, click the **Pencil Tool**, and draw a path on the Stage (Fig. 8.15).
8. Select the Bird layer. Click any frame between Frame 1 and Frame 50.
9. Click the **Snap** checkbox in the **Property inspector**. Selecting **Snap** will snap the registration point of the object to the motion path. Also select the **Orient to Path** option.
10. With the Bird layer still selected, click frame 1.
11. Place the bird on the path such that the registration point of the bird is exactly above the start of the path (Fig. 8.16).
12. Click frame 50 of the Bird layer.



Fig. 8.14 Picture imported on the Stage

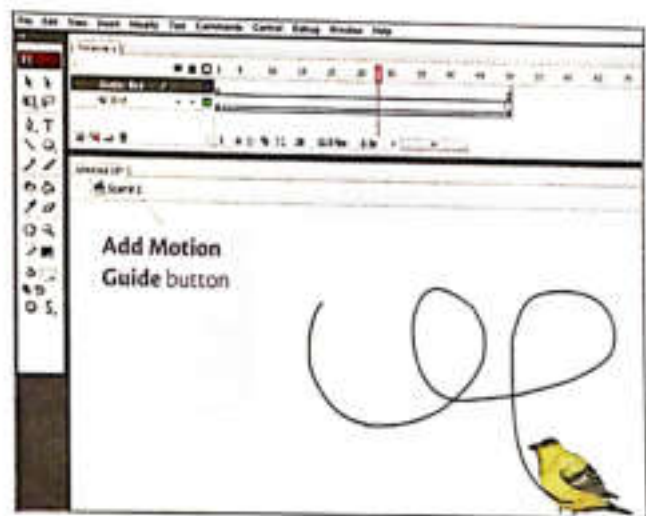


Fig. 8.15 Draw a path in the guide layer

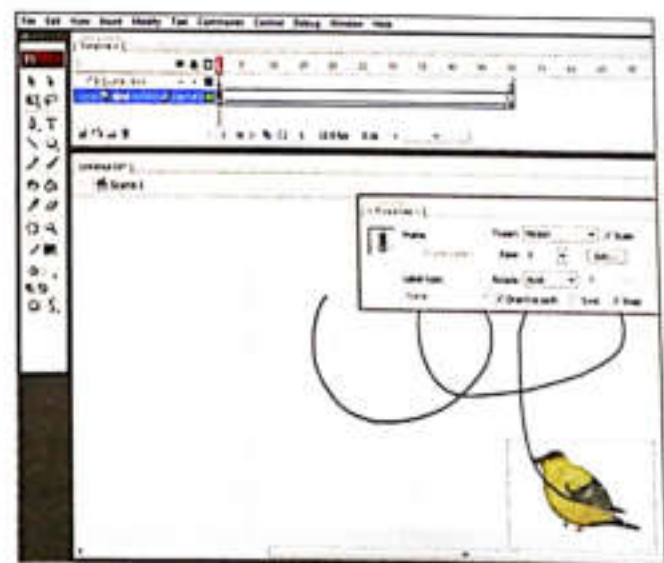


Fig. 8.16 Starting position of the bird

13. Now place the bird such that the registration point of the bird is exactly above the end of the path (Fig. 8.17).
14. Hide the motion guide layer.
15. Save the file and play the movie. You will see the bird flying along the flight path you drew!

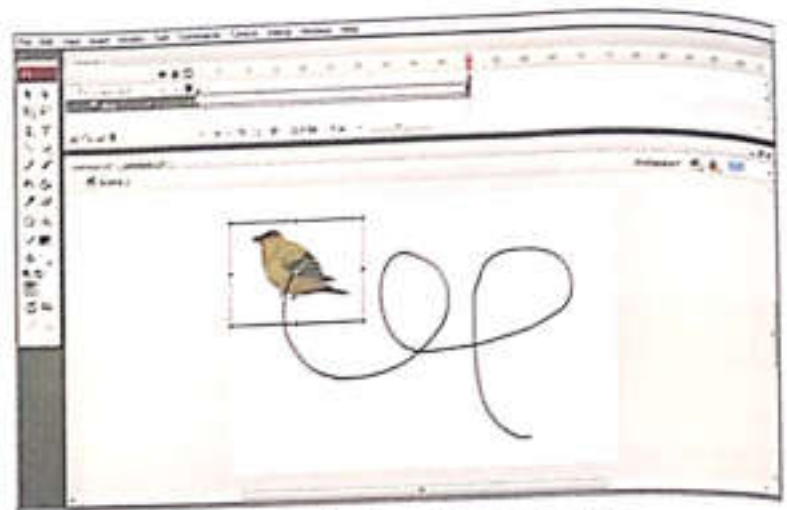


Fig. 8.17 Final position of the bird

PRACTICE TIME



Samreen's teacher has asked her to create an animation in which she has to set a landscape as a background, and then show a moving car on the road. Can you help her with the steps to create this animation?



SOLUTION

1. Create a new document in Flash.
2. Rename Layer 1 as **Background** and draw the background shown in the figure alongside.
3. Select frame 60 in the timeline and insert a keyframe.
4. Insert a new layer above the background layer and name it **Car**.
5. Draw or import a picture of a car on the Stage.
6. Click frame 60 in the **Timeline** of the **Car** layer and insert a keyframe.
7. To create a motion tween for the car, click any frame between frame 1 and 60 and choose **Motion** in the **Tween** menu of the **Property Inspector**.
8. Click **Add Motion Guide** in the **Timeline** window. This creates a motion guide layer above the **Car** layer. The layer is automatically named as **Guide: Car**.
9. With the **Guide: Car** layer selected, click the **Pencil Tool**, and draw a path on the Stage.

10. Select the **Car** layer. Click any frame between frame 1 and frame 60.
11. Select the **Snap** checkbox in the **Property inspector**. Selecting **Snap** will snap the registration point of the object to the motion path. Also select the **Orient to Path** option.
12. With the **Car** layer still selected, click frame 1.
13. Place the car on the path such that the registration point of the car is exactly above the start of the path.
14. Click frame 60 of the **Car** layer.
15. Now place the car such that the registration point of the car is exactly above the end of the path.
16. Hide the motion guide layer.
17. Save the file and play the movie.



APPLYING FILTERS

Filters are in-built visual effects in Flash. There are different types of filters, like **Bevel**, **Glow**, **Drop Shadow**, **Gradient Glow**, etc. You can apply more than one filter to an object. These are the steps to apply filters to text and animate it using motion tween:

1. Open a new Flash document.
2. Select frame 1.
3. Select the **Text Tool** and type Having Fun! on the Stage.
4. To apply a **Bevel** filter to the text:
 - a. Select the text block using the **Selection (Arrow) Tool**.
 - b. Click the **Filters** panel in the Flash window.
 - c. Click **Add Filter** on the **Filters** panel.
 - d. Click **Bevel** in the menu that appears (Fig. 8.18).

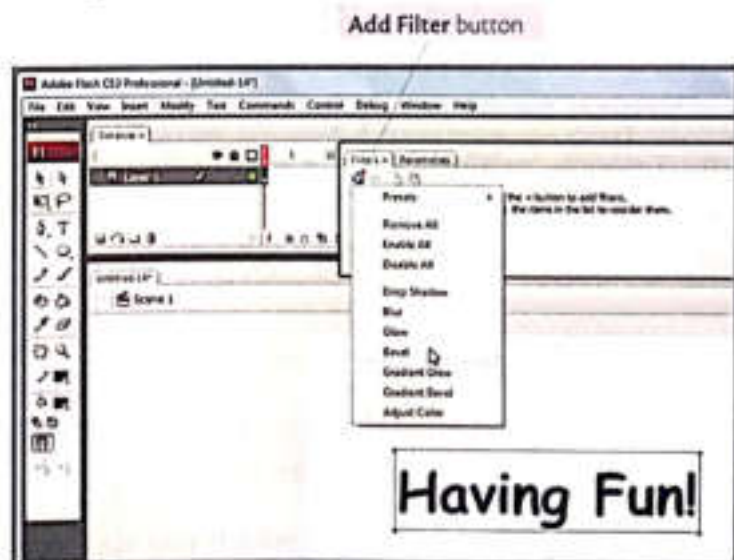


Fig. 8.18 Adding a filter

5. The **Filters** panel will now show options for the **Bevel** filter. Try some of them:
 - Click the drop-down menu arrow of the **Type** option and select **Outer**.

- The **Blur X** and **Blur Y** options set the width and height of the **Bevel**. Use the sliders and try different values. Here set the values to 30.
- Select the **Shadow** colour to blue and **Highlight** colour to green.
- The **Angle** option specifies the angle of the shadow cast by the bevelled edge. Set the value to 45.
- The **Distance** option specifies the width of the bevel. Set the value to 11. **Figure 8.19** shows the text with the selected options.

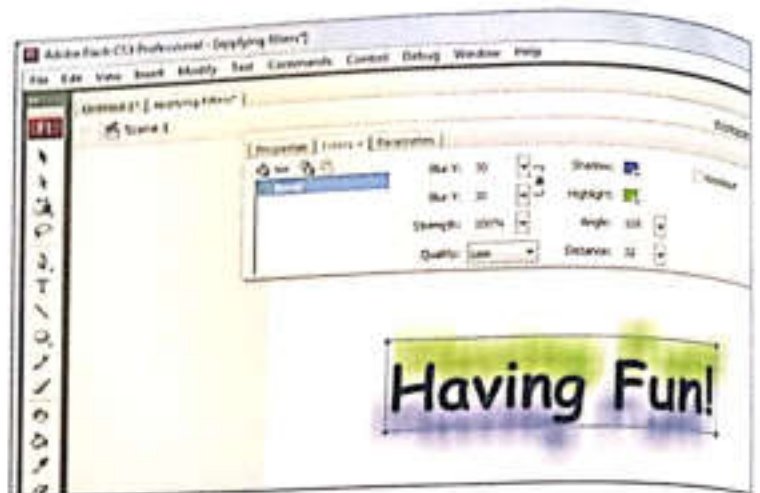


Fig. 8.19 Bevel filter

6. Select frame 40 in the **Timeline** and insert a keyframe by pressing F6.
7. Apply a **Glow** filter to the text, following the same steps as in the case of the **Bevel** filter.
8. Glow filter options appear in the **Filters** panel. Use **Blur X** and **Blur Y** to set the width and height of the glow, and set the glow colour (Fig. 8.20). You can also change the settings for the **Bevel** filter in this frame.

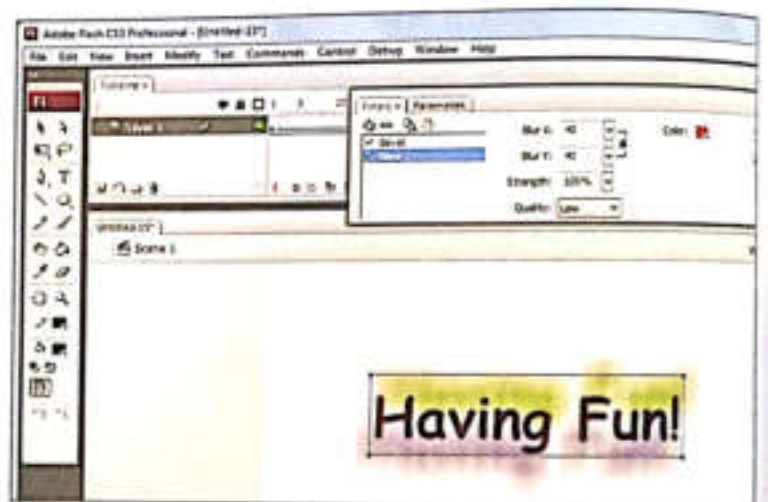


Fig. 8.20 Glow filter along with Bevel

9. To apply motion tween, click any frame between frames 1 and 40 and select **Motion** in the **Tween** drop-down list in the **Property inspector**.
10. Save the file and play the movie.

