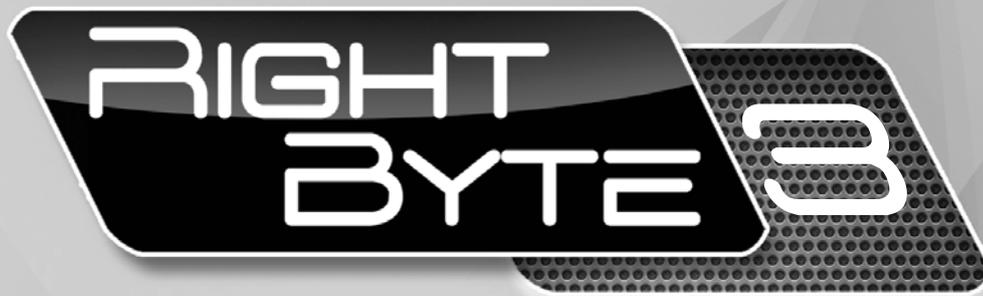


FOURTH EDITION

Teaching
Guide



For Secondary Classes

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Introduction to the series

Right Byte (Fourth Edition) is a three-book series aimed at introducing secondary level students to the logic behind computer operations. Students are now putting more effort into things that interest them and things they are convinced are relevant to them. Hence, the purpose of this book is to help students become competent in computer skills by explaining their practicality and usefulness. The new edition has been updated with respect to software and technology.

Education systems are based on examinations, and examination boards develop subject curricula accordingly. However, the foundation for all subjects is constructed well in advance. Computer studies is no different.

Written by experienced teachers, *Right Byte (Fourth Edition)* has been devised keeping in view the fact that the course should be a worthwhile experience in itself. The authors have sought to present the subject in a way which is accessible to all students. The series uses a simple and easy-to-learn approach throughout. Special attention has been paid to making the material comprehensive, interesting, concise, and practical.

Each chapter is self-contained and can be read independently. This provides the flexibility of studying chapters selectively. The chapters address a class-wise content and assessment methodology so that teachers can implement the curriculum effectively. The questions at the end of each chapter follow a logical progression in the amount of analysis and logical thinking required.

The authors sincerely hope that *Right Byte (Fourth Edition)* will shape the future of computer education at the secondary level.

For the instructor

In today's teaching environment, we understand that offering a textbook alone is not sufficient to meet the needs of the many different teachers who will be using it. To teach effectively, teachers must have a complete array of supplementary resources to assist them at every stage of teaching, from lesson planning to assessment.

Throughout the three Students' Books, important terms have been presented in bold and defined within the text. Summaries appear at the end of each chapter. The objective of these summaries is to provide a recapitulation of key concepts and terms in an engaging and meaningful way.

The approach of this fourth edition is to present information in clear and carefully-controlled steps. Engaging questions and tasks have been designed to test students' skills and explore the information presented. In addition, each chapter contains a number of objective questions to test students' recall of information. There is a list of key terms in the glossary at the end of each Student's Book.

All the concepts presented in the Students' Books are illustrated with suitable examples as and when required. This will enable the students to use the books most effectively.

Introduction to the Teaching Guides

Each Student's Book is accompanied by a Teaching Guide to help teachers use the textbook effectively. Our intention has been to produce a series that covers different aspects of IT. Every effort has been made to make it readable and accessible to those using this series. Simple and plain English has been used throughout.

The Teaching Guides have been developed keeping in mind that some teachers have had little or no prior experience of teaching computer studies. Efforts have been made to make sure that those teachers who have some experience of technology will benefit from the teaching ideas. The approach is practical and applied as well as theoretical. We believe that people learn by doing. A hands-on approach has been used to introduce each type of application. Sample lesson plans have been provided for each chapter that teachers can use to prepare their own lesson plans and activities appropriate for their class.

Features of the Teaching Guides

- Teaching objectives and learning outcomes
- Background information on important topics to guide the teacher during lesson planning
- Sample lesson plans
- Sample answers to questions given in the Students' Books
- Additional information that the teacher can incorporate in class discussions
- Activity sheets and test sheets for reinforcement and assessment
- Answers to activity sheets and test sheets

Note that students' answers to analytical questions might differ from the answers given in the guides. The answers given in the guides are only suggestions.

A practical approach

In order to function as an effective tool, the computer needs useful software that will make a student's work easier. We believe that the best way to learn is by doing. We encourage teachers to use the computer as a personal tool first and then to think about how to use it in the classroom. A tool is a means to an end, so it makes sense that the computer as a tool should be integrated throughout the school's curriculum. It is essential that the students get as much practical experience of using computers as they can because real understanding of computers can only come by using them as often as possible.

Issues involved in using computers

1

Location of the computers in the computer lab

One advantage of a computer lab is that it can accommodate the whole class at one time. An ideal lab should have enough computers so that there is one computer per child. But if that is not possible, then two students per computer is also a workable arrangement. Tables should also be provided in the computer lab so that students who are involved in off-computer activities have a place to work.

2

Keyboarding

It is important for students to learn the appropriate techniques for using a keyboard to enter data. Make sure that students do not develop bad keyboard habits. Schools should start formal keyboard instruction during the initial classes. The overall goal is for students to be able to type as fast as they can write. Emphasis should be placed on the correct technique as well as on accuracy.

Ideas on class management

- It is important to teach students some basic tasks such as how to insert a CD or a USB and how to protect them, how to plug in and unplug cables, how to navigate around a hard disk, how to use the printer properly, and so on.
- It is important to encourage students to make back-up copies of their important files.
- Pairing students at the computer is always very helpful. One student can enter information while the other can proofread what appears on the screen. Always remind them to change roles halfway through the task.

- When students work in pairs, make sure that each student does his or her own keyboarding. Sometimes the pair decides to let the faster typist do all the keyboarding and the other one does not get a chance to improve his or her keyboard skills. Please remember that one always learns to use software through hands-on experience, not by watching someone else.
- Always remind students to save their work periodically to minimize data loss caused by power failure. You could post a sign near the computer area saying, "Have you saved your work lately?"
- Students' keyboarding skills vary. Do not expect every student to need the same amount of time to complete a particular task. Help those who are slower.
- You can allow individual students to become class experts on particular software or on particular skills. These students can then help other students who need help, while you are busy with other students or tasks.
- When students ask for your help, never put your hands on their keyboard or mouse. Instead, tell them which key to press or what to do with the keyboard or mouse. Students should always do the task themselves in order to learn.
- Prepare a reference sheet for each software or software skill you introduce to students. Then, whenever they come for their practical class, they can bring their reference sheets to the computer lab to remind them of the most commonly-used procedures. This will save class time as students will have their own sheets and will refrain from asking questions again and again. You can also store students' reference sheets in a folder in the computer lab. Store the folders in alphabetical order on a shelf in the lab so that students can easily locate them whenever they need them.
- Another way to encourage students is to send letters to parents once in a term along with printouts of their practical work. Parents are always interested in knowing how their children are doing in class.

Some ideas for practical application

Your goal should be to stimulate students to think of new ways to integrate current lessons with computer activities.

Encourage students to interview their parents, grandparents, relatives, friends, or even their teachers to gather information about a given topic such as global warming. They can then enter the information on a Word document.

Students can prepare a newsletter of the events that have taken place at school over a period of three months or more, or about some other important event taking place in the country.

Encourage students to communicate and exchange ideas with other students in class via email.

Students can prepare a class database of all the students in their class along with their addresses and telephone numbers. They can also maintain a database of the weather for a month or two, or keep a database of all their school field trips and the places they have visited.

Always remember that if computer-related activities are designed to support the regular curriculum, they will not distract from learning, they will enhance it.

Teaching objectives

The objectives of this chapter are to:

- introduce multiplication and division of binary numbers
- explain the conversion of decimal numbers into octal numbers and *vice versa*
- explain the conversion of decimal numbers into hexadecimal values and *vice versa*.

Learning outcomes

After completing this chapter, students should be able to:

- perform multiplication and division of binary numbers
- convert decimal numbers into their octal and hexadecimal equivalents
- convert octal numbers and hexadecimal values into their decimal equivalents.

Introduction for the teacher

The purpose of this chapter is to build on students' knowledge of binary numbers which they acquired in Class VII. Since students are familiar with the addition and subtraction of binary numbers, this chapter introduces them to the multiplication and division of binary numbers using the rules of binary addition and subtraction learned in Class VII.

Similarly, since students also learned the conversion of decimal numbers into their binary equivalents and *vice versa* in Class VII, this chapter extends that knowledge to the conversion of decimal numbers into their octal and hexadecimal equivalents, and *vice versa*. The same repeated division and expansion methods are used with slight modifications.

Students might need to revise the concepts they learned a year ago so that they are able to grasp the concepts explained in this chapter. While explaining these concepts, previous concepts should be revisited as often as possible.

Since the chapter is based on computations, a significant amount of practice is necessary to ensure that students are fluent with the concepts and methods explained in the chapter.

By the end of this chapter, students should be able to perform multiplication and division operations on binary numbers.

Number of allocated periods: 4

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

How do we convert decimal numbers into binary numbers?

How do we convert binary numbers into decimal numbers?

What is 1+1 according to the rules of binary addition?

Reading and explanation (25 minutes)

Discuss section 1.1 on pages 3 to 5 of the textbook.

Begin the chapter by refreshing students' memories about binary addition. Ask them to read through the table given on page 3 of the textbook. Pay particular attention to the rule about 1+1 since this might cause confusion among some students. You might also solve a simple binary addition problem on the board.

After students have revised these concepts, state that you will now explain the process of multiplying two binary numbers using the rules of binary addition. Solve the examples given on page 4 of the textbook on the board. The procedure is similar to ordinary multiplication, so students should be able to understand what you are doing on the board. When it comes to adding 1 and 1, make sure that you ask students what the answer should be.

Now clear the solution from the board and ask students to solve the same question in their notebooks. Make sure that they do not refer to the textbook for the solution.

Classroom activity (5 minutes)

Assign question 1(a) from section D on page 9 to be completed in the classroom.

Homework assignment (5 minutes)

Assign question 1(b) from section D (page 9) as homework. Clarify what is required of students in their answers.

Period 2

Starter activity (5 minutes)

Reading and explanation (25 minutes)

Discuss section 1.2 on pages 4 and 5 of the textbook.

Classroom activity (5 minutes)

Assign question 2(a) from section D on page 9 to be completed in the classroom.

Homework assignment (5 minutes)

Assign question 2(b) from section D (page 9) as homework. Clarify what is required of students in their answers.

Period 3

Starter activity (5 minutes)

Reading and explanation (25 minutes)

Discuss sections 1.3 and 1.4 on pages 5 and 6 of the textbook.



Classroom activity (5 minutes)

Assign questions 3(a) and 4(a) from section D on page 9 to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 3(b) and 4(b) from section D (page 9) as homework. Clarify what is required of students in their answers.

Period 4**Starter activity (5 minutes)****Reading and explanation (20 minutes)**

Discuss sections 1.5 and 1.6 on pages 6 to 7 of the textbook.

Classroom activity (10 minutes)

Assign sections A, B, and C on pages 8 to 9 to be completed in the classroom.

Homework assignment (5 minutes)

Assign question 5 from section D (page 9) as homework. Clarify what is required of students in their answers.

Suggested answers to end-of-chapter questions on pages 8 and 9**A. Fill in the blanks.**

1. 10 2. 1 3. repeated division 4. decimal 5. E

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

- False. In binary addition $1 + 0 = 1$.
- True.
- False. The hexadecimal equivalent of $(50)_{10}$ is 32.
- True.
- False. The octal equivalent of $(100)_{10}$ is 144.

C. Select the correct option for each question.

1. d 2. c 3. b 4. a 5. a

D. Answer the following questions.**1. Find the product of the following:**

a. $(101)_2 \times (110)_2$

$$\begin{array}{r}
 101 \\
 \times 110 \\
 \hline
 000 \\
 + 101\ X \\
 101\ X\ X \\
 \hline
 11110
 \end{array}$$

The product is $(11110)_2$.

b. $(10010)_2 \times (100)_2$

$$\begin{array}{r}
 1\ 0\ 0\ 1\ 0 \\
 \times\ 1\ 0\ 0 \\
 \hline
 0\ 0\ 0\ 0\ 0 \\
 +\ 0\ 0\ 0\ 0\ 0\ X \\
 1\ 0\ 0\ 1\ 0\ X\ X \\
 \hline
 1\ 0\ 0\ 1\ 0\ 0\ 0
 \end{array}$$

The product is $(1001000)_2$.

2. Perform binary division on the following:

a. $(11100)_2 \div (10)_2$

$$\begin{array}{r}
 1110 \\
 10\overline{)11100} \\
 \underline{-10} \\
 11 \\
 \underline{-10} \\
 10 \\
 \underline{-10} \\
 00 \\
 \underline{-0} \\
 XX
 \end{array}$$

The answer is $(1110)_2$.

b. $(100110)_2 \div (10)_2$

$$\begin{array}{r}
 10011 \\
 10\overline{)100110} \\
 \underline{-10} \\
 00 \\
 \underline{-0} \\
 01 \\
 \underline{-0} \\
 11 \\
 \underline{-10} \\
 10 \\
 \underline{-10} \\
 XX
 \end{array}$$

The answer is $(10011)_2$.

3. Convert the following into their octal equivalents:

a. 750_{10}

	Number	Remainder
8	750	
8	93	6
8	11	5
	1	3

$$\therefore (750)_{10} = (1356)_8$$

b. 338_{10}

	Number	Remainder
8	338	
8	42	2
	5	2

$$\therefore (338)_{10} = (522)_8$$

4. Convert the following into hexadecimal values:

a. 650_{10}

	Number	Remainder
16	650	
16	40	10
	2	8

$$\therefore (650)_{10} = (28A)_{16} \text{ (since } 10 = A \text{)}$$

b. 240_{10}

	Number	Remainder
16	240	
	15	0

$$\therefore (240)_{10} = (F0)_{16} \text{ (since } 15 = F \text{)}$$



5. What is the hexadecimal equivalent of $(53)_8$?

First we convert $(53)_8$ into its decimal equivalent using the expansion method.

$$= (5 \times 8^1) + (3 \times 8^0)$$

$$= (5 \times 8) + (3 \times 1)$$

$$= 40 + 3$$

$$= 43$$

$$\therefore (53)_8 = (43)_{10}$$

Then we convert $(43)_{10}$ into its hexadecimal equivalent using the repeated division method.

	Number	Remainder
16	43	
	2	11

$$\therefore (43)_{10} = (2B)_{16} \quad (\text{since } 11 = B)$$

$$\therefore (53)_8 = (2B)_{16}$$

Additional information for the teacher

- The repeated division method relies on the procedure of dividing the decimal number by the base 8 and extracting the remainders. The first remainder is called the least significant digit (LSD) and the last remainder is called the most significant digit (MSD).
- The **MSD** is the digit that has the greatest impact on the number.
- The **LSD** is the digit that has the least impact on the number.

In a whole number, the MSD and LSD will be as follows:

5631.0

5 = MSD

1 = LSD or the digit to the left of the radix point or decimal point.

An example is given as follows:

Convert 15_{10} into its octal equivalent.

$$\begin{array}{r} 1 \\ 8 \overline{)15} \\ \underline{-8} \\ 7 \end{array}$$

Therefore, 7 is the LSD.

Next, the quotient 1 is divided by 8.

$$\begin{array}{r} 0 \\ 8 \overline{)1} \\ \underline{-0} \\ 1 \end{array}$$

Therefore, 1 is the MSD.

Finally, the answer is written from MSD TO LSD, i.e. 17_8 .

Activity Sheet

I. Find the product of $(110)_2$ and $(11)_2$.

II. Divide $(11011)_2$ by $(11)_2$.

III. Convert $(110)_{10}$ into its octal equivalent.

IV. Convert $(50)_{16}$ into its decimal equivalent.



Test Sheet

I. Convert the following into their decimal equivalents. (5 marks)

1. $(25A)_{16}$

2. $(4654)_8$

II. Convert the following into their octal equivalents. (5 marks)

1. $(500)_{10}$

2. $(2962)_{10}$



Answers to activity sheet

I. Find the product of $(110)_2$ and $(11)_2$.

$$\begin{array}{r}
 110 \\
 \times 11 \\
 \hline
 110 \\
 + 110 \\
 \hline
 10010
 \end{array}$$

The product is $(10010)_2$.

II. Divide $(11011)_2$ by $(11)_2$.

$$\begin{array}{r}
 1001 \\
 11 \overline{) 11011} \\
 \underline{-11} \\
 00 \\
 \underline{-0} \\
 01 \\
 \underline{-0} \\
 11 \\
 \underline{-11} \\
 XX
 \end{array}$$

The answer is $(1001)_2$.

III. Convert $(110)_{10}$ into its octal equivalent.

	Number	Remainder
8	110	
8	13	6
	1	5

$$\therefore (110)_{10} = (156)_8$$

IV. Convert $(50)_{16}$ into its decimal equivalent.

$$= (5 \times 16^1) + (0 \times 16^0)$$

$$= (5 \times 16) + (0 \times 1)$$

$$= 80 + 0$$

$$= 80$$

$$\therefore (50)_{16} = (80)_{10}$$

Answers to test sheet

I. Convert the following into their decimal equivalents.

1. $(25A)_{16}$

$$= (2 \times 16^2) + (5 \times 16^1) + (10 \times 16^0) \text{ (since } 10 = A)$$

$$= (2 \times 256) + (5 \times 16) + (10 \times 1)$$

$$= 512 + 80 + 10$$

$$= 602$$

$$\therefore (25A)_{16} = (602)_{10}$$

2. $(4654)_8$

$$= (4 \times 8^3) + (6 \times 8^2) + (5 \times 8^1) + (4 \times 8^0)$$

$$= (4 \times 512) + (6 \times 64) + (5 \times 8) + (4 \times 1)$$

$$= 2048 + 384 + 40 + 4$$

$$= 2476$$

$$\therefore (4654)_8 = (2476)_{10}$$

II. Convert the following into their octal equivalents.

1. $(500)_{10}$

	Number	Remainder
8	500	
8	62	4
	7	6

$$\therefore (500)_{10} = (764)_8$$

2. $(2962)_{10}$

	Number	Remainder
8	2962	
8	370	2
8	46	2
	5	6

$$\therefore (2962)_{10} = (5622)_8$$

Teaching objectives

The objectives of this chapter are to:

- explain the importance of using comments and watermarks
- explain how comments and watermarks can be inserted on a page
- explain the functions of tables and how they can be inserted on a page
- explain how text can be arranged in columns
- establish the importance of using pictures and how they can be inserted on a page.

Learning outcomes

After completing this chapter, students should be able to:

- insert comments at appropriate points in a document
- insert a watermark in a document
- create tables and format them according to purpose
- arrange text in columns
- insert relevant pictures and shapes at appropriate points in a document.

Introduction for the teacher

The purpose of this chapter is to introduce students to some advanced formatting options and tools that they can use to make their Word documents more functional and attractive. Since students learned the basics of editing and formatting Word documents in Books 1 and 2, the focus of this chapter is to help students organize edited material in a document.

Students should understand the functions of comments, watermarks, tables, columns, and graphics. They should be able to determine when each might be required on a Word document.

Comments should be explained as a way of inserting remarks in a document. Students should be able to state examples from their daily reading where they might feel the need to insert a comment. Next, watermarks should be explained as a means of ensuring the authenticity of the source of the document as well as adding an attractive feature. Tables should be explained as a structure for organizing information in a logical manner. Columns should be explained as a means of facilitating speedy reading of text. Finally, the functional and aesthetic functions of Clip Art, Shapes, and charts should bring the discussion to a close.

After explaining the unique functions of the tools described in the chapter, allow students time to practise on the computer so that they become fluent in the use of these tools. Most of the discussion in this chapter centres

around the use of tables. Make sure that students have ample practice of creating, editing, and formatting tables on a document.

By the end of this chapter, students should be able to create, edit, and format Word documents using the features described in this chapter. This awareness should be used to stimulate the desire to acquire advanced skills in Excel as well.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

Why do we make notes in the margins of a page?

Can these notes be useful to others?

How can we prevent others from calling our documents their own?

Reading and explanation (lab session) (30 minutes)

Discuss sections 2.1 and 2.2 on pages 11 to 13 of the textbook.

Using the responses given by the students, introduce the concept of inserting comments on a Word document. Explain that just as we make notes in the margins of a page to help us remember important points or to provide instructions, we can also insert comments on a Word document. Ask students for examples of instructions and explanatory information that might be inserted as comments.

Once students have given satisfactory responses, proceed towards practical work. Ask students to open a Word document that you have prepared and stored on each computer before the session. The document should not exceed two pages and should contain information that students can understand on their own. Ask them to read the document and identify points where comments might be useful. After all students have identified at least one point, explain how to insert a comment on a Word document. You could also ask students to follow the steps described on the relevant pages of the textbook. Give students adequate time to practise in pairs.

Next, introduce the term **watermark**. Explain that a watermark helps to identify the subject of a document, i.e. what a document is about. It also helps to identify the source of a document, i.e. the person who created the document. This helps to prevent people from calling other people's work their own. You should also explain that a watermark can also improve the appearance of a document if it is designed carefully. Once students understand the functions of a watermark, explain how to insert one in a document. Ask students to insert a suitable watermark in a document they have worked on earlier. You could suggest that each pair use the names of the pair of members as a watermark. Give students adequate time for practice.

Towards the end of the session, remind the students to save their work before shutting down the computer.

Homework assignment (5 minutes)

Assign questions 1 and 2 from section D (page 21) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss section 2.3 on pages 13 to 17 of the textbook.

Homework assignment (5 minutes)

Assign questions 3 and 4 from section D (page 21) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 2.4 and 2.5 on pages 17 and 18 of the textbook. Assign section F on page 21 as a lab activity.

Homework assignment (5 minutes)

Assign sections A, B, and C, section D (questions 5 to 7), and section E as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 20 and 21

A. Fill in the blanks.

1. Review 2. watermark 3. Fixed column width 4. Layout 5. SmartArt

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. False. A comment can be deleted after it has been created.
2. True.
3. False. Images can also be inserted as a watermark.
4. False. Clip Art consists of illustrations.
5. True.

C. Select the correct option for each question.

1. b 2. c 3. b 4. d 5. b

D. Answer the following questions.

1. What is a comment? Why is it useful for the creator of a document?

A comment is a remark made by a person while creating or reading a document. It may include brief explanations or reminders. A comment is useful for the creator of a document because the creator can insert a reminder to double-check a certain fact before printing the document. He can also insert a note to rewrite a sentence using simpler words.

2. Name the two types of watermark.

The two types of watermark are:

- i. text watermark
- ii. picture watermark

3. Explain three ways in which tables make it easier to understand data.

Tables allow us to understand data by organizing it in different ways. Three such ways are described below:

1. Tables make it easier to understand data by classifying it according to certain rules. For example, a table might include China, Thailand, Qatar, and Bangladesh in one column because these are all Asian countries. It might also include Italy, Spain, Greece, and Holland in a separate column because these are all European countries.

2. Tables enable us to summarize a large amount of data in one place. For example, we can use a table to list each country and the number of medals they have won during a sporting event.
3. Tables also enable us to compare data. For example, we can insert the size, price, and features of two computers in two different columns. This can help us to decide which computer to buy.

4. What is meant by text wrapping?

Text wrapping means the way in which text is placed along a table. Text can be placed entirely below or above a table. It can also be made to flow around a table.

5. Why do we arrange text in columns?

We arrange text in columns to save space on a page. We also arrange text in columns because it helps us to read faster. This is because lines in a column are shorter, so our eyes can move across them faster.

E. Write paragraphs to answer the following questions.

1. Describe two types of documents where SmartArt can enable users to understand data more effectively.

SmartArt can be used to explain the hierarchy of an office in a brochure. It can identify the head of the organization and the managers who report to him or her. It can also show how different departments in the organization are organized. SmartArt can also be used to explain the steps of a process in a procedure manual, such as assembling an item of furniture. Diagrams can be used to illustrate how to assemble a table or a chair.

2. Explain why a document would have the following as a watermark: DRAFT, CONFIDENTIAL, the name of the document creator.

A document should have the DRAFT watermark if it is a temporary version and the author is going to revise it before presenting it to the reader. The CONFIDENTIAL watermark should be used to indicate that the document should only be read by the person to whom the author delivers the document. Others should not read the document as it could contain personal information. The name of the author should be used if the document contains creative work or where it is important to identify whose ideas are expressed in the document.

F. Lab exercise

For the teacher: After explaining the task to the students, ask them to brainstorm ideas in groups before taking them to the lab. This will enable them to discuss ideas and come up with interesting ways to design the brochure. You could ask them to refer to a previous sporting event organized at the school. They could also bring in photographs of such events to insert in their brochures. Depending on resources and time, this activity could be adapted for pair, group, or individual work.

G. Project

For the teacher: To save classroom time, it is suggested that the teacher survey the library for books that contain tables and columns. Magazines, newspapers, and published reports may be a good source as well as textbooks on geography, mathematics, and science. Remind students about using the books carefully so that they can be returned to the library in good condition. You may choose to point out some applications of tables to give students a basic idea of how to proceed with the project.