APPLYING TIMELINE EFFECTS

Flash provides predefined motion tweens that can be applied to a graphic symbol. Let us create an animation to apply these effects.

1. Open the last animation in which you applied a filter to the text **Having Fun!**.
2. Select frames 41 and 42 and insert **Keyframes**.
3. Select frame 43. Select **Insert ► Timeline Effects ► Expand**.
4. A dialog box appears with options for the **Expand** effect (Fig. 8.21). Specify the required options. You can preview the animation, i.e. the text expanding. Click **OK**.



Fig. 8.21 Expand dialog box

5. Notice that the layer name changes to **Expand** and 20 frames are added in the Timeline. Now there are 62 frames (Fig. 8.22).

WORKING WITH SOUND

Now let us learn how to import a sound file in Flash and add sound to an animation.

Flash supports various sound formats like, MP3, AIF, WAV, etc. The steps are:

1. Open the Flash file in which you want to add sound.
2. To import the sound to the Library:
 - a. Select **File ► Import ► Import to Library**.
 - b. The **Import to Library** dialog box appears (Fig. 8.23).
 - c. Select the file and click OK.

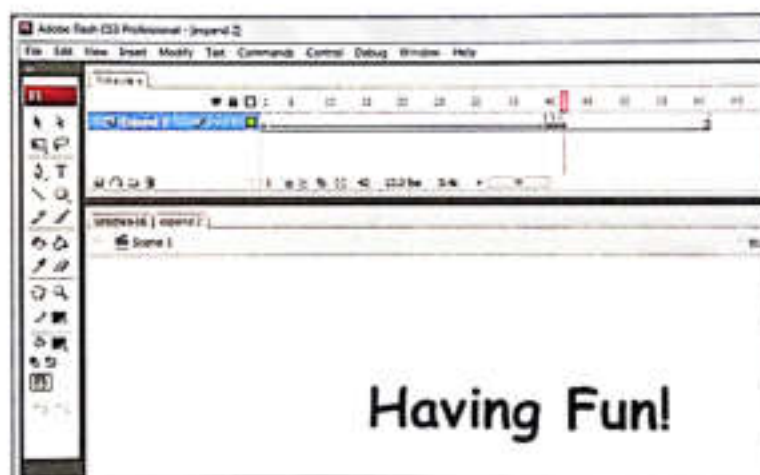


Fig. 8.22 Timeline effect added to the text



Fig. 8.23 Import to Library dialog box

3. Notice that the sound file is added to the **Library** and has a **Sound** icon (Fig. 8.24).
4. To add the sound to the animation:
 - a. Create a new layer by clicking the **Insert Layer** button in the **Timeline**.
 - b. Rename this layer as **Sound**.
 - c. Select the first Keyframe in the **Sound** layer.
 - d. Notice in the Timeline that the **Sound** layer displays the sound waves of the sound file (Fig. 8.25).

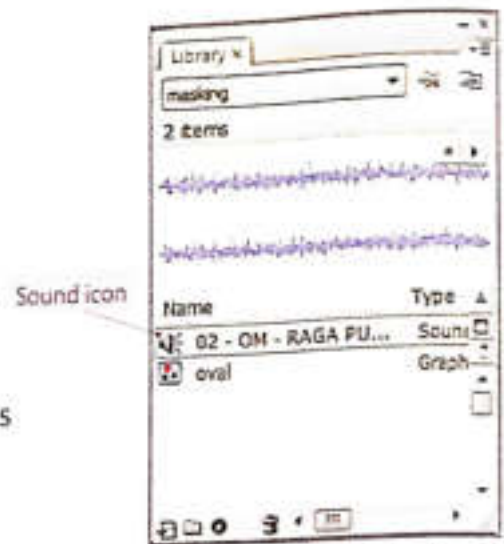


Fig. 8.24 Sound file added to Library

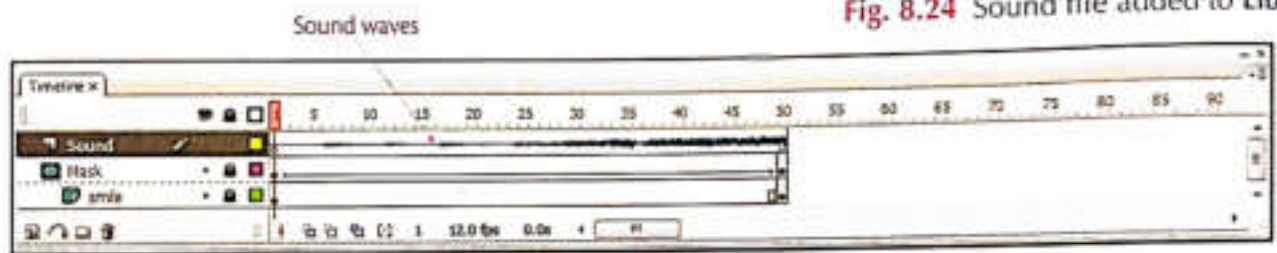


Fig. 8.25 Sound waves of the file in the **Sound** layer

Tricky Terms

Frame the basic unit of a Flash movie

Stage the white rectangular area where we add the contents of a Flash movie

Keyframe a critical time in a Flash animation where an object begins or ends an action

Filter in-built visual effects in Flash

Memory Bytes

- A Flash movie consists of many frames.
- Layers are like transparent sheets stacked on top of each other.
- There are different ways of creating animations in Flash.
- In motion tweening, we only specify the position of the first and last keyframes. Flash automatically fills in the frames between the two.
- Shape tweening makes one shape appear to change into another shape.
- Using the Onion Skin feature, you can see the relative position of an object over several frames.
- You can create special animation effects using the mask layer feature.
- To convert a layer into a mask layer, right-click the layer name and select Mask in the context menu.

- You can move an object along a definite curved path using a Guide layer.
- To create a motion path, select Snap in the Property inspector.
- Filters are in-built visual effects you can apply to objects.
- Flash provides predefined motion tweens (Timeline effects) that can be applied to a graphic symbol.
- You can import an audio file and add sound to an animation.



EXERCISES



Objective Type Questions

1. Choose the correct option.

- Bevel, Glow, and Drop Shadow are examples of
 - Filters
 - Motion tween
 - Animation
 - none of these
- The mask layer should always be the layer that you want to mask.
 - Below
 - Above
 - either i. or ii.
 - none of these
- The feature lets you see the relative position of an object over several frames.
 - Onion Skin
 - Motion tween
 - Shape tween
 - none of these
- The Onion Skin button is present at the bottom of the
 - Properties panel
 - Tools box
 - Timeline window
 - none of these
- To insert a layer, select **Insert** ► ► **Layer**.
 - Timeline
 - New
 - Add
 - none of these
- Every frame in the Timeline displays the frame number.
 - Fourth
 - Fifth
 - Sixth
 - Seventh
- The shows frames as a series of rectangles in each layer.
 - Property inspector
 - Tools box
 - Timeline
 - none of these
- The Timeline contains layers for organising the contents on the
 - Stage
 - Tools box
 - Property inspector
 - none of these

Descriptive Type Questions

1. Answer the following.

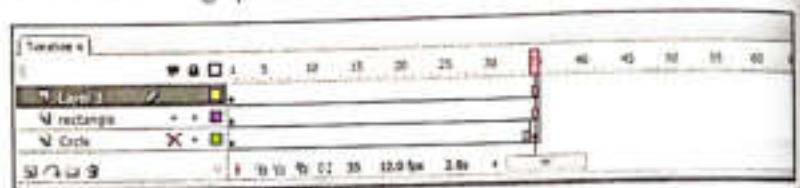
- How can you convert a layer into a mask layer?
- What is the use of the Onion Skin feature?
- List the steps to change the order of layers.
- Can you delete a layer? How?
- How can you identify keyframes in the Timeline?

- What are the keyboard shortcuts to insert a keyframe and a frame?
- List the steps to apply a filter to an object.
- How will you add sound to an animation in Flash?
- Analyse the use of layers and their importance in making animations in Flash.
- Ali was asked to create an animation in Flash to welcome new students to his class. Explain to him the different ways of doing this using masking layers and filters individually and then both together.
- Create a new Flash CS 3 document about the four seasons. Use text, pictures, sound, timelines, and layers.

Application-Based Questions

- Observe the figure on the right and answer the following questions:

- Can you change the name of 'Layer 3' to 'Polygon'?
- How can you move the **Circle** layer above the **rectangle** layer?
- Contents of which of the three layers are hidden?



- Observe the Timeline window on the right and answer the questions given below:

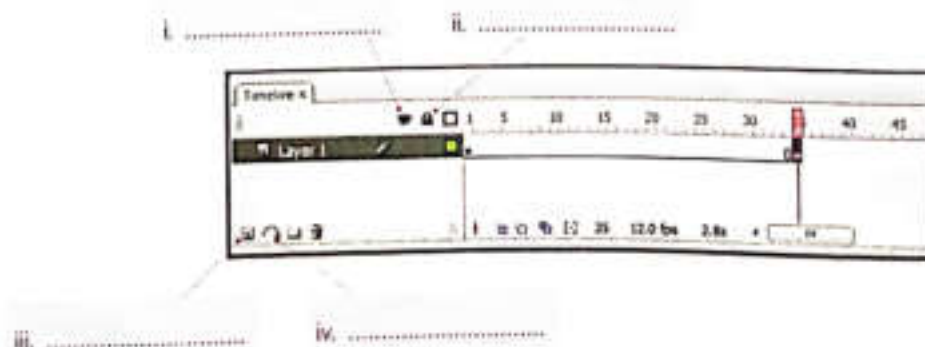
- Name the two keyframes created in the layer, Balloon.
- Which frame is selected in the figure?
- How can you insert a new layer above the Balloon layer?



- Sidra has to create an animation to change the shape of a rectangle into a cat.

- What type of tweening should she create in Flash?
- What should be kept in mind while creating such an animation?
- Can she add sound to an animation created in Flash? What type of sound files are supported by Flash?

- Label the parts of the figure given below.





IN THE LAB

1. Kamran has learnt how to use the masking effect in Flash. His teacher has told him to type the text 'Nothing is Impossible' and then display the text using the masking effect. He also has to add music to the animation. Help Kamran complete this task.
2. Rahman's teacher has taught him shape tweening. He has been asked to create an animation to change the shape of a circle to a five-sided polygon. Could you help him with the steps?
3. Anam's teacher has asked her to create an animation to show a paper plane fly along a curved path. Help her create this animation.
4. Ramla has to create a document in Flash and write 'Happy New Year'. Her teacher also wants her to apply filters to the text, add some timeline effects, and also a masking layer. Can you help her with the steps?

GROUP PROJECT

You are an animation team! You are challenged with creating a Flash animation which uses both motion and shape tweening. Show the transformation of at least three shapes. Don't make it too complicated to start with. Some of the best animations are the simplest. One of the hardest things to learn in group work is collaboration with one another. Once you have mastered this very difficult skill, you will be ready to tackle anything. When you watch a cartoon or animation film you will see in the end credits just how many people are involved in the making of the film. They all had to start somewhere!



TEACHER'S NOTES

- Explain the uses and importance of layers. It would be useful to demonstrate how to add layers to a movie.
- Have a class discussion and ask the class to think of uses for the masking effect feature.
- Students should be encouraged to use motion guides for creating animations and to apply filters and make text more attractive. Discuss animations that combine filters with motion tweening.
- How sound can enhance the effect of an animation could also be discussed and a sample animation with sound could be created and demonstrated.

Chapter 9

Introduction to HTML 5



You know that the Internet is a worldwide network of computers. A computer on the Internet that is used for storing and running a website is called a **server**. Other computers on the Internet are used to access websites on servers.

A website consists of web pages that are written in HyperText Markup Language (HTML).

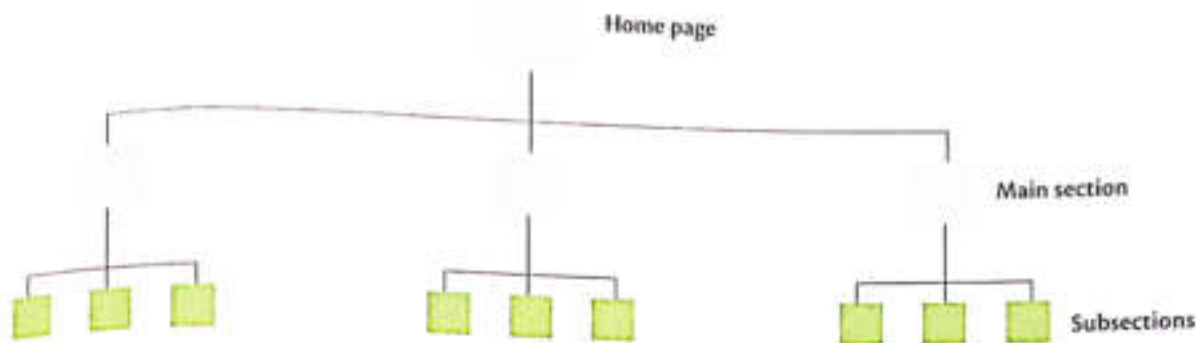
Let us first discuss the structure of a website and then understand what HTML is.

STRUCTURE OF A WEBSITE

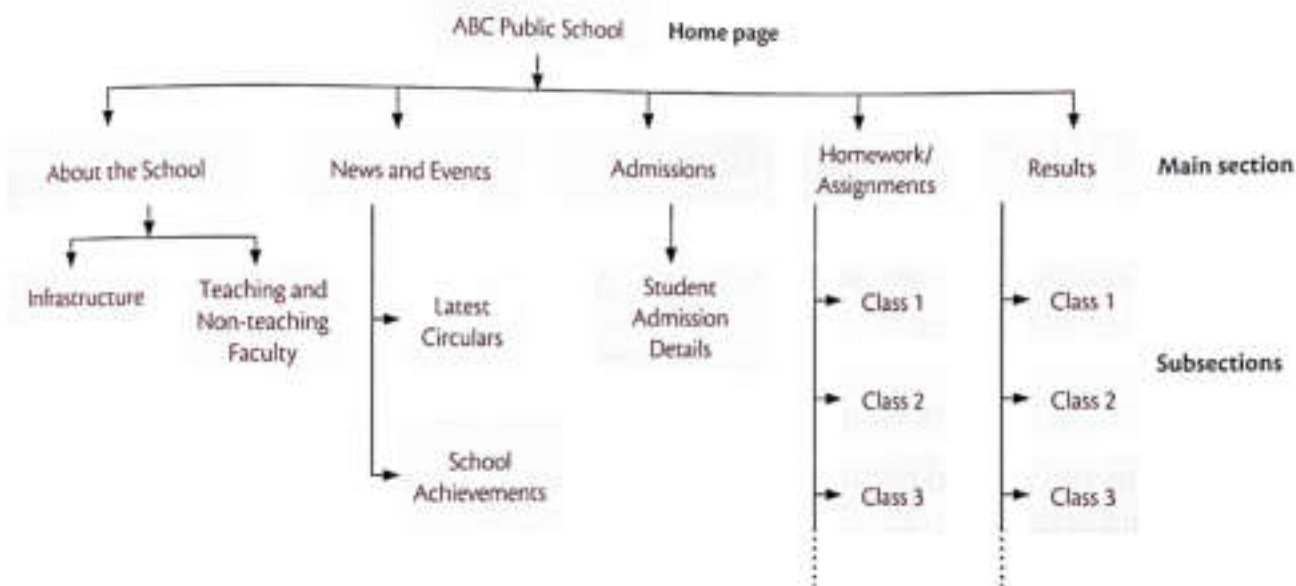
A **website** is composed of three main sections: the **home page**, the **main section**, and **subsections**.

In this Chapter

- Structure of a website
- What is HTML?
- HTML Editors
- HTML Coding
- Structure of an HTML Document
- Line Break Element
- Cascading Style Sheets
- Background Properties



The **home page** is the first page of the website. This page usually tells visitors what the site is about. The **main section** usually contains the headings for particular areas of the website, whereas the **subsections** contain most of the content. For example, the structure for a school website may look as given below.



WHAT IS HTML?

HyperText Markup Language (HTML) is a computer language used to create documents (web pages) for display on the World Wide Web.

In this chapter, you will learn about HTML 5. HTML 5 is the new language specification proposed for web pages. This new version attempts to remove the limitations of previous versions. Rules to handle HTML elements and errors have also been added to HTML 5. You will learn how to create, save, and open an HTML 5 document. We will also discuss Cascading Style Sheets (CSS) and background properties.

The most striking feature of HTML 5 is the facility to play audio and video content without the need for additional software such as the Flash Player. It has new graphics features such as

CANVAS, which defines a region for drawing within a web page, with which you create shapes, graphs, and even animations.

Two basic tools are needed to create HTML documents: an **HTML editor** to create and save the documents, and a **web browser** to view them.

HTML EDITORS

There are two main types of HTML editors: WYSIWYG editors and text editors.

WYSIWYG Editors

WYSIWYG stands for **What You See Is What You Get**. WYSIWYG editors let you create web pages without knowing how to write HTML. They have graphical interfaces and tools to develop web pages, and they allow you to insert images, tables, lists, hyperlinks, etc.

Google Web Designer and **Adobe Dreamweaver** are two of the popular WYSIWYG HTML editors. Microsoft Front Page, which was a popular WYSIWYG HTML editor at one time, has been discontinued.

The two main advantages of WYSIWYG HTML editors are:

- Websites can be created quickly.
- Knowledge of HTML tags or commands is not required.

Text Editors

You can also create HTML documents with Notepad, WordPad, or any other text editor.

But, in this case you need to be familiar with HTML coding. This is how you create an HTML document using Notepad:

1. Open Notepad by selecting **Start ► All Programs ► Accessories ► Notepad**. The Notepad window will appear.
2. Select **File ► New** from the **Notepad** menu to create a new document.
3. Type the HTML document exactly as shown in **Figure 9.1**. (We will discuss HTML coding later in this chapter.)
4. Select **File ► Save As**.
5. In the **Save As** dialog box, choose the location where you wish to save the document.

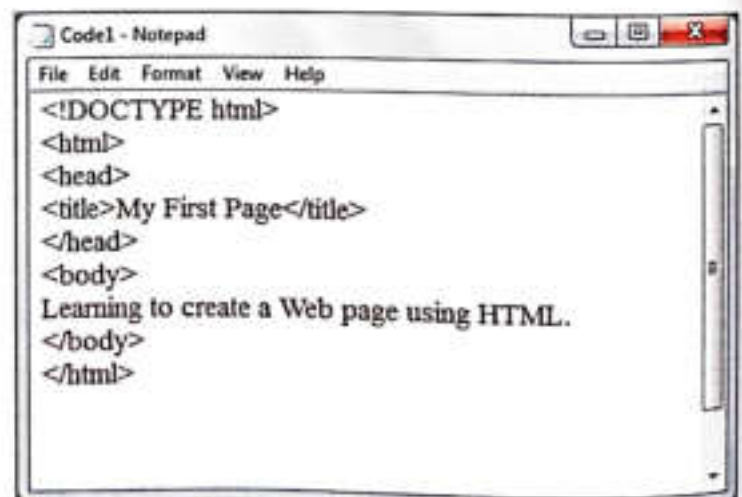


Fig. 9.1 HTML document typed in Notepad

6. Enter the file name with the extension .htm or .html, and click **Save** (Fig. 9.2).

Viewing HTML Documents in a web Browser

You can use any web browser, say **Internet Explorer** or **FireFox**, to view an HTML document. The steps to view an HTML document in Internet Explorer are:

1. Open **Internet Explorer**.
2. Select **File ► Open...** (Fig. 9.3).
3. The **Open** dialog box is displayed (Fig. 9.4). Click **Browse...**
4. A file selection dialog box will appear. Select the HTML file you just created.
5. Click **Open....**
6. The **Open** dialog box will reappear. Click **OK** and you will see the file in Internet Explorer.

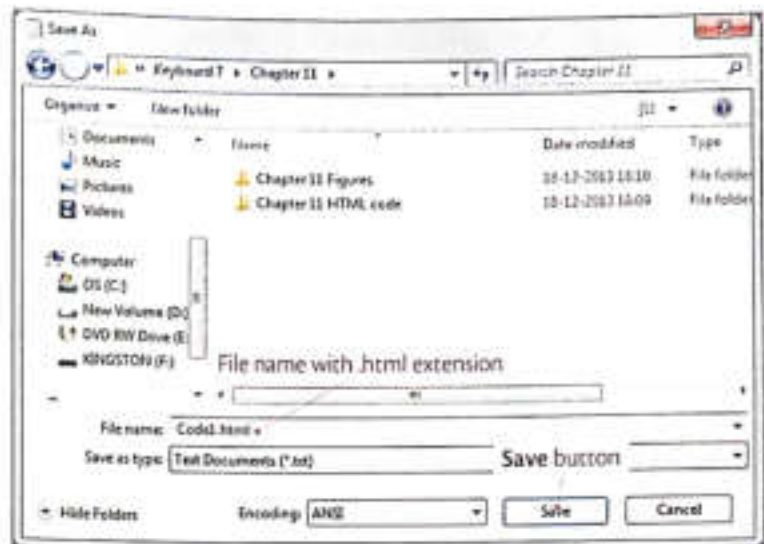


Fig. 9.2 Save As dialog box

Top Tip

If you do not see any menu in Internet Explorer, press ALT. The menu will appear. You can also right-click above or next to the address bar and select **Menu bar** in the options to get the menu.