Activity Sheet

I. Why...?

1. Why do we need to classify data?

2. Why do we need to summarize data?

3. Why do we use the Sort feature?

4. Why do we use pictures in a document?

Activity Sheet

II. Draw a table to classify the following data:

Istanbul, Oliver Twist, England, Germany, Liaquat Ali Khan, Kidnapped, Tokyo, Syria, David Copperfield, George Washington, Nigeria, The Wizard of Oz, Thomas Edison, Tehran, New York, Christopher Columbus, The Railway Children, Brazil, London, Nelson Mandela.

Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)
- We can divide one cell into two by using the _____ feature.
 - Merge Cells
 - Split Cells
 - Divide Cells
 - Many Cells
 - We can arrange text in columns by going to the _____ Menu.
 - Format
 - Insert
 - Edit
 - File
 - We can draw a flow chart by using the _____ feature.
 - SmartArt
 - Chart
 - Shapes
 - Clip Art
 - The way text flows around a table is called _____.
 - table wrapping
 - table flow
 - text flow
 - text wrapping
 - We can use tables to _____ data.
 - summarize
 - sort
 - compare
 - all of the above

Answers to activity sheet

I. Why...?

1. We need to classify data to indicate which items of data are similar to, and different from, one another.
2. We need to summarize data to help us go through important points in less time.
3. We use the Sort feature to arrange data in ascending or descending order.
4. We use pictures in a document because pictures give more information than words.

II. Draw a table to classify the following data:

Istanbul, Oliver Twist, England, Germany, Liaquat Ali Khan, Kidnapped, Tokyo, Syria, David Copperfield, George Washington, Nigeria, The Wizard of Oz, Thomas Edison, Tehran, New York, Christopher Columbus, The Railway Children, Brazil, London, Nelson Mandela.

Cities	Countries	Books	Famous People
Istanbul	Brazil	David Copperfield	Christopher Columbus
London	England	Kidnapped	George Washington
New York	Germany	Oliver Twist	Liaquat Ali Khan
Tehran	Nigeria	The Railway Children	Nelson Mandela
Tokyo	Syria	The Wizard of Oz	Thomas Edison

Answers to test sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

	a	b	c	d
1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Teaching objectives

The objectives of this chapter are to:

- explain the importance of conditional formatting
- explain how the IF, POWER, SQRT, and PRODUCT functions can be inserted
- compare column charts, line charts, and pie charts.

Learning outcomes

After completing this chapter, students should be able to:

- apply conditional formatting to set off unusual data in a data set
- insert the IF, POWER, SQRT, and PRODUCT functions using Insert Function
- insert column charts, line charts, and pie charts.

Introduction for the teacher

The purpose of this chapter is to build on students' existing knowledge about the editing and formatting options in Excel. Since students know that Excel helps us to manipulate numerical data, this chapter explains ways in which data can be presented in a more useful way. Conditional formatting is one such feature. Introduce conditional formatting as a means of setting off unusual data so that it stands out on the spreadsheet. Explain that this helps to reduce the time spent in scanning the entire spreadsheet for significant data.

In the next section of the chapter, try to build on the knowledge of the SUM, AVERAGE, MIN, and MAX functions discussed in Book 2. Introduce the new functions that are described in the chapter. Explain the purpose of the IF, POWER, SQRT, and PRODUCT functions. Explain the procedure for inserting each of these functions. Allow students to practise inserting the functions by creating a file as explained on the relevant pages of the textbook.

The third section of the chapter discusses charts. Stress the importance of using charts and graphs to present numerical data. Discuss the three types of chart described in the chapter. Ask students to suggest situations when column, line, and pie charts might be appropriate. Explain the procedure for inserting the different types of charts on a spreadsheet. It is important to give students adequate time for practice so that they become fluent with the terms **legend**, **data range**, and so on.

By the end of the chapter, students should be able to create and interpret data on a spreadsheet by applying the features discussed in the chapter.

Number of allocated periods: 5

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

How does Excel help us to interpret numbers?

Why do we format a spreadsheet?

Are there any other advantages of formatting?

Reading and explanation (lab session) (30 minutes)

Discuss section 3.1 on pages 23 to 26 of the textbook.

Ask students to recall the difference between editing and formatting. Ask them to state the purpose of formatting. They might say that formatting helps to improve the appearance of a document. After students have given their responses, introduce the idea of conditional formatting by explaining that formatting can also be used to highlight important or unusual data, just as a teacher uses a red pen to draw a circle around a spelling mistake.

Explain the importance of using a range in conditional formatting. Explain that a range helps to identify the data that needs to be formatted differently. Discuss the different types of range described in the textbook. Finally, explain the procedure for applying conditional formatting on a document.

Before the session begins, prepare a file as shown on page 24 of the textbook. Save copies of the file on every computer. Ask students to work on this file and apply conditional formatting to the data. As you describe the procedure for applying conditional formatting, ask students to follow the instructions and screenshots from the textbook.

Homework assignment (5 minutes)

Assign questions 1 and 3 from section D (page 44) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 3.2 and 3.2.1 on pages 27 to 31 of the textbook.

Homework assignment (5 minutes)

Assign question 2 from section D (page 44) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 3.2.2 to 3.2.4 on pages 31 to 34 of the textbook.

Homework assignment (5 minutes)

Assign questions 4 and 5 from section D (page 44) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 4

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 3.3 and 3.3.1 on pages 34 to 37 of the textbook.

Assign section F to be attempted on the computer.

Homework assignment (5 minutes)

Assign question 5 from section D (page 44) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 5

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 3.3.2 and 3.3.3 on pages 37 to 41 of the textbook.

Assign sections A, B, and C to be completed in the lab.

Homework assignment (5 minutes)

Assign section E (page 45) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 43 to 45

A. Fill in the blanks.

1. =SQRT(4) 2. Function Library 3. line 4. POWER 5. pie

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. True.
3. False. The POWER function consists of two numbers in the syntax.
4. False. The PRODUCT function can be used with two or more numbers.
5. False. The options for charts can be accessed from the Insert tab.

C. Select the correct option for each question.

1. c 2. a 3. c 4. a 5. d
6. c 7. a 8. c 9. a 10. b

D. Answer the following questions.

1. What is meant by conditional formatting? Why is it useful?

Conditional formatting is a feature that is used to make particular data appear in a format different from the rest of the data. Conditional formatting is useful because it helps us to identify unusual or important data by making it look different from normal or less important data.

2. Why do we use a condition in the IF function?

We use a condition in the IF function because a condition states the rules that should be applied to decide whether the data value is true or false. This enables the computer to decide which of two steps to take.



3. When do we use the following conditional options?**a. between**

We use between when we want to apply conditional formatting to data that lies between two values.

b. greater than

We use greater than when we want to apply conditional formatting to data that is greater than a certain value.

c. equal to

We use equal to when we want to apply conditional formatting to a specific value.

4. Describe the procedure for inserting the SQRT function.

The SQRT function can be applied by following these steps:

- Select the cell where the square root is to be entered.
- Select Function from the Insert tab.
- Select the SQRT function and click on OK.
- Click on the square-shaped figure at the right end of the Number box.
- Click on the cell which contains the square value.
- Click on the icon at the right end of the window.
- Click on OK.

5. Write down the syntax of the following functions:**a. IF**

=IF(logical_test, value_if_true, value_if_false)

b. POWER

=POWER(Base number, power)

c. SQRT

=SQRT(Number)

d. PRODUCT

=PRODUCT(Number 1, Number 2, ...).

E. Write paragraphs to answer the following questions.**1. "Charts are mainly inserted to make the data look attractive." Do you agree with this statement? Why or why not?**

I do not agree with the statement because charts are used for informational purposes. A chart presents a large amount of information in the form of an image. Charts make it easier for readers to compare information and spot trends. This information is necessary to make decisions about expenses and profits. Charts also make the document look attractive but this is not the main reason for using them.

2. Rabia wants to show how the price of books has increased over the past five years. Which type of chart should she use? Give reasons for your choice.

Rabia should use a line chart to show changes in the price of books over the past five years. A line chart can be made for the average price of books in each year. These points can be connected with a line. A

rising line would show that prices have increased over the past five years. A falling line would show that prices have decreased. Other charts would not be as useful for this purpose.

F. Lab exercise

For the teacher: This is a relatively simple exercise if students have learnt the functions and their syntax well. The main challenge for students is to organize the data in appropriate columns and avoid entering the formula repeatedly. Alert students to the need for remaining vigilant about entering the correct references and values on the spreadsheet.

G. Project

For the teacher: It may be a good idea to revise the steps of conditional formatting before students embark on this task. Students are likely to have their favourite cricketers; hence, you can ask them to name them in the class to stimulate their interest. You can identify published and online sources from where students can collect the required data for this project.

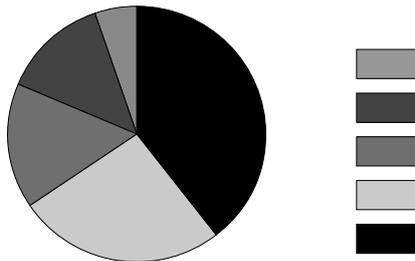
Activity Sheet

I. Fill in the blanks to complete the functions:

- To determine whether a student has passed or failed
=IF (marks ____ 32, "Pass", "Fail")
- To find the value of 5 raised to the power of 3
= POWER (____, ____)
- To find the square root of 81
= SQRT (____)

II. Below is data about the hobbies of a group of students. A pie chart is also given. Provide a title, legend, and data labels for the pie chart.

Hobby	Number of students
Cycling	15
Cooking	10
Reading	6
Swimming	5
Collecting coins	2



Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)
- A condition includes a _____.
 - range
 - value
 - format
 - function
 - If we use the greater than or equal to 50 condition, the computer will apply conditional formatting to _____.
 - 60
 - 100
 - 45
 - a & b
 - The _____ function tells a computer what to do if a condition is true and what to do if the condition is not true.
 - PRODUCT
 - IF
 - SQRT
 - TRUE
 - We can use a _____ chart to show that books are more expensive this year than last year.
 - column
 - pie
 - line
 - price
 - The _____ function tells us that $9 \times 8 = 72$.
 - PRODUCT
 - SQRT
 - IF
 - POWER



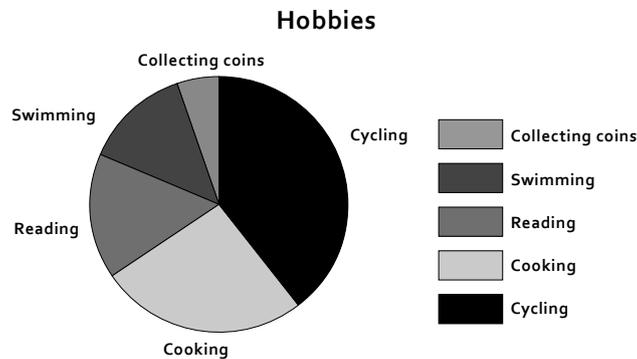
Answers to activity sheet

I. Fill in the blanks to complete the functions:

- To determine whether a student has passed or failed
=IF (marks >= 32, "Pass", "Fail")
- To find the value of 5 raised to the power of 3
= POWER (5, 3)
- To find the square root of 81
= SQRT (81)

II. Below is data about the hobbies of a group of students. A pie chart is also given. Provide a title, legend, and data labels for the pie chart.

Hobby	Number of students
Cycling	15
Cooking	10
Reading	6
Swimming	5
Collecting coins	2



Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

	a	b	c	d
1	●	○	○	○
2	○	○	○	●
3	○	●	○	○
4	○	○	●	○
5	●	○	○	○

Teaching objectives

The objectives of this chapter are to:

- introduce a step-by-step approach to problem-solving
- explain the importance of considering environmental input, output, and process requirements
- introduce the repetition problem
- explain the DO...WHILE and REPEAT...UNTIL statements
- explain how algorithms and flow charts can be created for repetition problems.

Learning outcomes

After completing this chapter, students should be able to:

- explain the step-by-step approach to problem-solving
- consider the environmental input, output, and process requirements for solving problems from daily life
- explain the repetition problem
- compare the DO...WHILE and REPEAT...UNTIL statements
- write algorithms and draw flow charts for repetition problems.

Introduction for the teacher

The purpose of this chapter is to build the foundation for the concepts of computer programming that are to be taught in subsequent chapters. In order to achieve this end, this chapter describes a step-by-step approach to problem-solving. Although this chapter uses common examples from daily life, the principles and approach can be applied to technical problems as well.

Being able to think about problem-solving in a systematic way is important because it helps students to think clearly about problems without getting locked into traditional solutions. It encourages creativity and ensures that the best possible solution is achieved. Introduce the concepts of input, output, and processing requirements. Explain how this process is similar to the way in which a computer solves a problem.

Next, present the repetition problem as one type of problem that requires an action to be repeated until a certain state is achieved. It is important that students identify such situations from daily life.

Introduce the DO...WHILE and REPEAT...UNTIL statements as instructions that help a computer solve repetition problems. Discuss how algorithms and flow charts might be created for DO...WHILE and REPEAT...UNTIL statements. Describe these as stages involved in the problem-solving process.