Fig. 9.3 Open... option of the File menu in Internet Explorer

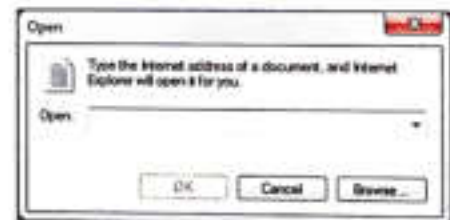


Fig. 9.4 Open dialog box in Internet Explorer

HTML CODING

Next, we will discuss how to code in HTML. Let us start by discussing the various components that make up the HTML code: **elements**, **tags**, and **attributes**.

HTML Elements and Tags

A web page is made up of HTML **elements**, and HTML elements are identified by HTML **tags**.

An HTML tag always begins with a **less than** sign < and ends with a **greater than** sign >.

For example, the tag for making the text bold (darker) is .

- We put before the text that we want to format in bold. This is the opening tag or the ON tag.

- We put `` after the text. This is the closing tag or the OFF tag. The OFF tag is the same as the ON tag, except that it has a forward slash / after <.

So, to make the text 'HTML tag' bold, you will type the following in the text editor:

HTML tag

When you view the web page in a browser, the text will look like this: **HTML tag**

An **HTML element** consists of the **opening tag**, the **closing tag**, and everything in between. Some elements do not have a closing tag.

Container Elements

HTML elements that include both ON and OFF tags are called **container elements**. For example,

This text is in bold

Empty Elements

HTML elements that only have an ON tag and do not require an OFF tag are called **empty elements**. For example, the `
` tag, which is used to give a line break, does not require a closing tag. Another example is the horizontal rule tag `<hr>`.

HTML Attributes

Attributes give us extra information about elements. They are always specified inside the start tag, and have a name-value pair.

For example, the `lang` attribute of the `html` tag specifies the language of the web page, while the `title` attribute specifies the title of the paragraph, and the `src` attribute of the `` tag is used to specify the URL of the image.

Examples: `<html lang = "en-GB"> <p title = "HTML 5"> `

HTML Rules

These are some rules for writing HTML code:

1. Tag names and attribute names are not case sensitive. For example, **<BODY>** is the same as **<body>**.

However, using lower case is recommended.

2. Attribute values should always be enclosed within quotes. Double style quotes are the most common, but single quotes are also allowed.

3. Attribute values can be case sensitive. The **World Wide Web Consortium (W3C)**, the body that develops standards and specifications for HTML documents, recommends **lowercase attribute values**.
4. Spaces between tags do not matter. For example,
` Bold text `
 is the same as
` Bold text `
 and
``
 Bold text
``
5. Tag names cannot contain spaces. For example, `<b o d y>` is not the same as `<body>`. Also, there should be no space between `<` and `>` in a tag. So do not write `< b >` or `</ b>`.
6. Elements can be nested. For example, if we want to italicise text and also make it bold, we can write:
`<i> Correct order of tags </i> `
 However, the following is incorrect:
`<i> Incorrect order of tags </i>`

STRUCTURE OF AN HTML DOCUMENT

An HTML document contains two distinct parts: HEAD and BODY.

- The **HEAD** section contains information about the document.
- The **BODY** section contains everything that is displayed on the web page. It includes text, graphics, etc.

Here is the basic structure of an HTML 5 document:

```
<!DOCTYPE html>
<html>
<head>
<title> ----- </title>
</head>
<body>
-----
-----
</body>
</html>
```


<!DOCTYPE html> element: This element is the starting element in an HTML document and specifies the type of document. It is an empty element and does not have a closing tag.

<html> element: The <html> element is written after the <!DOCTYPE html> element and defines the document as an HTML file. It is a container element. The document starts with <html> and ends with </html>. A browser will interpret everything that comes in between as an HTML document. An <html> element contains only the <head> and <body> elements. They in turn can contain other elements.

<head> element: The <head> element is a container element that includes identification and additional information about the document. Most of this is not displayed.

<title> element: The <title> element has the title of your web page. This is the title that is displayed in the title bar when you view the page in a browser. It is a container element. Each <head> element should contain a <title> element.

<body> element: The <body> element has the main content of your web page. It includes text, images, etc.

Did you Know?

In HTML 5, all attributes of the <body> tag have been removed.

PRACTICE TIME



Mishal has to create a simple web page on "Rice Cultivation". Help her with the HTML code for this web page. What are the steps she will have to follow?

SOLUTION

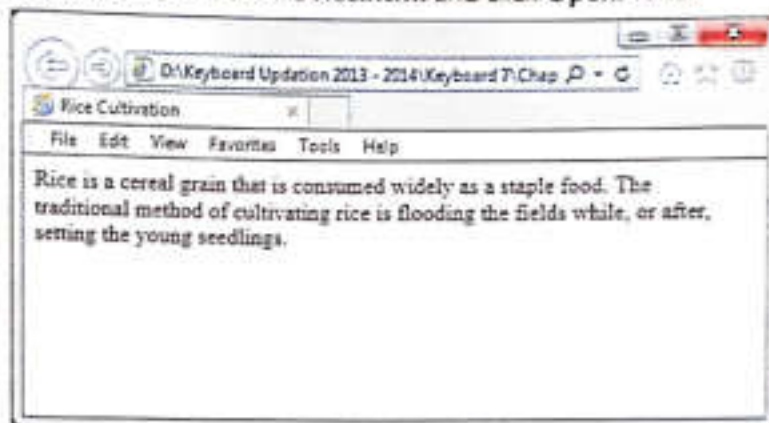
1. Start Notepad.
2. Type the following HTML code:

```
<!DOCTYPE html>
<html>
<head>
<title>Rice Cultivation</title>
</head>
<body>
```

Rice is a cereal grain that is consumed widely as a staple food. The traditional method of cultivating rice is flooding the fields while, or after, setting the young seedlings.

```
</body>
</html>
```

3. Now select **File ► Save** and save the file as **rice.html**.
4. To view the document in a Web browser, open, say, Internet Explorer.
5. Select **File ► Open....**
6. The **Open** dialog box appears. Click **Browse....** Select the file **rice.html** and click **Open**. When the **Open** dialog box reappears, click **OK** to open the page.
7. The web page appears as shown in the figure given alongside.



LINE BREAK ELEMENT

The browser does not recognise **paragraph formatting** in HTML text. If you want to start a new line, you need to insert a line break with **
**. This element has no end tag. Let us consider an example.

Type the following HTML code in Notepad, save the document as an HTML file, and open it in a browser (Fig. 9.5). You will notice that though our text is in four paragraphs, the browser displays it as a single paragraph.

```
<!DOCTYPE html>
<html>
<head>
<title>Mushrooms</title>
</head>
<body>
```

A mushroom is a fleshy, spore-bearing fruiting body of a fungus, typically produced above ground on soil or on its food source.

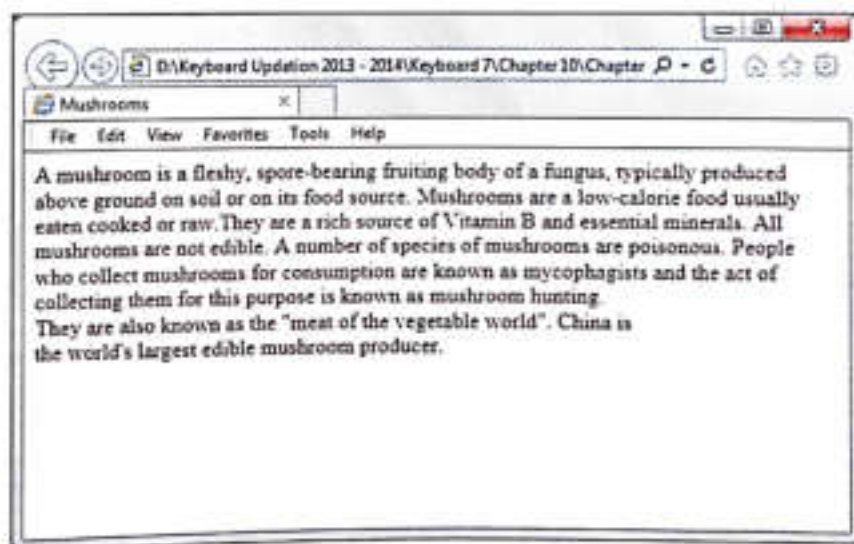


Fig. 9.5 The browser ignores paragraph breaks in the text

Mushrooms are a low-calorie food usually eaten cooked or raw. They are a rich source of Vitamin B and essential minerals. All mushrooms are not edible. A number of species of mushrooms are poisonous.

People who collect mushrooms for consumption are known as mycophagists and the act of collecting them for this purpose is known as mushroom hunting. They are also known as the "meat of the vegetable world". China is the world's largest edible mushroom producer.

```
</body>
```

```
</html>
```

In order to start a new line, we need to use the `
` tag. Insert `
` tags in the same HTML document as shown.

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
<title>Mushrooms</title>
```

```
</head>
```

```
<body>
```

A mushroom is a fleshy, spore-bearing fruiting body of a fungus, typically produced above ground on soil or on its food source. `
`

Mushrooms are a low-calorie food item usually eaten cooked or raw. They are a rich source of Vitamin B and essential minerals. All mushrooms are not edible. A number of species of mushrooms are poisonous. `
`

People who collect mushrooms for consumption are known as mycophagists and the act of collecting them for this purpose is known as mushroom hunting. `
`

They are also known as the "meat of the vegetable world". China is the world's largest edible mushroom producer.

```
</body>
```

```
</html>
```

Save the document and open it in a browser again (Fig. 9.6). You will see that the text has been broken into paragraphs according to where you inserted `
`.

You can also use the `
` tag to

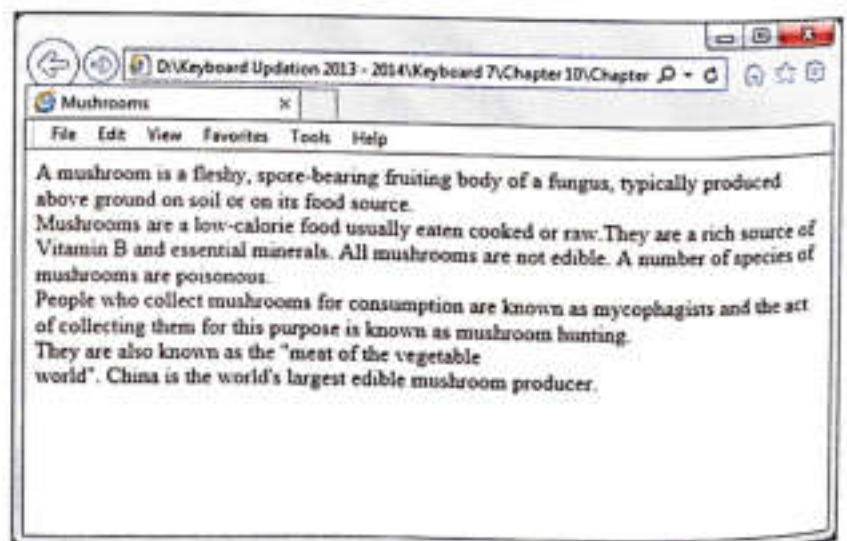


Fig. 9.6 The browser shows paragraphs now

skip a line or multiple lines. Insert four `
` tags in a row and see the result (Fig. 9.7).

CASCADING STYLE SHEETS

Cascading Style Sheets or CSS is a style sheet that provides the set of style rules for displaying HTML elements in a web page. CSS helps multiple web pages of a website to share the same formatting. Also it provides more flexibility and control in the manner in which the content is presented on a web page.

CSS styles can be included in an HTML document in one of the following ways:

- using external style sheets
- using embedded style sheets
- using inline styles

The syntax of a CSS rule is as follows:

```
selector {property1:property1-  
value; property2: property2-value;  
.....}
```

Where selector stands for the HTML element for which the rule is defined.

property1, property2, etc. represent properties (or attributes) of the element.

property1-value, property2-value, etc. represent values assigned to the properties.

For example, `body {background-color: pink; background-repeat: repeat-X}`

The above code specifies that the background colour of the web page is pink and the background image is repeated x times.

In this chapter, we will learn about **background properties** and create an HTML document with **embedded style sheets**. Using **inline styles** will be discussed in later chapters. An **embedded** (or **internal**) style sheet is defined in the `<head>` section using a `<style>` element. **Inline styles** uses a style attribute in HTML elements.

BACKGROUND PROPERTIES

Background properties are used to set the background style of an HTML element. Background properties are explained in the following table (Table 9.1):

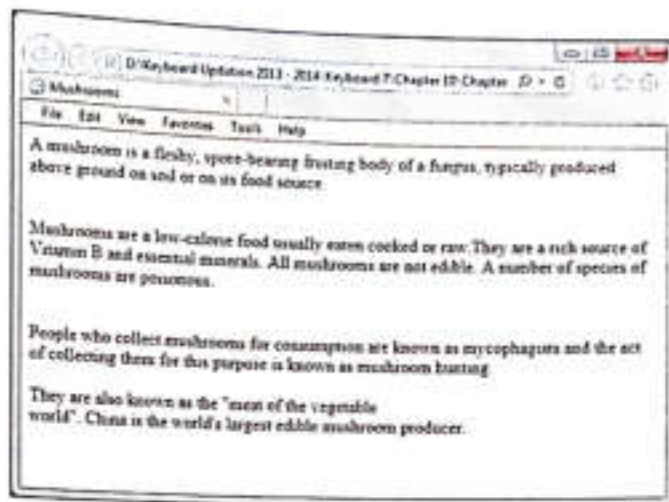


Fig. 9.7 Web page with multiple blank lines

Did you Know?

W3C has developed some rules for creating and using style sheets in an HTML web page. In the latest specification W3C has recommended that HTML elements which deal with style-related aspects should be avoided and their replacements in CSS should be used.

Table 9.1 Background properties

Property	Description	Value(s)	Examples
background-color	Specifies the background color	color name/color value/transparent	background-color: yellow
background-image	Specifies the background image	URL of the image	background-image: url('sky.jpg')
background-position	Specifies the initial position of the background image	left top/left centre/left bottom/right top/right centre/right bottom/centre top/centre centre/centre bottom x-position, y-position X%, Y%	background-position: centre centre
background-attachment	Specifies whether the background image is fixed or scrolls when the user scrolls the rest of the page	scroll, fixed	background-attachment: fixed
background-repeat	Specifies whether the background image is repeated or not	repeat repeat-x repeat-y no-repeat	background-repeat: repeat-x

Let us discuss these properties in detail using some examples.

Setting background Color

The **background-color** property allows you to set the background colour of the HTML element or document.

For example,

```
<!DOCTYPE html>
<html>
<head>
<style type= "text/css">
body {background-color: yellow}
</style>
</head>
<body>
Changing the background color
</body>
</html>
```

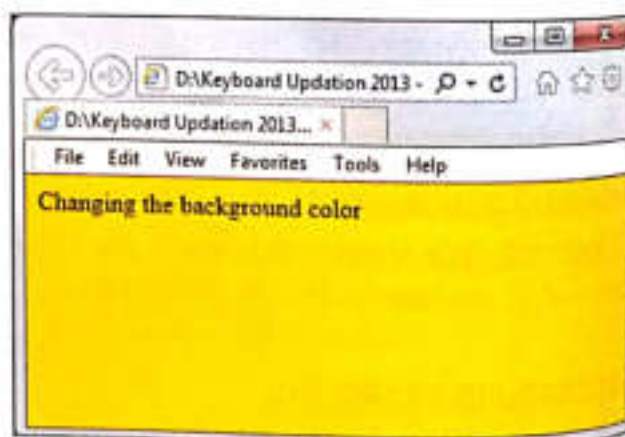


Fig 9.8 View in web browser after specifying the background colour

The output in Internet Explorer is shown in Figure 9.8.

Setting the Background image

You can enhance the background of the HTML document by adding a picture in the background using the **background-image** property.

Consider the following HTML document:

```
<!DOCTYPE html>
<html>
<head>
<style type= "text/css">
body {background-image: url('flower.
jpg'); background-attachment: fixed;
background-repeat: repeat}
</style>
</head>
<body>
Setting a background image
</body>
</html>
```

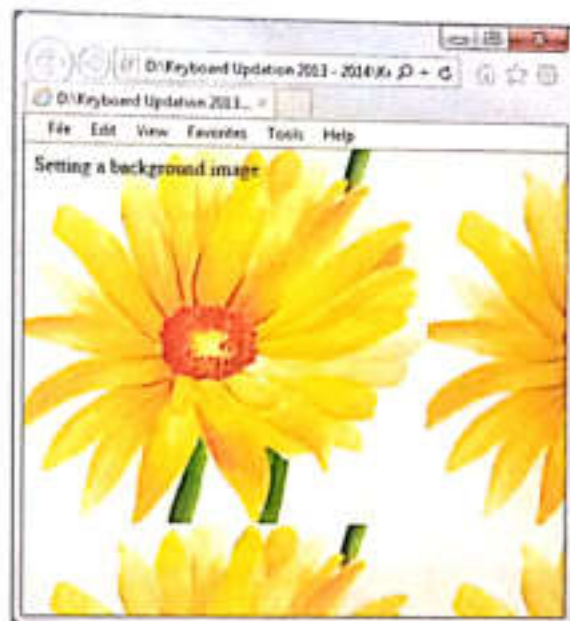


Fig 9.9 View in Web browser after setting a background image

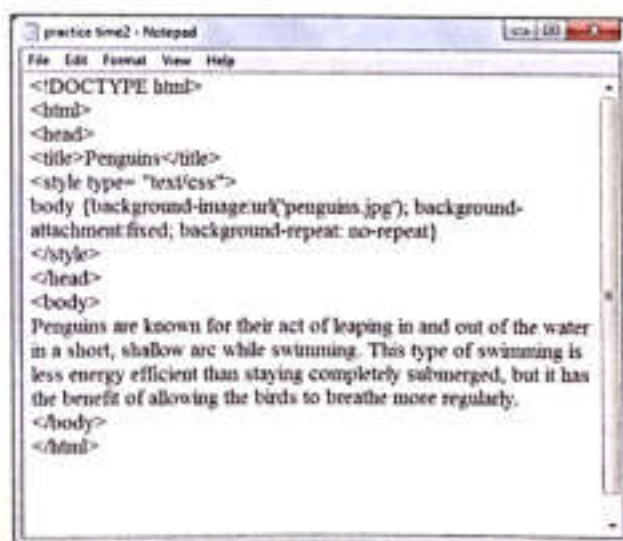
PRACTICE TIME



Qadir wants to create a web page on "Penguins". Help him write the code for the web page. Set the background image, and use appropriate background properties for the image.

SOLUTION

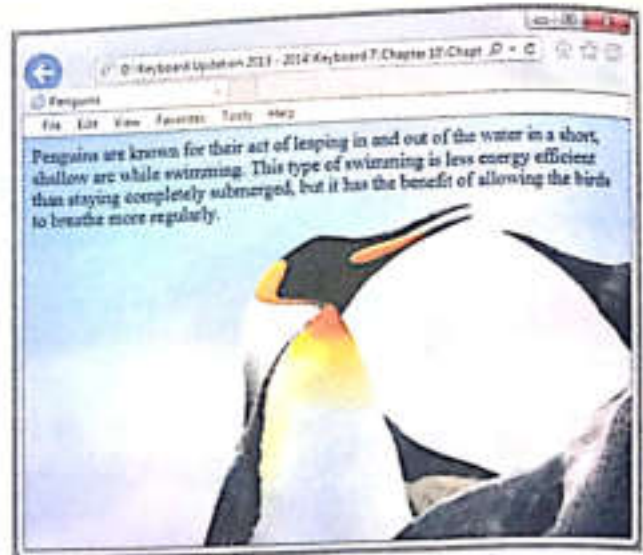
1. Start Notepad.
2. Type the HTML code given alongside.
3. Select **File ► Save** and save the document as **penguin.html**.
4. Open Internet Explorer. Select **File ► Open....**



5. Click on **Browse...** in the **Open** dialog box that appears.
6. Select the file **penguin.html** and click **Open**.

When the **Open** dialog box reappears, click **OK**.

The web page will be displayed in the browser as given in the figure alongside.



Tricky Terms

Home Page the first page of a website

HTML a computer language used to create documents (web pages) for display on the World Wide Web

HTML Elements building blocks of HTML documents. An HTML element consists of opening and closing tags, and the content between them.

HTML Tags identifiers of HTML elements. They always begin with a less than sign < and end with a greater than sign >

Container Elements HTML elements that include both ON and OFF tags

Empty Elements HTML elements that do not require an OFF tag

HTML Attributes extra bits of information that appear inside the opening tag of an element

HEAD part of the HTML document containing information about the web page

BODY part of the HTML document containing everything displayed on the web page

Cascading Style Sheets a set of style rules for displaying HTML elements in a web page

Memory Bytes

- A website is composed of three sections: the home page, main sections, and subsections.
- A website consists of web pages written in HyperText Markup Language (HTML).

- An editor is required for creating and saving an HTML document. This can be a WYSIWYG HTML editor or a text editor.
- A Web browser is used to view HTML documents.

- Tags, elements, and attributes are the components that make up an HTML code.
- An HTML document consists of two distinct parts: the head and the body.
- The HEAD section contains information about the document.
- The BODY section contains everything that is displayed on the web page and includes text, graphics, etc.
- The <title> element has the title of the web page which is displayed in the title bar of the web browser.
-
 tag is used to insert a line break. It is an empty element.
- CSS is a style sheet that provides a set of style rules for displaying HTML.
- Background-properties are used to set the background style of an HTML element.



EXERCISES



Objective Type Questions

1. Choose the correct option.

- An important feature of HTML 5 is the facility to play
 - Audio
 - Video
 - Both i. and ii.
 - none of these
- HTML 5 helps you create
 - Shapes
 - Graphs
 - Animations
 - all of these
- Which of these are container elements?
 - <html>
 - <head>
 - <body>
 - all of these
- Which of these elements contains the main content of a web page?
 - <html>
 - <head>
 - <body>
 - none of these
- Which of these has no off tag?
 - <body>
 -

 - <title>
 - none of these
- provides the set of rules for displaying HTML elements.
 - CSS
 - Head
 - Title
 - none of these
- In which of the following ways, can CSS be incorporated in an HTML document?
 - Using external style sheets
 - Using embedded style sheets
 - Using inline styles
 - all of these
- The property that specifies whether the background image is fixed or scrolls is
 - background-position
 - background-attachment
 - background-repeat
 - none of these

Descriptive Type Questions

1. Answer the following.

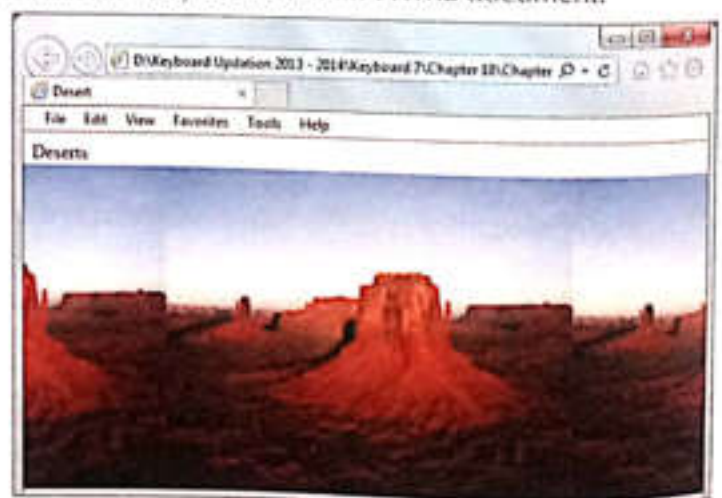
- Name the different types of HTML editors. Give one example of each type.
- What are HTML elements?
- Differentiate between container and empty elements.
- What are the different values that the background-repeat property can take?
- What does CSS mean? What does it specify?
- Evaluate the role of WYSIWYG editors in making web design more popular.
- There are a number of background properties in HTML. Take a look at your school's website and identify the different background properties used on any three pages.
- Write an HTML code which displays your first name, your age, the first names of your siblings, and your school's name.

Application-Based Questions

- Observe the web page given on the right and answer the following questions:
 - Name the property that was used to set the background image.
 - Mention the property and its value that should be used so that the image appears as shown in the figure.
- Inaya wants to create a simple web page about her school. She wants to set the image of her school as the background.
 - Name the property and its value she should use, so that the image appears at the centre of the page.
 - Which property should she use so that the image appears only once on the web page? What value should be assigned to that property?
- Farhan has written the following code for the embedded style sheet in an HTML document.

```
<style = "text/css">
body {background-image: yellow}
</style>
```

Identify the errors and write the correct code.
- Danyal has created the web page shown on the right. Identify any three HTML elements and two background properties he has used to create the web page.





IN THE LAB

1. Farhan has to create a simple web page on the topic 'Our National Bird'. Set an image of the bird as the background. Help him create the web page and set suitable properties. Then view the page in a web browser.
2. Rabia has learnt to create web pages in HTML. She has now been assigned to create a web page on 'School Sports Activities'. Set the background colour as pink, and use the activities that your school offers to create the text.
3. Faiza has to create a web page on the topic 'Historical Places that I Like'. Which are the historical places that impress you the most? Create an HTML document in Notepad on the topic, save it, and view it in a web browser. Include a short description of each of the places that you would like to visit or want to visit again.
4. Which is your favorite outdoor game? Write an HTML document to create a web page on your favorite sports activity. Also set an appropriate image as the background, and set background properties for the image.

GROUP PROJECT

Web page creation. You are going to have a go at this mammoth task! But working as a team you will be successful. Listen and advise one another carefully. Based on what you have learned so far about HTML, create two web pages about a topic of your choice, e.g. an endangered animal, a family pet, a classic car or a special celebration outfit. When creating your web pages think about your audience. Are you creating them for younger people? What difference will it make?



TEACHER'S NOTES

- Demonstrate and give students plenty of practice in creating HTML documents in Notepad and viewing them in a browser.
- Explain to students why the extension .html or .htm has to be given while saving the HTML document created in Notepad.
- If possible give examples of Cascading Style Sheets from external sources and give a demonstration on how to create embedded style sheets.

Chapter 10

Basic HTML 5 Commands



We have already discussed how to create an HTML document, save it, and view it in a web browser.

In this chapter, you will learn some basic HTML commands. These will also include elements that allow you to format HTML text, i.e. to change its font, size, and colour. Also we will discuss how to use inline styles.

HTML ELEMENTS

There are some basic HTML elements that you will need to use frequently. Let us understand them one by one. We will use CSS to style these HTML elements.

There are some elements that are called **deprecated elements** in HTML 5. For example, the `<centre>` element (which centres text) is deprecated in HTML 5. A deprecated element will become obsolete in the future, so its use should be avoided in the code we are writing today.

In this Chapter

- HTML Elements
- Text Properties
- Font Properties
- Setting Margins
- Setting Borders
- Inline Styles

paragraph

The paragraph element `<p>` defines a paragraph in HTML. Browsers insert empty lines before and after each paragraph. A paragraph starts with the `<p>` ON tag and ends with the `</p>` OFF tag.

Horizontal Rule

The horizontal rule element `<hr>` defines a thematic break in an HTML page, i.e. it is used to separate content in an HTML page. It is an empty element and has no end tag.

The horizontal rule is used to separate paragraphs or sections in a web page. The horizontal rule is created in a new line and the text that follows this tag is also displayed in a new line. We will use CSS to style the `<hr>` element.

Headings

The heading elements tell the browser that a piece of text is a heading. The browser then displays it differently from normal text. HTML provides for six heading levels. Headings are container elements and are written like this:

```
<h1> heading text </h1>
```

Here *n* is a heading level and can take values from 1 to 6.

`<h1>` defines the most prominent heading and `<h6>` defines the least prominent heading.

Type the following HTML code and open it in a browser.

```
<!DOCTYPE html>
<html>
<head>
<title>Heading element</title>
<style type="text/css">
  body {background-color: yellow}
</style>
</head>
<body>
<h1>This is heading level one</h1>
<h2>This is heading level two</h2>
<h3>This is heading level three</h3>
<h4>This is heading level four</h4>
<h5>This is heading level five</h5>
<h6>This is heading level six</h6>
</body>
</html>
```

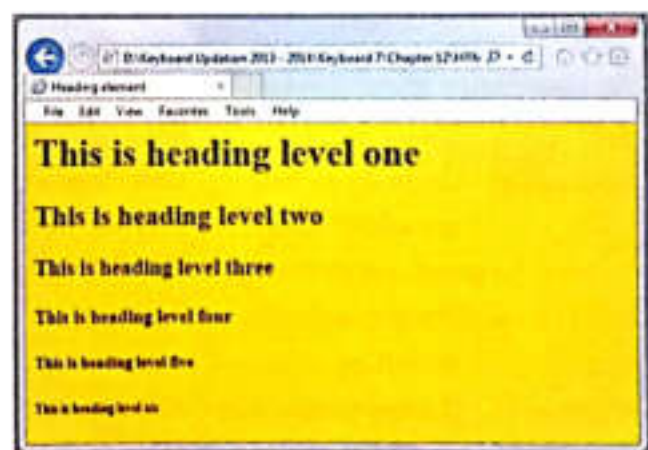


Fig. 10.1 Heading levels

See how the browser displays different heading levels (Fig. 10.1).

paragraph

The paragraph element `<p>` defines a paragraph in HTML. Browsers insert empty lines before and after each paragraph. A paragraph starts with the `<p>` ON tag and ends with the `</p>` OFF tag.

Horizontal Rule

The horizontal rule element `<hr>` defines a thematic break in an HTML page, i.e. it is used to separate content in an HTML page. It is an empty element and has no end tag.

The horizontal rule is used to separate paragraphs or sections in a web page. The horizontal rule is created in a new line and the text that follows this tag is also displayed in a new line. We will use CSS to style the `<hr>` element.

Headings

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```
<h1> heading text </h1>
```

Here *n* is a heading level and can take values from 1 to 6.

`<h1>` defines the most prominent heading and `<h6>` defines the least prominent heading.

Type the following HTML code and open it in a browser.

```
<!DOCTYPE html>
<html>
<head>
<title>Heading element</title>
<style type="text/css">
  body {background-color: yellow}
</style>
</head>
<body>
<h1>This is heading level one</h1>
<h2>This is heading level two</h2>
<h3>This is heading level three</h3>
<h4>This is heading level four</h4>
<h5>This is heading level five</h5>
<h6>This is heading level six</h6>
</body>
</html>
```

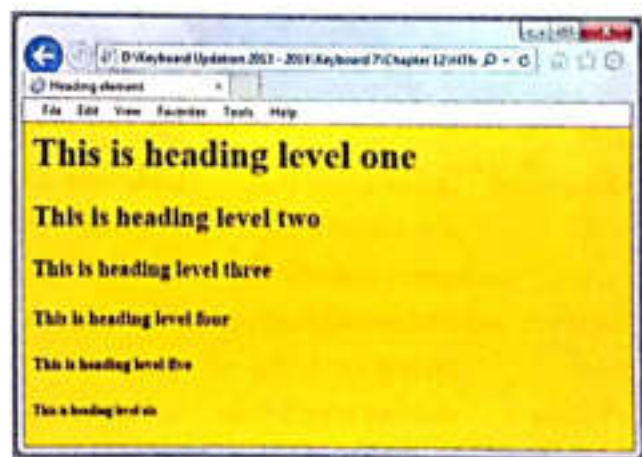


Fig. 10.1 Heading levels

See how the browser displays different heading levels (Fig. 10.1).

TEXT PROPERTIES

All elements have various **properties**, for example, text, font, margin, etc. All these properties have **default values**. These values can be changed by the person writing the code.

The **text properties** provide you with various text formatting options that help you style text in a web page. Table 10.1 shows various text properties, their description, and the values that they can be assigned.

Table 10.1 Text properties

Property	Description	Values	Examples
color	Specifies the foreground colour of the text	colour name hexadecimal colour value RGB colour values	color: red color: #243535 color: rgb (45, 65, 150)
text-align	Specifies the horizontal alignment of text or block of text	left right centre justify	text-align: right
line-height	Specifies the distance between two lines	normal (default) number (a number that will be multiplied with the current font size to set the line height) length (fixed line height in px, pt, cm) percentage value (line height in percentage of current value)	line-height: normal line-height: 8px
text-decoration	Specifies the decorations that are added to the text – underlining, line through, etc.	none (default—defines a normal text) underline (defines a line below the text) overline (defines a line above the text) line-through (defines a line through the text)	text-decoration: overline text-decoration: underline
text-shadow	Specifies a list of shadow effects to be applied to the text	none colour name colour value	text-shadow: 2px 2px green
text-transform	Controls the capitalisation of text	none (default—the text appears as it is) capitalise (the first character of each word in uppercase) uppercase (all characters are in uppercase) lowercase (all characters are in lowercase)	text-transform: uppercase

Let us discuss these properties in detail.

color property

Colors can be defined in one of the following ways:

- Predefined color names
- Hexadecimal color values
- RGB color values

Predefined color names like blue, aqua, gray, maroon, yellow, etc. can be used for color specification in CSS. For example,

```
color: silver
```

```
color: navy
```

Hexadecimal color values are specified as #RRGGBB, where RR (red), GG (green) and BB (blue) are the components of the color and the values must be between 0 and FF. For example,

```
color: #FFFF00
```

RGB color values are specified as **rgb** (red, green, blue). The values for red, green and blue should be from 0 to 255 or a percentage value from 0% to 100%. For example,

```
color: rgb(255,165,0)
```

```
color: rgb(0%,100%,0%)
```

Consider the following code to set the text color for different HTML elements.

```
<style type= "text/css">
h1 {color: orange}
p {color: #FFB6C1}
</style>
```

The above code tells the browser that the text of the HTML element <h1> should be in orange, and the text defined by the <p> element should be in the color given by the code #FFB6C1.