As discussion on the chapter draws to a close, recapitulate the stages of problem-solving, right from defining a problem to creating flow charts.

By the end of this chapter, students should be able to think systematically about problem-solving and perform the steps that have been discussed. They should be in a position to grasp the need for creating programs as the next step in solving a problem.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

Can you describe a problem that you faced recently?

How did you try to solve it?

Was the solution successful?

How can we think of better solutions?

Reading and explanation (30 minutes)

Discuss sections 4.1 to 4.1.5 on pages 47 to 51 of the textbook.

After collecting students' responses to the starter questions, select one of the problems and ask the students to define the problem. Students will probably find this difficult. After collecting their responses, describe the function of a problem definition and its characteristics. Use the example given in the textbook. Now ask students to define the problem again. They should be able to provide a reasonable definition this time.

Next, discuss the input requirements for solving problems. You could continue with the example discussed previously or discuss the example given in the textbook. Students should find this a simple task since they have discussed input requirements in earlier classes too.

Discuss the processing requirements and point out to the fact that computers and humans possess a limited amount of processing capability. Therefore it is important to be clear about the processing requirements to avoid wasting time and energy.

Finally, examine how a solution emerges when the three requirements are considered together. Towards the end of the session, students should have arrived at some solution for the problem under discussion. You could ask them to read through the example of the doctor and his patient to clarify their ideas.

Homework assignment (5 minutes)

Assign questions 1 to 3 from section D (page 58) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 4.2 and 4.2.1 on pages 51 and 52 of the textbook.

Homework assignment (5 minutes)

Assign question 4 from section D (page 58) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (20 minutes)

Discuss section 4.2.2 on pages 52 to 55 of the textbook.

Classroom activity (10 minutes)

Assign sections A, B, and C (pages 57 and 58) to be completed in the classroom.

Homework assignment (5 minutes)

Assign question 5 from section D and section E (page 58) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 57 to 59

A. Fill in the blanks.

1. input 2. repetition 3. conditional 4. problem definition 5. solution

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. False. A precise problem definition is better than a broad definition.
2. False. We should determine the output requirements before the process requirements.
3. False. Preparing a timetable is not a repetition process.
4. True.
5. False. The REPEAT...UNTIL statement repeats an action as long as the condition is not true.

C. Select the correct option for each question.

1. a 2. c 3. d 4. a 5. d
6. a 7. c 8. d 9. b 10. a

D. Answer the following questions.

1. Why should we adopt a step-by-step approach to problem-solving?

We should adopt a step-by-step approach to problem-solving because it helps us to think about all the causes of a problem. It helps us to identify the actual problem. It allows us to collect all the necessary information about a problem and think of all the possible solutions. In this way, it helps us to reach a sound solution.

2. Describe two qualities of a good problem definition.

A good problem definition is precise. This means that the problem definition identifies a single problem. It does not mix up two or more related problems. A precise problem definition helps us to focus attention on one problem at a time.

A good problem definition also identifies the actual cause of a problem instead of its effects. This helps us to think of a solution that deals with the cause and solves the problem.

3. Why should we think about output requirements?

We should think about output requirements because it helps us to think about the result of our solution. By thinking about the output requirements we can test our solution to see whether it can give the desired results.



4. **Why is the DO...WHILE statement called a conditional statement? Is the REPEAT...UNTIL statement also a conditional statement?**

The DO...WHILE statement is called a conditional statement because it uses a condition to tell the computer when to stop repeating an action. The computer uses that condition to repeat an action for as long as the condition remains true. The REPEAT...UNTIL statement is also a conditional statement because it also uses a condition to tell the computer when to stop repeating an action. The computer uses that condition to repeat an action until the condition becomes true.

5. **What is the difference between the DO...WHILE statement and the REPEAT...UNTIL statement?**

The difference between the DO...WHILE and the REPEAT...UNTIL statements is that in a DO...WHILE statement, the computer repeats an action while the condition is true. It tests the condition before carrying out an instruction. In a REPEAT...UNTIL statement, the computer repeats an action for as long as the condition is not true. It carries out the instruction before testing the condition.

E. **Write paragraphs to answer the following questions.**

1. **When do we need to repeat an action? Explain with examples from daily life.**

We need to repeat an action for conditional tasks. Repeating an action or step helps us to improve performance or complete the required number of steps for a job. In daily life, we use repetition when we are trying to learn a new skill such as painting or calligraphy. We need to repeat the strokes until we learn to do them perfectly. We also use repetition to complete a large project. A chef needs to prepare the same meal at a restaurant hundreds of times a day to serve the customers.

2. **Identify the input, processing, and output requirements in the following situation: you have been asked by your teacher to present a skit for an upcoming annual school function.**

The input requirements are the date of the function and the students in my class. The output requirements are the criteria for selection of the teacher and the costumes, sets, and audio system. The processing requirements are the preparation of the script, selection of actors, creating the team for backstage preparations, and regular practice.

F. **Practical exercise**

For the teacher: Explain to the students that the task involves repetition with regard to a condition. Have the students state the condition and write it on the top of the page. Students will come up with slightly different versions of the algorithm. Once students have prepared the algorithm, they should revise it as there would inevitably be scope for trimming down the first version. Next, students could be asked to draw a flow chart.

G. **Project**

For the teacher: Guide students about how to approach their parents for this project. You could suggest simple ideas such as weekend plans, planning a new purchase, etc. Advise students not to be intrusive and respect their parents' desire to withhold some information. Ask the students to organize their answers under separate headings for each type of requirement.

Additional information for the teacher

The DO...WHILE and REPEAT...UNTIL statements have been described as loops. Programming involves repetitive actions for certain queries and traditionally the same process needs to be repeated several times. A loop simplifies this process by answering a query and then continuing this process till no further answers are required.

- Each pass through a loop is called an **iteration**. The concept of loops can be clearly observed in flow charts. This can also be explained with an example of a program designed to calculate a student's marks. The program will start with the calculation of the marks scored by the student in one subject and repeat or reiterate the same action till there are no more subjects left. Loops are highly useful in programming because they describe structured processes.

- The loop described above can be understood as a **FOREACH** loop. It is different from conditional loops because the FOREACH loop is not repeated until a condition is met. Instead, the FOREACH loop is repeated as many times as the number of items in the data set. Assuming that in the previous example, the student was examined on six subjects, the FOREACH loop would be executed six times only, to add up the marks scored in each subject.



Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. The first step in problem-solving is _____.
 - a. output analysis
 - b. input collection
 - c. problem definition
 - d. none of the above
2. A _____ problem definition combines related problems into a single problem.
 - a. broad
 - b. narrow
 - c. precise
 - d. strong
3. Input consists of information available in the _____.
 - a. computer
 - b. environment
 - c. problem
 - d. definition
4. There can be two or more _____ to a problem.
 - a. programs
 - b. loops
 - c. repetitions
 - d. solutions
5. The DO...WHILE statement is a _____ statement.
 - a. programming
 - b. conditional
 - c. problem
 - d. process
6. The _____ statement repeats the action until the condition becomes true.
 - a. REPEAT...UNTIL
 - b. DO...WHILE
 - c. IF...THEN...ELSE
 - d. b & c
7. We need to think about the _____ requirements to see how inputs can be converted into outputs.
 - a. solution
 - b. problem
 - c. processing
 - d. all of the above
8. The DO...WHILE statement creates a _____ because the instructions flow in a circular path.
 - a. loop
 - b. condition
 - c. solution
 - d. problem
9. The _____ loop carries out the instruction after testing the condition.
 - a. REPEAT...UNTIL
 - b. DO...WHILE
 - c. conditional
 - d. process
10. A _____ approach to problem-solving can be used to create computer programs.
 - a. repetition
 - b. step-by-step
 - c. precise
 - d. general

Answers to activity sheet

This is an open-ended activity designed to stimulate students to display independent thinking and analyze problems along the lines prescribed in the chapter. Therefore, no correct answer to this activity can be prescribed.

Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

1. c
2. a
3. b
4. d
5. b
6. a
7. c
8. a
9. b
10. b

Teaching objectives

The objectives of this chapter are to:

- explain the importance of programs and programming languages
- introduce BASIC as a user-friendly programming language
- explain the difference between commands and statements
- clarify what is meant by the terms constant, variable, and expression
- explain the different types of operators and errors.

Learning outcomes

After completing this chapter, students should be able to:

- explain the importance of a user-friendly programming language
- differentiate between commands and statements with examples
- state that a variable is assigned a value by means of an expression
- explain the order of precedence for arithmetical operators
- distinguish between logical errors and syntax errors.

Introduction for the teacher

Since students have already gained an understanding of how to approach situations involving problem-solving, this chapter aims to build on that foundation by introducing the components of computer programming. Once students are familiar with the concepts of commands, statements, variables, and constants they will be able to deal with computer programming in the next chapter.

The discussion should begin with a revision of programs and programming languages from earlier classes. Also, remind students of what they learned about BASIC in Book 2. Next, discuss the terms **command**, **statement**, **constant**, and **variable**. Elaborate on their differences and explain their functions in a program.

Discuss the role of operators in assigning meaning to a variable. Discuss the different types of operators, i.e. arithmetical, assignment, and relational operators. Also, explain the order of precedence for arithmetical operators. Since these operators are taught in mathematics as well, it is likely that students might be confused. Clarify that the computer follows a different order of precedence.

The importance of syntax has been sufficiently covered in earlier classes. It is important to explain the concept briefly before students proceed towards writing programs using different commands, statements, constants, and variables.



Discuss logical and syntax errors and stress the need for being vigilant enough to detect and correct them at an early stage.

By the end of the chapter, students should be ready to create programs in GW-BASIC.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

How does a computer know what it is supposed to do?

Can a computer understand instructions in the same way as humans?

Reading and explanation (30 minutes)

Discuss sections 5.1 to 5.4.2 on pages 61 to 63 of the textbook.

These sections establish students' basic concepts of programming. Begin the session by asking students to recall what they have learned about programs, programmers, and programming languages in earlier classes. Differentiate between high-level and low-level programming languages. Next, introduce BASIC as an easy-to-learn, high-level programming language. This should not take much time as students have covered these concepts in earlier classes.

Using the definition of a program as a set of instructions, introduce commands and statements as two types of instructions. Describe their roles in a program and discuss some examples of each.

Next, introduce constants and variables. Explain that while a constant has a fixed value, a variable can represent any value that we assign to it. This property of a variable makes it useful to programmers because the same program can then be used to process a wide variety of data.

End the discussion by asking students how a variable might be assigned any value by the programmer or user. Introduce the term **expression** and describe its function in assigning values to variables. Discuss the examples of variables and expressions given on page 63 of the textbook. This should prepare students for a discussion on operators in the next session.

Homework assignment (5 minutes)

Assign questions 1 to 5 from section D (page 68) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss section 5.5 on pages 63 to 65 of the textbook.

Homework assignment (5 minutes)

Assign section E (page 69) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (20 minutes)

Discuss sections 5.6 and 5.7 on pages 65 and 66 of the textbook.

Classroom activity (10 minutes)

Assign sections A, B, and C to be completed in the classroom.

Homework assignment (5 minutes)

Assign section E (page 69) and section G as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 67 to 69

A. Fill in the blanks.

1. commands 2. constant 3. arithmetical 4. syntax 5. expression

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. False. BASIC stands for Beginners' All-purpose Symbolic Instruction Code.
3. False. A variable can be assigned any value.
4. True.
5. True.

C. Select the correct option for each question.

1. b 2. b 3. c 4. d 5. b
6. b 7. c 8. b 9. a 10. c

D. Answer the following questions.

1. What is a programming language?

A programming language is a set of tools and techniques for writing computer programs. Different programming languages are used for writing different types of programs.

2. What is the difference between low-level and high-level programming languages?

Low-level programming languages are used to write programs using only the binary digits 0 and 1. It is difficult to write programs in low-level languages but the computer can process these instructions quickly. High-level languages are used to write programs using common words from English. For this reason, it is easier to write programs in these languages but computers process these instructions slowly.

3. Why is BASIC considered to be a user-friendly language?

BASIC is considered to be a user-friendly language because it uses simple words from English and has a simple syntax.

4. What is the difference between a command and a statement?

A command is used to instruct a computer to perform a specific task. The same command performs the same task on different programs. It has a simple syntax. A statement is used to instruct a computer to perform a task with a different outcome for each program. It has a specific syntax.



5. **What is a variable? How can we assign a value to a variable?**

A variable is a term that can be assigned any value. The variable X can be assigned any value, for example, 2, 5, or 5000. We can assign a value to a variable by using an expression. An expression is a statement that describes the relationship between a variable and its value.