Text-Align Property

The **text-align** property is used to specify the horizontal alignment of text in an element. The default value is **left**. Consider the following code to set the text-align property of different HTML elements:

```
<style type= "text/css">
p {text-align: justify}
h2 {text-align: centre}
h3 {text-align: left}
h4 {text-align: right}
</style>
```

The above code tells the browser that the paragraph text is **fully-justified**, heading level two is **centre-aligned**, heading level three is **left-aligned** and heading level four is **right-aligned**.

Text-shadow property

The **text-shadow** property applies a shadow to text. The value of this property is given as follows:

`text-shadow: h-shadow v-shadow color`

where,

h-shadow specifies the position of the horizontal shadow.

v-shadow specifies the position of the vertical shadow.

color specifies the colour of the shadow.

For example,

`text-shadow: 4px 2px green`

In the above example, **4px** specifies the position of the horizontal shadow, **2px** specifies the position of the vertical shadow and **green** specifies the colour of the shadow.

You can specify a shadow for each HTML element separately. For example, the code below sets the text-shadow property for the paragraph element, heading level 1, and for heading level 2.

```
<style type= "text/css">
p {text-shadow: 2px 2px blue}
h1 {text-shadow: 5px 5px red}
h2 {text-shadow: 4px 4px black}
</style>
```

Text-transform property

The **text-transform** property controls the **capitalisation** of text. This property can have the values – **none**, **capitalise**, **uppercase**, **lowercase**.

Consider the following code to set the text-transform property for different HTML elements:

```
<style type= "text/css">
p{text-transform: none}
h1{text-transform: capitalise}
h2{text-transform: uppercase}
</style>
```

The above code tells the browser that the text of the paragraph will appear as it is, text of heading level one is in title case, and the text of heading level two is in uppercase.

Comment tag

HTML comments are not displayed by the browser. Any text placed as a comment will be ignored. You can use comments to explain your HTML code, which will help you or anyone else who reads or edits the document in the future.

The comment tags are `<!--` and `-->`. This is how you enter a comment:

```
<!--comment text-->
```

bold and italics tags

The tags for marking text as bold and italics are `` and `<i>`, respectively. They are both container elements. For example,

```
This text is in <b>bold</b>
```

```
This text is in <i>italics</i>
```

You can combine these tags. For example, if you wish to make text bold and italic, you can code it like this:

```
This text is in <b><i>bold and is also in italics</i></b>
```

The output would be:

This text is in **bold and is also in italics**

FONT PROPERTIES

Using **font properties**, you can change the font, size, and style of the text.

Let us discuss the font property in detail.

font property

The **font property** is used to set all the font properties in one declaration. The font properties that can be set are:

```
font: font-style font-size font-family
```

Here,

font-style specifies the font style for the text and can take the values, *normal*, *italic*, or *oblique*. The default value is *normal*.

font-size sets the size of a font and can take any one of the values given in [Table 10.2](#).

If you specify an absolute value for this property, then you can give the value in any unit like, *px*, *pt*, etc.

font-family property specifies the font for the text in the HTML element. For example:

```
font-family: arial, "Times New Roman"
```

Note: Font names are separated by commas and if a font name consists of spaces, then it must be written within quotes.

Consider the following examples that set the font properties for different HTML elements:

```

<style>
p {font-size: xx-small; font-style: italic; font-family: arial}
h1 {font-family: "Comic Sans MS"; color: red}
h2 {font-family: "Times New Roman"; font-style: oblique; color: navy}
</style>

```

Table 10.2 Font properties

Property	Description	Values	Example
font	Specifies all the font properties in one declaration	"font-style font-size font-family"	font: italic 20px arial
font-family	Specifies a list of font names	font name	font-family: arial
font-size	Specifies the size of a font	xx-small x-small small medium (default) large x-large xx-large larger smaller value percentage	font-size: large font-size: 17px font-size: 14pt
font-style	Specifies the style of the font	normal italic oblique	font-style: italic font-style: oblique

PRACTICE TIME



Sumayyah has to create a short note on e-waste and display it in a web page. She also has to set the following properties of the web page:

- Background colour should be yellow.
- Paragraph text should be in green colour, fully justified. Font size should be large and font should be Comic Sans MS.
- Space between the lines should be 8.

```

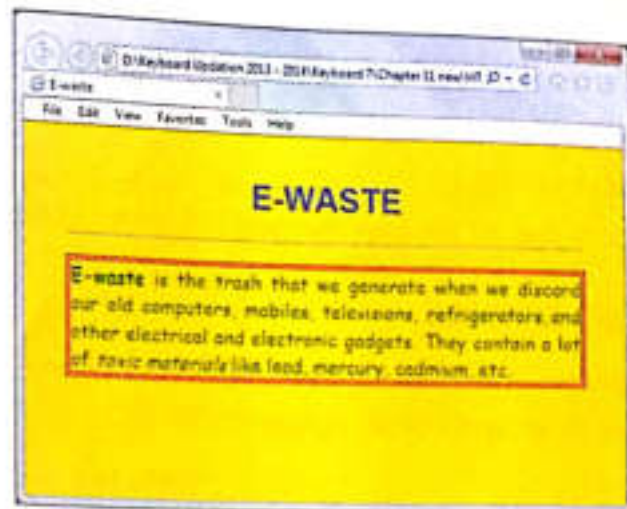
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!DOCTYPE html>
<html>
<head>
<title>E-waste</title>
<style type="text/css">
body {background-color: yellow; margin: 10px;}
p {color: green; text-align: justify; text-indent: 40px; font-family:
"Comic Sans MS"; font-size: large; border-color: red; border-
style: double; border-width: thick;}
h1 {text-align: center; color: blue; text-transform: uppercase;
font-family: arial}
</style>
</head>
<body>
<h1>E-waste</h1>
<br>
<p><b>E-waste</b> is the trash that we generate when we
discard our old computers, mobiles, televisions, refrigerators,
and other electrical and electronic gadgets. They contain a lot
of <b>toxic materials</b> like lead, mercury, cadmium, etc.</p>
</body>
</html>

```


- Heading level 1 should be centre-aligned, blue in colour, uppercase and in Arial font.
- How should she proceed?

SOLUTION

1. Start Notepad and type the HTML code given in the figure on page 158.
2. Save the document as **e-waste.html**.
3. Open Internet Explorer and then open the file, **e-waste.html**. The view in the web browser is shown in the figure alongside.



SETTING MARGINS

The **margin properties** are used to set the margins for an HTML element (Table 10.3).

Table 10.3 Margin properties

Property	Description	Values	Example
margin	Sets all the margin properties in one declaration	"margin-bottom margin-left margin-right margin-top"	Margin: 10px 5px 5px 10px
margin-bottom	Sets the fixed bottom margin of an element in px, pt, cm, etc.	length Default value is 0px	margin-bottom: 1cm
margin-left	Sets the left margin of an element in px, pt, cm, etc.	length Default value is 0px	margin-left: 2cm
margin-right	Sets the right-margin of an element in px, pt, cm, etc.	length Default value is 0px	margin-right: 10px
margin-top	Sets the top margin of an element in px, pt, cm, etc.	length Default value is 0px	margin-top: 3cm

Margin Properties

The **margin** property is used to set all the margins (left, right, top, and bottom) in one declaration. Consider the following examples:

`margin: 10px 5px 8px 12px`

In the above example, top margin is 10px, right margin is 5px, bottom margin is 8px, and left margin is 12px.

If you write the margin property as

```
margin: 20px 15px
```

Then, top and bottom margins are 20px, right and left margins are 15px.

If we specify the margin property as

```
margin: 15px
```

It means that all the four margins are set to 15px.

SETTING BORDERS

CSS allows you to set styles of the border of any HTML element. You can set the border width, border style, and border colour (Table 10.4).

Table 10.4 Border properties

Property	Description	Values	Example
border	Sets all the border properties in one declaration	border-width, border-style, border-color	border: solid 3px green
border-width	Specifies the width of the border	thin medium (default) thick length (you can define the thickness of the border)	border-width: thick border-width: 5px
border-style	Specifies the style of the border	none (no border) dotted dashed solid double groove ridge inset outset	border-style: solid border-style: ridge
border-color	Specifies the colour of the border	color name color value	border-color: red

Note: You should specify the **border-style** property before the **border-color** property as an element must have a border before you change its colour.

Top Tip

If you want to apply a style to many selectors, then just separate the selectors with a comma. For example,
h1, h2, h3, h4 {color: green}

INLINE STYLES

Inline styles are used to apply a style to specific elements on a web page. For creating and applying inline styles, you need to add a **style** attribute to the HTML tag. This type of style is useful when you want to define specific styles for individual HTML elements.

Consider the following HTML code to apply different styles to the word 'Welcome':

```
<!DOCTYPE html>
<html>
<head>
  <title>welcome</title>
</head>
<body>
  <p style="font-size: xx-large; color: maroon; text-align: centre; border: solid 4px blue">Welcome</p>
  <p style="font-size: x-large; color: green; text-align: right; border: dashed 3px orange">Welcome
</p>
  <p style="font-size: medium; color: navy; text-align: left; border: groove 4px pink">Welcome</p>
</body>
</html>
```

The output in the web browser will be as shown in Figure 10.2.