E. **Write paragraphs to answer the following questions.**

1. **Shahid entered an incorrect statement which the computer failed to detect. Would the output of the program be accurate? Explain your answer.**

The output of Shahid's program will not be accurate because he has entered an incorrect statement. A computer can detect an incorrect syntax error but other types of errors such as logical errors cannot be detected. The quality of the output depends on the quality of the input. Therefore, if incorrect input is given to the computer, it will produce incorrect output.

2. **Nadia entered $5+2*4$ on the computer. The computer displays the answer 13. Nadia believes the computer made an error and the correct answer should be 28. Do you agree with Nadia? Explain your answer.**

I do not agree with Nadia because she is not following the order of precedence. According to the order of precedence, multiplication is performed before addition. The computer first performed $2*4$ and then added the result to 5 to get the answer 13. Nadia first added 5 and 2 and then multiplied the sum by 4 to get 28. If Nadia wants the computer to follow a different order, she should use brackets in the question.

F. **Lab exercise**

For the teacher: There are plenty of exercises available online to help students deal with algebra. Many students find algebra difficult and large class sizes make it difficult to ask questions. You can consult with the mathematics teacher or find useful resources by conducting an online search.

G. **Project**

For the teacher: Students already possess basic information about the Internet. They will find no difficulty in searching for information about the creators of BASIC. You may need to explain the function of a timeline and how it can be created. Avoid giving detailed instructions about creating a timeline as the students should now learn to explore the options available on the computer independently. You may suggest that they can create a timeline in Microsoft Word.

Additional information for the teacher

- **Syntax errors** are also made while writing programs. They can take the form of a statement or a command that has been spelt incorrectly. A space entered incorrectly in a statement can also result in a syntax error. Programming software comes with a checker that identifies such syntax errors while programmers are writing programs. This is similar to the way in which a spell checker identifies spelling errors on a Word document by underlining them in red.
- **Logical errors** are made while a program is being used. Such errors are made when inappropriate data is entered as input to the program. These errors might occur due to the ignorance or negligence of the computer user. As discussed in the chapter, logical errors are hard to correct because the computer cannot identify them.
- There is a third category of errors called **run-time errors**. These errors occur after an instruction to run or execute the program has been given. The program might not run even though there may be no syntax or logical errors. A particular line of instruction or the entire file might have become corrupted, preventing the program from being executed. This error can be removed by identifying the corrupted instruction or file and retyping it.

Activity Sheet

I. Classify the following as arithmetical, assignment, and relational operators:

= - > + >= <= ^ * <> /

Arithmetical operators	Assignment operators	Relational operators

II. Write expressions to describe the following relationships:

1. The value of X is the same as the sum of 5 and 9.

2. The product of A and B is the same as the product of C and D.

3. The value of N is greater than the difference between X and Y.

4. Profit (P) is calculated by subtracting cost (C) from price (R).

5. The sum of P and Q is less than the product of 7 and 2.

Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. A program is used to give _____ to a computer.
 - a. output
 - b. data
 - c. instructions
 - d. variables
2. An example of a command is _____.
 - a. LIST
 - b. SAVE
 - c. INPUT
 - d. a & b
3. A constant has a _____ value.
 - a. changeable
 - b. fixed
 - c. large
 - d. logical
4. In the expression $X = 5 * 4$, the variable is _____.
 - a. X
 - b. 5
 - c. 4
 - d. 20
5. Arithmetical operators include _____.
 - a. <
 - b. <>
 - c. =
 - d. none of the above
6. An expression assigns a _____ to a variable.
 - a. term
 - b. value
 - c. sign
 - d. relationship
7. The logical arrangement of words and symbols in a statement is called _____.
 - a. program
 - b. constant
 - c. syntax
 - d. a & c
8. A computer can identify a _____ error.
 - a. syntax
 - b. numerical
 - c. command
 - d. logical
9. A _____ error is an example of a syntax error.
 - a. statement
 - b. multiplication
 - c. mechanical
 - d. spelling
10. Correcting errors in a program is called _____.
 - a. deleting
 - b. removing
 - c. debugging
 - d. erasing

Answers to activity sheet

I. Classify the following as arithmetical, assignment, and relational operators:

= - > + >= <= ^ * <> /

Arithmetical operators	Assignment operators	Relational operators
-	=	>
+		>=
^		<=
*		<>
/		

II. Write expressions to describe the following relationships:

1. $X = 5 + 9$

2. $A * B = C * D$

3. $N > X - Y$

4. $P = R - C$

5. $P + Q < 7 * 2$

Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

1. c

2. d

3. b

4. a

5. d

6. b

7. c

8. a

9. d

10. c

Teaching objectives

The objectives of this chapter are to:

- introduce the important commands used in GW-BASIC
- introduce the important statements used in GW-BASIC
- elaborate on the importance of correct syntax when entering commands and statements
- explain how programs can be created in GW-BASIC.

Learning outcomes

After completing this chapter, students should be able to:

- explain the function and syntax of the CLS, LIST, LOAD, SAVE, and RUN commands
- differentiate between numeric and string data
- explain the function and syntax of statements such as the INPUT, PRINT, READ, DATA, and IF... THEN...ELSE statements
- create programs to perform simple numerical computations.

Introduction for the teacher

Since students have now become familiar with the rationale behind programming, this chapter provides the tools that will allow them to create simple programs in GW-BASIC. These tools are presented in the form of commands and statements, each with its unique syntax. Since students are familiar with the difference between commands and statements, you could begin straightaway with a discussion of the various commands described in the textbook. Once students understand the function and syntax of the CLS, LIST, LOAD, SAVE, and RUN commands, introduce the various statements. Pay special attention to ensure that students have learnt the correct syntax for each statement to avoid problems later.

The final section of the chapter explains how the various commands and statements can be used to create some simple programs in GW-BASIC. These programs can be used to find the sum and average of numbers, the area of a rectangle, and so on. Discourage memorization of the programs. Instead, focus on the role of each command and statement so that students learn how to combine these to write a unique program.

By the end of the chapter, students should be able to understand a problem situation and create a program using the commands and statements of GW-BASIC.

Number of allocated periods: 5

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

Can you name some commands?

What is the function of the RUN command?

Why is syntax important?

Reading and explanation (lab session) (30 minutes)

Discuss section 6.1 on pages 71 and 72 of the textbook.

Ask students to recall what BASIC is. They should be able to identify it as a simple programming language. Explain that they will learn how to write programs in GW-BASIC, which is one popular version of BASIC. Next, ask them to recall the difference between commands and statements. Ask them to name some of the commands they came across in the previous chapter. Write their responses on the board. When sufficient commands have been identified, explain that each command has a unique function and syntax. Explain further that these commands and statements can be used to create programs.

Ask students to run the GW-BASIC application on their computers. Help them to identify the background and the prompt. Introduce the CLS command. Write the name of the command on the board and ask students what they think the function of this command might be. Do not expect them to state the correct function but allow them to give their responses. Once students have given their responses, tell them what the CLS command does. Next, describe the syntax of the CLS command. Ask students to type the command using their keyboards. Ask them what happens on the screen.

In the same way, discuss the LIST, LOAD, SAVE, and RUN commands. For this, it is advisable to save a simple command on each computer before the session begins. You can then ask students to apply the commands to the program. Stimulate their curiosity by telling them that they will soon be able to write such programs in the following sessions.

Homework assignment (5 minutes)

Assign questions 1 and 2 from section D (page 82) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 6.2 to 6.2.4 on pages 73 and 74 of the textbook.

Homework assignment (5 minutes)

Assign questions 3 and 5 section D (page 82) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 6.2.5 to 6.2.10 on pages 75 and 76 of the textbook.

Homework assignment (5 minutes)

Assign questions 3 and 5 from section D (page 82) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 4

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 6.3 to 6.3.2 on pages 76 to 78 of the textbook.

Homework assignment (5 minutes)

Assign sections A, B, and C on page 81 as homework. Clarify what is required of students in their answers.

Period 5

Starter activity (5 minutes)

Reading and explanation (lab session) (30 minutes)

Discuss sections 6.3.3 to 6.3.5 on pages 78 and 79 of the textbook.

Homework assignment (5 minutes)

Assign section E on page 82 as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 81 to 83

A. Fill in the blanks.

1. SAVE 2. LIST 3. INPUT 4. LET 5. condition

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. False. The CLS command is used to clear the screen.
2. False. The LOAD command is used to retrieve a program.
3. True.
4. True.
5. True.

C. Select the correct option for each question.

1. d 2. c 3. a 4. c 5. d
6. c 7. a 8. d 9. a 10. c

D. Answer the following questions.

1. What is the difference between a command and a statement?

A command does not have to be part of a program to be executed. A statement is always executed as part of a program.

2. What is the function of the LOAD command?

The function of the LOAD command is to instruct the computer to transfer a program from secondary storage to primary storage. After the program has been transferred, the computer can execute it.

3. Why are the READ and DATA statements used together?

The READ and DATA statements are used together because the READ statement identifies the variables and the DATA statement specifies the value of each variable.

4. What is string data?

String data is data that consists of letters and other characters in addition to numbers. String data is always placed within double quotation marks.

5. Write the syntax of the following:

a. the INPUT statement

```
INPUT "<prompt>",<variable>
```

b. the PRINT statement

```
PRINT <expression>
```

c. the SAVE command

```
SAVE "<filename>"
```

6. How do we use the LOCATE statement?

We use the locate statement by specifying the row number and column number where we want the cursor to be placed on the screen.

Syntax: LOCATE <row number>,<column number>

E. Write paragraphs to answer the following questions.

1. Why is the LET statement an optional statement?

The LET statement is used to assign a value to a variable. The LET statement is an optional statement because it is not essential to write it in the statement. For instance, the statement A = 5 would be executed in the same way as LET A = 5.

2. Explain how a computer would execute an IF...THEN...ELSE statement.

A computer would execute an IF...THEN...ELSE statement by first processing the condition followed by IF. The computer will evaluate whether the condition is true or not true. If the condition is true, it will execute the instruction followed by THEN. If the condition is not true, then the computer will execute the instruction followed by ELSE.

F. Lab exercise

For the teacher: Depending on the available time and resources, the students could be divided into two groups and each group assigned one of the two tasks in this section. Give students around 10 minutes to brainstorm their solutions and prepare the algorithm and flow chart. You should approve the algorithm before the students write the program on the computer.

G. Project

For the teacher: You can bring in a map of Pakistan which shows all the bordering countries clearly. Ask students to find out the names of their capitals and then create the program for this project. Students can be asked to compare their programs. Programs that achieve the purpose in fewer steps are generally more efficient.

Additional information for the teacher

- GW-BASIC also has some functions that can be very useful. A **function** in GW-BASIC is an in-built program that can be used to perform useful operations, such as finding the octal or hexadecimal equivalent of a decimal number, finding the logarithm of a number, and so on. Some simple functions are described below.

- **Name of function: HEX\$**

Purpose: To display the hexadecimal equivalent of a decimal number

Example: 10 INPUT N
20 PRINT HEX\$ (N)
RUN
? 10
A

- **Name of function: LOG**

Purpose: To display the natural logarithm of a number

Example: 10 INPUT N
20 PRINT LOG (N)
RUN
? 9
0.954

- **Name of function: SQR**

Purpose: To display the square root of a number

Example: 10 INPUT N
20 PRINT SQR (N)
RUN
? 49
7

Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. The _____ command is used to clear the screen.

a. CLS	b. WIPE
c. RUN	d. SAVE
2. _____ is a statement.

a. LIST	b. SAVE
c. INPUT	d. LOAD
3. _____ is an optional statement.

a. INPUT	b. PRINT
c. RUN	d. LET
4. The _____ statement can be used to insert the title of a program.

a. LET	b. INPUT
c. REM	d. none of the above
5. String data contains _____.

a. characters	b. letters
c. numbers	d. all of the above
6. The READ statement is used together with the _____ statement.

a. LET	b. DATA
c. PRINT	d. WRITE
7. Line numbers indicate the _____ of instructions in a program.

a. sequence	b. length
c. end	d. b & c
8. To go to a specific point on the screen we use the _____ statement.

a. GOTO	b. LOCATE
c. LINE	d. PRINT
9. We can use a _____ instead of typing the word PRINT in the PRINT statement.

a. comma	b. space
c. colon	d. question mark
10. To execute a program we use the _____ command.

a. SAVE	b. LIST
c. RUN	d. END

Answers to activity sheet

1. 10 REM "TO FIND OUT EXAMINATION RESULT"
20 INPUT "Enter marks in paper 1:", M1
30 INPUT "Enter marks in paper 2:", M2
40 INPUT "Enter marks in paper 3:", M3
50 INPUT "Enter marks in paper 4:", M4
60 LET T = M1 + M2 + M3 + M4
70 LET P = T * 100 / 400
80 IF P >= 33 THEN PRINT "PASS" ELSE 90
90 PRINT "FAIL"
100 END

Answers to test sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.
 1. a
 2. c
 3. d
 4. c
 5. d
 6. b
 7. a
 8. b
 9. d
 10. c

Teaching objectives

The objectives of this chapter are to:

- introduce the term data integrity
- explain common types of errors
- highlight the importance of the double-entry method
- explain data validation and describe the function of different validation checks.

Learning outcomes

After completing this chapter, students should be able to:

- identify the attributes of data that contribute to data integrity
- identify common types of errors
- explain the double-entry method of data verification
- select an appropriate validation check according to the type of data to be entered
- compare data verification and data validation.

Introduction for the teacher

Data-processing is the primary task of a computer. Students have learnt about the various stages of the data-processing cycle. They have also learnt about the different types of software that can be used to process data in different ways. This chapter draws students' attention to an important emerging field in data-processing. The purpose of this chapter is to stress the importance of maintaining the integrity and accuracy of data because successful data-processing depends on the quality of the data used as input.

Discuss the concept of data integrity and its importance in the twenty-first century. Explain the three characteristics of completeness, accuracy, and sense that contribute towards data integrity. Next, introduce the concept of errors. Discuss the three types of errors: typing errors, transmission errors, and programming errors. Encourage students to identify situations where such errors might lead to a loss of data integrity.

Lead students to the next section of the chapter where data verification offers one way to minimize the chance of errors. Describe data verification by using simple examples from daily life. When students understand the importance of data verification, introduce the double-entry method and explain how it works.

Next, discuss data validation and why it is needed. Make sure that students are able to distinguish clearly between data verification and data validation. Explain that while data verification ensures the accuracy of data, data validation ensures completeness and sense of data. Both data verification and data validation contribute towards data integrity. Finally, discuss the different types of validation checks described in the textbook.

By the end of this chapter, students should be able to explain the purpose of data verification and validation. They should be able to appreciate the growing importance of these techniques for data-processing in the twenty-first century.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

What is the most important stage of the data-processing cycle?

What will happen if we enter incorrect data as input?

How can we make sure that we enter correct data as input?

Reading and explanation (30 minutes)

Discuss sections 7.1 and 7.2 on pages 85 to 87 of the textbook.

After collecting students' responses to the starter questions, ask them to give examples from their experience of working on the computer, of instances where they entered incorrect data. Students should be able to mention instances where they entered an incorrect number on a spreadsheet and ended up with an unexpected total. In other instances, they might have made a spelling mistake while typing a paragraph on a word processor. After discussing these examples, conclude by explaining that because incorrect data was entered, the output produced by the computer was also incorrect. Describe the forms of incorrect data. Discuss the characteristics of completeness, accuracy, and sense by using some simple examples.

Finally, divide the errors that students have mentioned into the three categories described in the textbook. Discuss how these errors are caused and why they are grouped separately. Students should be able to identify the point in the data-processing cycle where each of these errors is most likely to occur. This should put them in a proper frame of mind for the discussion of data verification and data validation in subsequent sessions.

Homework assignment (5 minutes)

Assign question 1 from section D (page 93) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss section 7.3 on pages 87 and 88 of the textbook.

Homework assignment (5 minutes)

Assign question 2 from section D (page 93) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (20 minutes)

Discuss sections 7.4 and 7.5 on pages 88 to 90 of the textbook.



Classroom activity (10 minutes)

Assign sections A, B, and C (page 92) to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 3 to 6 from section D and section E (page 93) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 92 and 93**A. Fill in the blanks.**

1. integrity 2. transposing 3. errors 4. range 5. verification

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. False. Errors that occur while data travels over a network are called transmission errors.
3. True.
4. True.
5. True.

C. Select the correct option for each question.

1. a 2. a 3. c 4. d 5. a

D. Answer the following questions.**1 What is meant by data integrity?**

Data integrity is a quality that makes data useful and reliable. Data that is complete, accurate, and lies within a sensible range has integrity. Data that has integrity produces accurate results.

2. How does the double-entry method help a computer to verify data?

The double-entry method enables a computer to verify data by asking the user to enter the same data twice. The computer then compares the two entries to see if they match. If the entries match, the data is verified. The computer then processes the data. If the two entries do not match, the data is not verified. The computer asks the user to make sure that he has entered the correct data.

3. What is meant by data validation?

Data validation is a method of checking that data being processed by a computer is complete, accurate, and within a sensible range. Data validation can be performed at any stage of the data-processing cycle.

4. Describe three types of checks used to validate data.

Data validation uses several checks to validate data. Three types of checks are described below.

1. Alphabetic check

An alphabetic check is used to make sure that only letters of the alphabet are entered as input. For example, the name of a person should contain only letters and not numbers.

2. Completeness check

A completeness check is used to make sure that all the data that needs to be processed is entered. For example, on a student's report card, the marks of all the subjects should be entered. If the marks of any one subject have been left out, the computer will not process the data.

3. Range check

A range check is used to make sure that data that is entered lies within a sensible range. For example, the date on a particular day can lie within the range 1-31. If 32 has been entered as a date, the computer will not process it.

5. Choose a sensible maximum value that could be used as a data validation check in the following cases:

- a. The age of students at a secondary school

16 years

- b. The height of officers at a police station

195 centimetres

- c. The weight of members of a swimming club

80 kilograms

6. Give an example of data on which the following validation checks would be carried out:

- a. Alphabetic check

The name of a country

- b. Numeric check

The age of a person

- c. Consistency check

The manufacturing and expiry dates of a product

- d. Completeness check

An admission form

- e. Table lookup

An order placed at a restaurant

E. Write paragraphs to answer the following questions.

1. Sometimes even after data has been verified and validated, it can be wrong when entered into a computer system. Give an example of how this could happen.

Sometimes input data can remain incorrect even after it has been verified and validated. This might be because of human error. Such an error might occur when a shopkeeper adds an amount to the bill of another customer. The computer could verify the amount and validate it by using a range check, but an incorrect bill would still be produced.

2. Dates of birth were entered into a computer program. The data was stored in the form Day/Month/Year. The program rejected this date of birth as incorrect.

06/13/2014

Why was this not accepted?

It was not accepted because the month that was entered was invalid. Months can only lie within the range of 1–12.

Why do you think this error occurred?

This error probably occurred because the person entering the data did not follow the format for the date. He or she probably thought that the date 13th June was being entered in the Month/Day/Year format.

F. Lab exercise

For the teacher: You must keep a watch on students during this activity so that they do not give out any personal or confidential information while signing up. You must draw their attention to the verification code step and explore the visual and audio options for receiving the code. Also explain the purpose of entering the password twice.

G. Project

For the teacher: Advise students to visit the restaurants accompanied by a parent or responsible adult. It is better to visit the restaurants early in the morning on a weekend when there are fewer diners and the staff will have more time to answer their queries. Advise students to obtain the management's permission if they want to take photographs.

Additional information for the teacher

- Apart from the errors discussed in the chapter, there are other types of errors that can result in loss of data integrity. Some of these errors are described below:

The information received from the source could be incorrect or presented incorrectly to begin with.

Keyboarding errors are a regular source of errors. Some keys might malfunction by not showing the character on the screen at all. Since users do not look at the screen each time they press a key, they might not be aware of the error until very late in the data entry process. Another common keyboarding error occurs when pressing one key results in the character being entered two or more times on the screen. Such errors also go undetected. An example of such an error might be the non-functioning of the Ctrl key or the S key which can result in documents not being saved when the Ctrl + S command is given. This results in lost data and becomes a major problem during computer-based exams.

Human errors in the form of selecting the wrong formula or data from a menu also occur frequently. They can lead to incorrect results and require double-checking.

- Apart from double-entry, **proofreading** is another method which is used to verify data. The method requires the user to check data after it has been entered to ensure that it matches the source document data. The user might get a printout of the data and compare it to the source document.
- The process of entering oral or written data on a form or other document is called **transcribing**. Errors resulting during this process are called **transcription errors**.

Activity Sheet

I. Identify invalid entries from the ones given below. State the validation check that you applied to identify the invalid entry.

1. Names of cities in Pakistan

- a. Nawabshah
- b. 42101
- c. Hyderabad

Invalid entry: _____

Validation check: _____

2. Dates of birth of three brothers

- a. 3 June 1997
- b. 16 September 1999
- c. 20 August

Invalid entry: _____

Validation check: _____

3. Marks scored out of 50

- a. 65
- b. 50
- c. 47

Invalid entry: _____

Validation check: _____

4. Names of prime ministers of Pakistan

- a. Nawaz Sharif
- b. Liaquat Ali Khan
- c. Imran Khan

Invalid entry: _____

Validation check: _____

5. Names of authors

- a. Charles Dickens
- b. Mark Twain
- c. Enid Blyton

Invalid entry: _____

Validation check: _____



Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)
- A _____ check ensures that only numbers are entered in a field.
 - consistency
 - numeric
 - grammar
 - alphabetic
 - A _____ check ensures that all necessary data is entered.
 - completeness
 - alphabetic
 - table lookup
 - range
 - Data verification checks are placed at the _____ stage of the data-processing cycle.
 - middle
 - final
 - earliest
 - third
 - It is possible for incorrect data to be processed by a computer even after it has been _____.
 - input
 - validated
 - verified
 - b & c
 - Data validation is performed _____ data entry.
 - after
 - before
 - during
 - all of the above

Answers to activity sheet

- I. Identify invalid entries from the ones given below. State the validation check that you applied to identify the invalid entry.
 1. Invalid entry: b Validation check: Alphabetic check
 2. Invalid entry: c Validation check: Completeness check
 3. Invalid entry: a Validation check: Range check
 4. Invalid entry: c Validation check: Table lookup
 5. Invalid entry: a Validation check: Spelling check

Answers to test sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.
 1. b
 2. a
 3. c
 4. d
 5. a



Teaching objectives

The objectives of this chapter are to:

- explain the importance of data protection and security
- introduce common security issues such as data privacy, identity theft, and data integrity
- explain security threats such as Internet fraud, hacking, phishing, adware, and spyware
- explain the function and use of antivirus software.

Learning outcomes

After completing this chapter, students should be able to:

- demonstrate a concern for data privacy, identity theft, and data integrity
- guard against the threats of Internet fraud, hacking, phishing, adware, and spyware
- distinguish between computer viruses, worms, and Trojan horses
- scan a computer for viruses with the help of antivirus software.

Introduction for the teacher

In the previous chapter, students learned about the risks of incorrect data being entered into the computer. This chapter discusses the threats to data once it has been entered into the computer. In addition to data integrity, data privacy and security have also become primary concerns in the twenty-first century. This chapter aims to create awareness of these concerns among the students.

Introduce the terms **data protection** and **data security**. Explain why these issues have become important in recent years. Follow the chapter to discuss these issues in a logical manner. First, identify common security issues like data privacy, identity theft, and risk to data integrity. Explain the consequences of data falling into unauthorized hands. Next, discuss the various forms in which these threats arise. Explain Internet fraud, hacking, phishing, adware, and spyware.

Once students are aware of the different forms of security threats, identify the sources from which these threats, in their various forms, originate. Explain how computer viruses, worms, and Trojan horses infect computers. Explain how they are similar to and different from one another. Next, identify the modes through which viruses, worms, and Trojan horses can travel from one computer to another. Explain how infected drives and devices, email attachments, unsecured websites, and pirated software can make it easy for viruses, worms, and Trojan horses to infect several computers.

Finally, explain the purpose of antivirus software. Explain how antivirus software protects a system against the threat of viruses, worms, and Trojan horses. Explain the procedures for installing and maintaining antivirus software on the computer.

By the end of the chapter, students should be able to explain the importance of data protection and security. They should be able to identify the threats to data protection and security and suggest ways of guarding against such threats.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

What would happen if a stranger came to know your personal details?

How might you protect such information?

What type of information on your computer needs similar protection?

Reading and explanation (30 minutes)

Discuss sections 8.1 and 8.2 on pages 95 to 97 of the textbook.

After collecting students' responses to the starter questions, ask them if they have ever experienced or witnessed a valuable item being stolen. Ask them what steps the owner could have taken to prevent the theft. Summarize the discussion by stating that information is also as valuable as a car or a mobile phone and needs equal protection.

Ask students if they know any ways in which information might be stolen from a computer. After collecting their responses, introduce the term **data privacy**. Explain that some information is meant to be disclosed to the public while some is meant to be kept private. Care should be taken to prevent the private information from becoming public. You can also suggest that there is some information that each one of us would only like to share with people who are close to us. Next, introduce identity theft. Mention some instances where identity theft has resulted in financial loss to an individual. Finally, ask students to recall data integrity issues from the previous chapter. Explain that the integrity of data can be destroyed if it is not protected adequately.

Homework assignment (5 minutes)

Assign question 1 from section D (page 105) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 8.3 and 8.4 on pages 97 to 100 of the textbook.