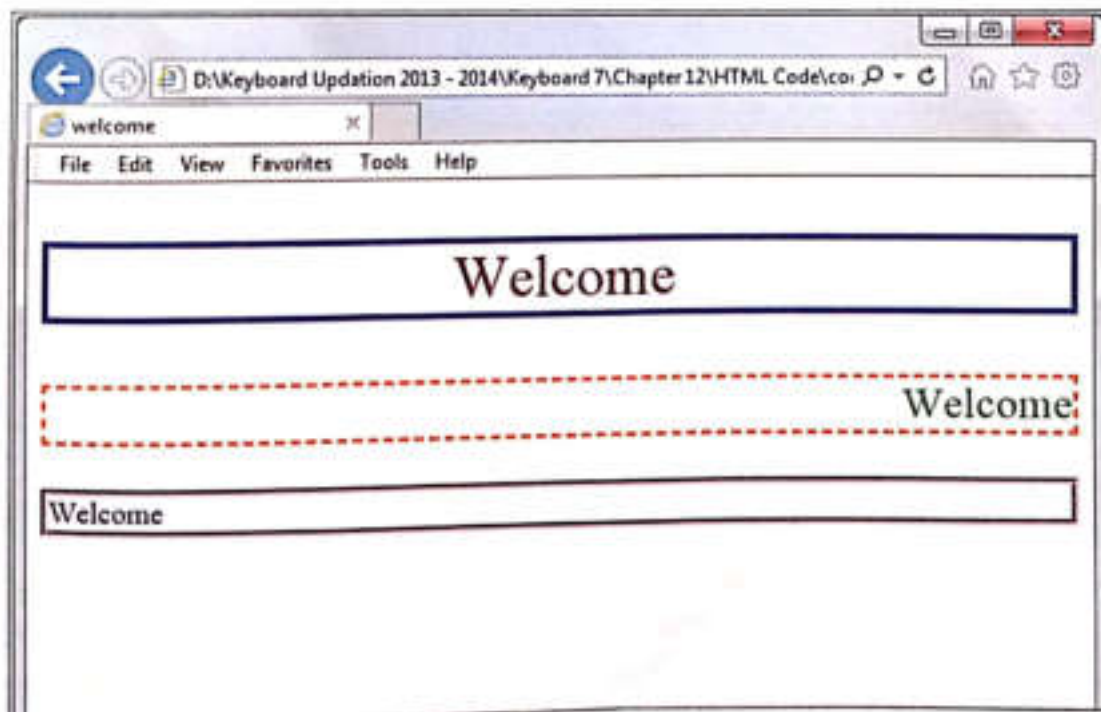


Fig. 10.2 View in the web browser—Different styles for 'welcome'

PRACTICE TIME



Create a simple web page on the 'World Wide Fund for Nature (WWF)'. Set suitable properties for the text. Draw a horizontal line after each paragraph. (Use inline styles to set the properties).

SOLUTION

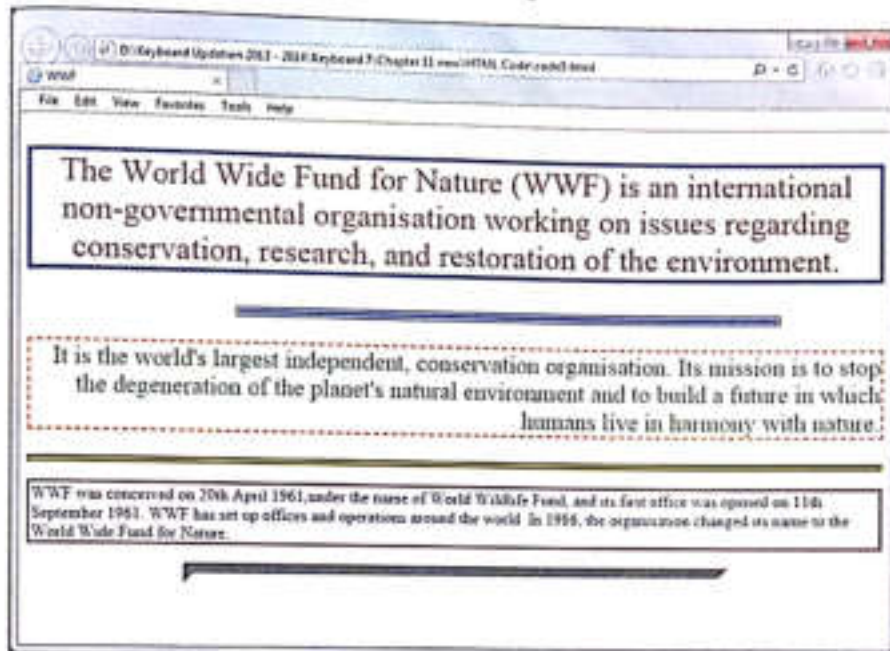
1. Open Notepad and type the following HTML code.

```
<!DOCTYPE html>
<html>
<head>
<title>WWF</title>
</head>
<body>
<p style= "font-size: xx-large; color: maroon; text-align:
centre; border: solid 4px blue">
The World Wide Fund for Nature (WWF) is an international
non-governmental organisation working on issues regarding
conservation, research and restoration of the environment. </p>
<hr style= "margin-left: 200px; margin-right: 100px; border-
width: thick; border-style: double; color: blue">
<p style= "font-size: x-large; color: green; text-align: right;
border: dashed 3px orange">
It is the world's largest independent, conservation organisation.
Its mission is to stop the degeneration of the planet's natural
environment and to build a future in which humans live in harmony
with nature. </p>
<hr style= "border: 4px groove yellow">
<p style= "font-size: medium; color: navy; text-align: left;
border: groove 4px pink">WWF was conceived on 20th April 1961,
under the name of World Wildlife Fund, and its first office
was opened on 11th September 1961. WWF has set up offices and
operations around the world. In 1986, the organisation changed
its name to the World Wide Fund for Nature. </p>
<hr style= "margin-left: 150px; margin-right: 150px; border-
width: 10px">
```


</body>

</html>

2. Save the document as **code5.html**.
3. Open Internet Explorer and then open the document **code5.html**.
4. The view in the web browser is shown in the figure given below.



View in the web browser—Text on the WWF

Tricky Terms

Font a set of printable or displayable text characters in a specific style and size

Deprecated Element an outdated element that is still supported but would become obsolete in the future

Memory Bytes

- The paragraph element `<p>` lets us define paragraphs.
- The horizontal rule element `<hr>` draws a line across the page.

- The comment tags `<!--` and `-->` are used to add comments to an HTML document.
- The heading element `<h1>` is used to add section headings.

- `` and `<i>` are used to make text bold, and italicised, respectively.
- Using font properties, you can change the font, size, and style of the text.
- The text properties provide you with various text formatting options that help you to format the text in a web page.
- If a font name consists of a space, then it should be written within double quotes.
- Margin properties can be used to set the margin for an HTML element.
- Border properties can be used to set styles of border of any HTML element.
- You should specify the border-style property before the border-colour property as an element must have a border before you change its colour.
- Inline styles are used to apply a style to specific elements on a web page.

EXERCISES



Objective Type Questions

1. Choose the correct option.

- Which of the following defines the least prominent heading?
 i. `<h1>` ii. `<h5>` iii. `<h6>` iv. none of these
- Which of the following values can be assigned to the text-align property?
 i. left ii. right iii. centre iv. all of these
- Identify the correct code.
 i. `text-decoration: none`
 ii. `text-decoration: underline`
 iii. `text-decoration: overline`
 iv. all of these
- While specifying RGB colour values, the values must be from 0 to
 i. 254 ii. 255 iii. 256 iv. none of these
- The property is used to specify horizontal alignment of text.
 i. align ii. alignment iii. text-align iv. none of these
- Which of the following code is correct, if you want to apply a shadow to the text?
 i. `text-shadow: green`
 ii. `text-shadow: 2px 2px aqua`
 iii. `shadow: 2px 2px aqua`
 iv. None of the above
- The value that can be assigned to the font-style property is
 i. normal ii. italic iii. oblique iv. Any one of these
- The default value of the font-size property is
 i. medium ii. small iii. large iv. none of these



Descriptive Type Questions

1. Answer the following.

- Mention any two ways in which the colour property can be assigned its values.
- Name the property that is used to specify the horizontal alignment property. What is its default value?
- What values can be assigned to the text-transform property?
- Which tag is used to give comments in an HTML document?
- What is the use of the font-family and the font-style property?
- What is the purpose of the margin property? Explain with an example.
- Differentiate between the text-shadow and the text-decoration properties.
- What is the use of the <hr> tag? Is it an empty or a container element?
- Why do you think that most of the commands in this chapter deal with text formatting?
- Now that you know a number of commands and how to write simple HTML codes, how would you assess the language in terms of ease of learning and use?
- Write an HTML code for the 'About Us' page for your school's website. Make sure you include information about the history of your school, your school leaders, and also how to get in touch with your school's office.

Application-Based Questions

- Usman has to create a web page on an HTML 5 tutorial. He needs to give a thematic break after each topic.
 - Which HTML tag should he use for this purpose?
 - Name the property he should set to change the colour of the horizontal line.
- Observe the following HTML code and answer the questions:

```
h1{text-align: centre; color: white; transform: uppercase}
```

 - Identify the error(s) and write the correct code.
 - What change will you make in the above code if you want the text in small letters?
 - What other values can be specified with the text-align property?
- Wasim has written an HTML code for a simple web page that uses the first three heading levels. He wants to assign the color, maroon, to all the heading levels. He has written the following code:

```
h1 {color: maroon}
h2{color: maroon}
h3 {color: maroon}
```

 - Can this code be written in another way?
 - How many levels of headings can be created in HTML?
 - Name any two properties that can be set for the heading element.
- Talal has created a web page giving information about the national animal of Pakistan. Which property should he use, if he wants to make the following changes:
 - Change the spacing between the lines.

- ii. Change the alignment of the paragraph text to 'justify'.
- iii. Apply a shadow to the heading.



IN THE LAB

1. Jibran has collected information about 'Mangroves'. He now wants to create a web page to share this information with others. Help him with the task.
2. Create a simple web page giving some inspiring quotations. A horizontal line should be drawn after each quotation to separate them.
3. Mansoor has to create a web page on the topic 'National Festivals of Pakistan'. Can you create a similar web page for your class. Set a suitable background colour, font, font size, and font colour. Also, set the top and bottom margins.
4. Maria loves playing badminton. Her teacher has asked her to create a web page for her school giving information about the game. Set a suitable font, size, and colour for the text. Draw a border around the text. Important terms should be in bold. Also set the background colour as black.

GROUP PROJECT

Create group Web Design. It would be helpful if your group web pages were all on the same topic – e.g. wild animals, football teams, or fashion. Your theme for your web pages is different colour coding. Explore the different colour values used in HTML 5. Each member of the group should create a webpage by applying a different colour code. Once all your web pages are created, put them together to show to the other groups. What can you learn from one another? How will it help you improve your work?



TEACHER'S NOTES

- Explain to the students how to use hexadecimal code for specifying text colour.
- Demonstrate how to change the font style, size, and colour of text and encourage them to experiment with different styles.
- Explain how the same properties can be set for different HTML elements.

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Copy	CTRL + C	Center Align	CTRL + E
Paste	CTRL + V	Right Align	CTRL + R
Cut	CTRL + X	Justify	CTRL + J
Undo	CTRL + Z	New Drawing	CTRL + N
Redo	CTRL + Y	Save	CTRL + S
Resize and Skew	CTRL + W	Open	CTRL + O
Select All	CTRL + A	Print	CTRL + P
Open Font	CTRL + D		
Left Align	CTRL + L		



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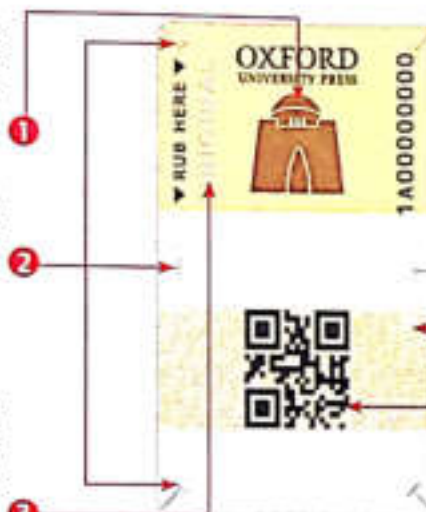
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