Homework assignment (5 minutes)

Assign questions 2 to 5 from section D (page 105) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (lab session) (20 minutes)

Discuss sections 8.5 and 8.6 on pages 100 to 102 of the textbook.



Classroom activity (10 minutes)

Assign sections A, B, and C on page 104 to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 6 to 8 from section D (page 105) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 104 and 105**A. Fill in the blanks.**

1. privacy 2. identity theft 3. fraud 4. Viruses, worms 5. Pirated

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. False. A Trojan horse is a harmful program that appears to be useful.
2. True.
3. True.
4. False. Worms are not transmitted through carrier files.
5. True.

C. Select the correct option for each question.

1. a
2. c
3. c
4. d
5. c

D. Answer the following questions.**1. What harm might result from identity theft?**

An identity thief can gain access to a person's personal information without his knowledge. Such personal information includes his password, bank account number, credit card number, etc. He might then use this information to commit crimes. When the police try to trace the criminal, they end up arresting the person whose identity was stolen.

2. What is a hacker? How might a hacker misuse private information?

A hacker is a person who gains access to a person's computer without his knowledge. The hacker might then steal important data from the computer. He might also destroy the data or change it. He might even sell that information to someone else.

3. How does a phisher acquire personal information from Internet users?

A phisher acquires personal information from Internet users by creating a website that is similar to a reliable website, like that of a bank. He then sends email messages to the customers of the bank and asks them to visit his website. After logging on to his website, the users give away personal information because they think the information is being given to the bank.

4. What is the difference between a worm and a virus?

The difference between a worm and a virus is that a worm steals information from a computer. It does not need a carrier file to move from one computer to another. On the other hand, a virus needs to attach itself

to a carrier file to move from one computer to another. Viruses do not steal information from a computer but destroy data stored on it.

5. How does adware work?

Adware displays online advertisements on a user's computer screen whenever the user visits a website. It displays advertisements in the form of pop-up windows that appear automatically on the computer screen.

6. Describe some common ways in which a computer might become infected by a computer virus.

A computer might become infected by a virus in several ways.

A computer can become infected by a virus if a drive or device infected by a virus is connected to it. Common drives and devices include hard drives, CDs, and USB drives.

Some viruses also travel in the form of email attachments. A computer can become infected by such a virus if the user downloads and opens such an email attachment.

CDs that contain pirated software can also contain viruses. A computer can become infected by such viruses if the user installs pirated software on the computer from such CDs.

7. What is the purpose of antivirus software? Why should it be updated regularly?

The purpose of antivirus software is to detect viruses that have infected the computer, and prevent them from destroying the files stored on the computer. It should be updated regularly because each antivirus program can only identify a limited number of viruses. To identify as many types of viruses as necessary, we need to add new virus definitions to its database.

8. When does an antivirus program delete an infected file?

An antivirus program deletes an infected file after it has failed to disinfect or quarantine it.

E. Write paragraphs to answer the following questions.

1. Salman's computer was infected by a virus. He is confused and cannot understand how the virus could infect his computer because he has had antivirus software installed for several years. What could be the possible reasons for the software failing to detect and block the virus?

The virus may have infected Salman's computer because he may not have updated the antivirus software installed on his computer. He has had the antivirus software for several years and it may not contain the virus definition of newer viruses. The virus attacking Salman's computer may have been developed recently and was able to escape detection by the antivirus software.

2. Explain some ways in which one can guard against phishing.

One can guard against phishing by ensuring that the website is an authentic website. The URL of the secure and genuine website begins with https and usually has the picture of a lock in the address bar. It is important to be cautious and avoid entering confidential or sensitive data.

F. Lab exercise

For the teacher: Advise students to identify lapses in decision-making while reading the various stories on Internet fraud. To save time, advise students to read not more than three fraud incidents. Encourage students to develop a cover page and insert images for their report. The final section of the report should contain a list of precautions that can prevent people from falling victim to Internet fraud.

G. Project

For the teacher: Advise students that performing a Google search should be the first step in their research. Prepare a list of aspects that students should compare for different antivirus packages. Limit the number of packages to be compared to five.



Additional information for the teacher

- Some types of Internet fraud have been discussed in the chapter. Phishing is one of them. There are other types of fraud that regularly take place on the Internet and result in loss of money and life to thousands of innocent victims.
- Sometimes, fraudsters set up **fake online auction sites**. They post several attractive items up for bidding, none of which actually exist. When they sell these non-existent goods to innocent online bidders, they demand advance payment before shipping the goods to their new owners. The fraudsters then disappear with the money without delivering anything to the victims.
- One of the Internet scams occurring most frequently is the email from Nigeria. This email takes different forms. In one version of the email, the fraudster pretends to be someone who has recently inherited a large fortune upon the death of a distant relative. He then goes on to state that he needs to protect the fortune from several jealous relatives. He then requests the victim to open a bank account into which the sum can be transferred. He promises a share of the fortune to the victim for his help. After the victim has agreed, he asks to meet the victim in person and make some payment for processing some documents. The fraudster then disappears with the advance payment. Sometimes, the victims are even kidnapped and held for ransom. Some unfortunate victims even lose their lives.
- Other scams involve setting up a fake program. Victims are lured into the program on payment of a monthly fee with promises of earning commission on the number of people they are able to persuade into signing up for the program. The fraudsters again disappear with the monthly fees.
- Some fraudsters send email messages to several people informing them that they have won a lottery. The victims are then asked to transmit processing fees through wire transfer. Once this has been done, the fraudsters again vanish into thin air.

Activity Sheet

I. Why...?

1. Why is data privacy important?

2. Why is Internet fraud becoming increasingly common?

3. Why do some companies use spyware?

4. Why should we be careful about opening email attachments?

5. Why is it difficult to detect a Trojan horse?

Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. An identity thief can steal a person's _____.
 - a. password
 - b. account number
 - c. telephone number
 - d. all of the above
2. Internet fraud usually takes the form of online _____.
 - a. sales
 - b. scams
 - c. auctions
 - d. deals
3. A phisher works through a _____.
 - a. website
 - b. browser
 - c. CD
 - d. virus
4. A computer virus can _____ itself.
 - a. copy
 - b. destroy
 - c. replicate
 - d. a & c
5. A Trojan horse can cause a computer to _____.
 - a. restart
 - b. save
 - c. crash
 - d. load
6. The machine code of a virus is called a _____.
 - a. virus code
 - b. binary code
 - c. computer virus
 - d. virus definition
7. Removing a virus from a file is called _____ the file.
 - a. disinfecting
 - b. cleaning
 - c. removing
 - d. deleting
8. To quarantine means _____.
 - a. to delete
 - b. to place separately
 - c. to save as a new file
 - d. to clean
9. Adware is _____.
 - a. harmful
 - b. harmless
 - c. irritating
 - d. b & c
10. Viruses can travel through _____.
 - a. passwords
 - b. antivirus software
 - c. online shopping
 - d. none of the above



Answers to activity sheet

I. Why...?

1. Data privacy is important because private information can easily be obtained by criminals.
2. Internet fraud is becoming increasingly common because more and more people and companies are using the Internet for shopping and banking.
3. Some companies use spyware to find out what type of websites Internet users like to visit.
4. We should be careful about opening email attachments because they might contain viruses.
5. It is difficult to detect a Trojan horse because it appears to be a useful program.

Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

1. d
2. b
3. a
4. d
5. c
6. d
7. a
8. b
9. d
10. d



Teaching objectives

The objectives of this chapter are to:

- explain the importance of automation in the modern world
- explain the terms computer-aided design (CAD) and computer aided manufacturing (CAM)
- introduce databases and their different types
- discuss the concepts of the paperless office and telecommuting
- describe the new forms of technology-enabled communication
- establish the importance of staying up-to-date with technological changes.

Learning outcomes

After completing this chapter, students should be able to:

- explain automation and its influence on daily life
- identify CAD and CAM processes in the manufacture of common products
- explain why databases are useful to a business
- compare the advantages and disadvantages of the paperless office and telecommuting
- compare different forms of technology-enabled communication such as online chatting, blogging, web conferencing, social networking, and Internet marketing
- explain the implications of changing technologies on prospects for employment
- explain the importance of continuous learning.

Introduction for the teacher

Until now students have been learning about how computers have changed the way we prepare different types of documents. This chapter aims to expand their horizons by describing how computers are being used all around them to change how we perform the simplest and the most complex of activities.

Begin by explaining the term **automation**. Describe this as the use of computer-controlled machines to improve productivity. Discuss the concepts of CAD and CAM and explain how they have changed the nature of manual work. Next, introduce the concept of database management and explain how this development has changed the way higher-level managers process data to make decisions. Follow this with a description of the different types of database systems. Discuss transaction processing systems, management information systems, decision support systems, and expert systems. Describe their progression towards greater autonomy in decision-making.

Next, introduce the concept of the paperless office. Explain how computers have enabled this phenomenon to become a possibility. Discuss its advantages and disadvantages. Discuss telecommuting as another way in which work habits are changing because of technology.

Discuss the changes taking place in the way people communicate with one another at work and otherwise. Discuss online chatting, blogging, web conferencing, social networking, and Internet marketing.

Introduce the new jobs that technology has helped to create. Discuss its implications for employment opportunities in the future. Discuss the skills necessary for becoming software programmers, network administrators, and call centre professionals.

By the end of the chapter, students should understand how important it is to update one's knowledge and skills in order to survive in the twenty-first century. Technology is continuously changing and will continue to change in the future. Therefore, it is important that we acquaint ourselves with new developments and changes continuously.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

How many people work in a factory?

How many products can they produce?

How much work can a robot do?

Reading and explanation (30 minutes)

Discuss sections 9.1 to 9.3 on pages 107 to 110 of the textbook.

After collecting students' responses to the starter questions, ask them to recall what they have learned about CAD and CAM in earlier classes. If students face some difficulty in recalling the concepts, you can help them by giving them clues. Next, ask them to recall what a database is. State that the session will be based on learning more about these concepts that they have been introduced to in earlier classes.

Define automation and discuss its implications for productivity and employment. Using robots as an example will drive home the point effectively. Discuss how CAD and CAM technologies have revolutionized the tasks of designing and manufacturing products.

Next, define databases and explain their importance for managers. Explain that managers need databases to help them make decisions about their organizations. Discuss how transaction processing systems, management information systems, decision support systems, and expert systems offer managers increasing assistance in processing data and making decisions.

Conclude the discussion by asking students to imagine what a factory and an office might look like in the future. This will help students to revise the concepts discussed and prepare them for a discussion on the paperless office and telecommuting in the next session.

Homework assignment (5 minutes)

Assign questions 1 to 3 from section D (page 118) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 9.4 and 9.5 on pages 110 to 113 of the textbook.



Homework assignment (5 minutes)

Assign questions 4 and 5 from section D (page 118) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3**Starter activity (5 minutes)****Reading and explanation (20 minutes)**

Discuss sections 9.6 to 9.8 on pages 113 to 116 of the textbook.

Classroom activity (10 minutes)

Assign sections A, B, and C on pages 117–118 to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 6 to 8 from section D and section E (page 118) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 117 to 119**A. Fill in the blanks.**

1. manufacturing
2. transaction processing
3. expert system
4. telecommuting
5. blog

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. False. The 21st century is an information age.
2. True.
3. True.
4. False. There are some disadvantages of a paperless office.
5. True.

C. Select the correct option for each question.

1. d
2. c
3. a
4. d
5. b

D. Answer the following questions.**1. What is meant by the terms CAD and CAM? What role do computers play in CAD and CAM?**

CAD stands for computer-aided design. It enables designers to make complicated designs easily and in very little time. CAM stands for computer aided manufacturing. It enables a large number of products to be produced in relatively little time. Computers play an important role in CAD and CAM. Computers make it easy for designers to draw accurately without the use of measuring instruments and pencils. Computers control robots and machines in factories.

2. Define the terms database and database system.

A database is an organized collection of data. A database system is a set of ways in which data is organized, stored, and accessed from a database.

3. Describe the function of a transaction processing system.

A transaction processing system is used by employees to perform routine tasks quickly and efficiently. A transaction processing system is used to fill out orders, make up bills, calculate salaries, and so on. A transaction processing system maintains a record of all these activities but is not very useful for managers.

4. What are the advantages of a paperless office?

A paperless office has many advantages. It helps the organization to spend less money on storage space. It makes it easier to send data across the organization. It also speeds up data processing and location. Finally, a paperless office helps to save trees.

5. A lot of time is wasted while travelling to and from work. How can employees save their valuable time?

Employees can save their valuable time by telecommuting. Telecommuting enables employees to work from home and while travelling with the help of laptops, mobile phones, and fax machines.

6. What is the purpose of web conferencing? Is it the same as online chatting?

The purpose of web conferencing is to hold business meetings with people who are located in different countries and time zones. It is different from online chatting because online chatting only uses text messages for communication. Web conferencing also enables people to see each other. Online chatting is for friendly chats and not for business meetings.

7. Describe one new job that technology has helped to create.

One new job that technology has helped to create is that of software programmers. Software programmers create programs for various system and application software that run on a computer. Software programmers create software for different types of organizations, such as schools, hospitals, airline companies, and amusement centres.

8. Why is it important to stay updated about changes in technology?

It is important to stay updated about changes in technology because more and more work is being done with the help of technology. Technology also changes very rapidly. Therefore, to be able to do useful work in the future, it is important to learn about new technologies and how they work.

E. Write paragraphs to answer the following questions.

1. What kind of information would you expect to find in the database of a school?

The database of a school would contain information about all the students and staff members. The student data would include their names, roll numbers, addresses, results, and details of fees paid. The database would be used by teachers to enter examination results and develop performance reports. The administration would use the database to calculate salaries of the teachers and other employees of the school.

2. Adil has got a job as a network administrator. His son wants to know what kind of work Adil does. How would you explain it to him?

A network administrator is an important person in an organization. He is responsible for ensuring that the network is working properly. He ensures that all devices are connected to the network and data flows smoothly across the devices. He should also correct any problems such as lost connectivity or any disruption in data transfer. He should replace damaged components such as hubs, switches, and routers in the network.

F. Lab exercise

For the teacher: The objective of this exercise is to develop students' online searching skills and writing skills. Students should be evaluated on the richness of the selected blog as many blogs contain fluff or unimportant

information. Students should be asked to select a blog that addresses a topic of contemporary relevance. When summarizing the blog, students must mention the source of the original blog and keep the length of the summary to one-third of the original article.

G. Project

For the teacher: Students should be advised to include the following information in their job descriptions: primary responsibilities, skills required, designation, salary range, educational qualification, experience, and typical problems encountered. If resources permit, you could arrange for a professional to visit the class and explain their job to the students.

Additional information for the teacher

- As databases have grown in size over the past few decades, managing them has become a difficult task. To overcome this difficulty, experts have come up with a new approach to database management. This approach is called a **modular approach**. A module is a part of a system that can function even when removed from the system of which it is a part. Similarly, the system can continue to function normally without its modular component. New database systems are designed using this approach. This means that companies can adjust the size of their database according to their needs. Before modular databases were available, companies would have to purchase a new database system when their old database systems became too small for their needs. They would then have to transfer all the data from the old database system to the new one. With modular databases, a company can use a limited number of modules in the beginning. As its needs for memory and functions increase, the company can add more modules to the existing system. This has made things much easier for growing companies.
- Database systems help companies manage **directories**. These directories store the names and contact details of their customers, suppliers, employees, partners, and so on.
- Modern database systems also allow users to access data from the database by using their laptops and mobile phones. This helps people to make decisions while telecommuting.
- Search engines on the Internet also make use of database systems. These database systems store the addresses of a vast number of websites arranged in different categories to help users search for the ones that are most relevant to their needs.
- Retailers also use database systems to create **data warehouses**. A data warehouse is a very large database that can contain information about all the store's past transactions. **Data mining** is the term used for the processes involved in accessing relevant data from a data warehouse.

Activity Sheet

- I. Arrange the following information in the database of a department store given below. One transaction has been recorded for you.

On 19 December 2015, Mrs A bought a toaster for Rs 2000.

Mr X bought two ties for Rs 300 each on 15 May 2015.

We sold a microwave oven for Rs 5000 to Mr and Mrs C on 27 January 2015.

On 6 March 2015, a box of biscuits was sold to Mr T for Rs 20.

Mrs P bought a can of apple juice on 14 June 2015. Its price was Rs 50, but we gave her a discount of Rs 10.

On 27 March 2015, Mr W bought a sweater for Rs 600.

S. No.	Date	Customer	Department	Item	Units	Price per unit (Rs)	Discount (Rs)	Revenue (Rs)
1	27-1-2015	Mr & Mrs C	Electronics	Microwave oven	1	5000	-	5000

Test Sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. The twenty-first century is the age of the _____.
 - a. industrial revolution
 - b. information revolution
 - c. computer revolution
 - d. agriculture revolution
2. CAD technology would help a designer to design _____.
 - a. ships
 - b. aircraft
 - c. buildings
 - d. all of the above
3. A transaction processing system is useful for a _____.
 - a. manager
 - b. chairman
 - c. president
 - d. cashier
4. A paperless office would use more _____.
 - a. CDs
 - b. file racks
 - c. cabinets
 - d. shelves
5. _____ benefit from telecommuting.
 - a. Employees
 - b. Employers
 - c. a & b
 - d. machines
6. _____ enables people to post their views on the World Wide Web.
 - a. Chatting
 - b. Blogging
 - c. Web conferencing
 - d. Social networking
7. A _____ makes sure that an organization's intranet is working smoothly.
 - a. software programmer
 - b. call centre professional
 - c. network administrator
 - d. manager
8. Internet marketing takes the form of _____.
 - a. websites
 - b. phishing
 - c. blogs
 - d. online advertisements
9. A paperless office would help to reduce _____.
 - a. rubbish
 - b. space
 - c. waste of time
 - d. all of the above
10. A collection of organized data is called a _____.
 - a. database
 - b. program
 - c. decision support system
 - d. network

Answers to activity sheet

- I. Arrange the following information in the database of a department store given below. One transaction has been recorded for you.

On 19 December 2015, Mrs A bought a toaster for Rs 2000.

Mr X bought two ties for Rs 300 each on 15 May 2015.

We sold a microwave oven for Rs 5000 to Mr and Mrs C on 27 January 2015.

On 6 March 2015, a box of biscuits was sold to Mr T for Rs 20.

Mrs P bought a can of apple juice on 14 June 2015. Its price was Rs 50, but we gave her a discount of Rs 10.

On 27 March 2015, Mr W bought a sweater for Rs 600.

S. No.	Date	Customer	Department	Item	Units	Price per unit (Rs)	Discount (Rs)	Revenue (Rs)
1	27-1-2015	Mr & Mrs C	Electronics	Microwave oven	1	5000	-	5000
2	6-3-2015	Mr T	Food Items	Biscuits	1	20	-	20
3	27-3-2015	Mr W	Clothing	Sweater	1	600	-	600
4	15-5-2015	Mr X	Clothing	Tie	2	300	-	600
5	14-6-2015	Mrs P	Food Items	Juice	1	50	10	40
6	19-12-2015	Mrs A	Electronics	Toaster	1	2000	-	2000

Answers to test sheet

- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

1. b

2. d

3. d

4. a

5. c

6. b

7. c

8. d

9. d

10. a

Teaching objectives

The objectives of this chapter are to:

- introduce electronic commerce
- explain the evolution of e-commerce
- explain the different ways in which commercial activities have been transformed due to e-commerce
- discuss the benefits of e-commerce along with some important security concerns
- examine the performance of Pakistan in the field of e-commerce.

Learning outcomes

After completing this chapter, students should be able to:

- define the terms e-commerce, e-retailing, and online banking
- explain how credit cards and ATMs are used
- identify the benefits of e-commerce and highlight some security concerns
- identify the infrastructure requirements for e-commerce
- evaluate the performance of Pakistan with respect to e-commerce.

Introduction for the teacher

The previous chapter introduced students to the applications of computers in manufacturing and operational work. This chapter aims to expand students' horizons further by describing the impact of computers on everyday commercial activities, be it the purchase of items of daily use or operating one's bank account.

Begin by explaining the terms **commerce** and **e-commerce**. Explain how our lives depend on commercial activities. Next, describe how the contribution of computerized systems to commercial activities has continued to increase since the 1970s. Describe the emergence of electronic data interchange, online shopping, credit cards, ATMs, and the Internet.

Explain how Internet-enabled commercial activities have created new ways of generating income. Explain the phenomena of e-retailing and online banking. Discuss these in detail so that students are able to compare how these activities are performed in a traditional environment as opposed to an electronic environment.

Next, describe the infrastructure that is required to have a well-developed e-commerce environment in the country. Ask students to compare these requirements with those available in Pakistan. Discuss the benefits of e-commerce for customers, businesses, and the society in general. At the same time, make students aware of the increased security concerns that arise due to dependence on computers. You could refer to the discussion on viruses and similar threats from the previous chapter.

Finally, discuss the progress Pakistan has made in e-commerce by identifying some of the significant advancements that have been made. Also identify areas where the country needs to improve.

By the end of the chapter, students should be able to explain what e-commerce is and how it has become an integral part of our daily life.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

How many of you went shopping last week?

Did you enjoy it? What were some of the problems you faced?

How can we use computers to solve these problems?

Reading and explanation (30 minutes)

Discuss sections 10.1 and 10.2 on pages 121 to 124 of the textbook.

Ask students to explain what they understand by the term **commerce**. In general, students will not give very precise answers. Explain that commerce consists of all the buying and selling activities that we see around us. Next, ask students to explain what electronic commerce might mean. This time round, you may expect some students to explain that it might involve buying and selling with the help of a computer. Clarify their understanding by explaining that e-commerce involves using computers and the Internet to make commercial transactions.

Ask students if they have ever seen their parents shop or bank online. Some of them might have done so. Tell students that you are going to narrate the story of how it has become possible for us to shop and bank online. Discuss the events and developments described in section 10.2 of the textbook. Explain the terms **electronic data interchange** and **online shopping** as basic forms of online banking and shopping.

Next, explain how credit cards and ATMs came into common use. Most students should have some experience with at least one of these technologies. Ask students to explain how these developments have made things more convenient for them and their parents.

Describe the birth of the Internet and the World Wide Web. Explain how the emergence of web browsers led to the development of e-commerce websites that allowed people to shop and bank online from their homes.

Conclude with the dot-com bubble burst of 2000 and the current outlook for e-commerce. Ask students to imagine how commercial activities might have changed fifteen or twenty years from now.

Homework assignment (5 minutes)

Assign questions 1 and 2 from section D (page 132) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 10.3 to 10.5 on pages 124 to 127 of the textbook.

Homework assignment (5 minutes)

Assign questions 3 to 6 from section D (page 132) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3**Starter activity (5 minutes)****Reading and explanation (20 minutes)**

Discuss sections 10.6 to 10.9 on pages 127 to 130 of the textbook.

Classroom activity (10 minutes)

Assign sections A, B, and C on pages 131 and 132 to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 7 and 8 from section D (page 132) and section E (page 133) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-unit questions on pages 131 to 133**A. Fill in the blanks.**

1. selling 2. ATM 3. e-retailing 4. Security 5. banking

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. False. E-commerce websites were launched in 1998.
3. True.
4. False. Online banking poses some security threats such as hacking.
5. True.

C. Select the correct option for each question.

1. b 2. b 3. c 4. b 5. a
6. b 7. b 8. d 9. a 10. d

D. Answer the following questions.**1. What is e-commerce?**

E-commerce stands for electronic commerce. It consists of ways in which we can use a computer and the Internet to buy and sell without having to visit an actual marketplace. It also allows us to operate our bank accounts without having to go to the bank.

2. Describe the important developments that took place in e-commerce during the 1970s and 1980s.

Several important developments took place in e-commerce during the 1970s and 1980s. Some of them are described below.

Electronic Data Interchange (EDI) was introduced during the 1970s. This enabled different organizations to share data with one another across a computer network.

Online shopping was introduced in 1979. In the beginning, only businesses could use it to order supplies. Later, ordinary people could also use it to buy and sell things on the Internet.

Credit cards and Automated Teller Machines (ATMs) came to be used during the 1980s. A credit card is issued by a bank to its clients. The clients can then make purchases without paying in cash because the bank that issues the credit card makes the payment on their behalf. Later, the clients pay the money back to the bank.

Automated teller machines are devices placed outside banks, shopping centres, and other busy places. People can insert an ATM card issued by their bank into the machine and enter a password or personal identification number (PIN). They can then withdraw cash from their bank account. The cash is dispensed through another slot in the machine.

3. Describe three ways in which businesses might generate income through e-commerce?

Businesses can generate income through e-commerce in several ways. Three such ways are described below.

1. Businesses might sell products such as computers, books, furniture, clothes, and toys, or provide services such as auctions and banking services through web sites.
2. Businesses might also sell software like music, games, and photographs through websites.
3. Some businesses can provide information like news, games, and groups on their websites. They earn revenue from companies that might want to place online advertisements on their websites.

4. Why do banks issue credit cards?

Banks issue credit cards so that credit card holders do not have to carry cash when they are shopping. Carrying large amounts of cash can be dangerous. The cash might get lost or stolen. In this way, banks make shopping convenient for people by issuing credit cards.

5. What are the benefits of automated teller machines?

The benefits of automated teller machines are that people can withdraw cash from their accounts wherever they need it. They do not have to look around for a bank because ATMs are placed in hotels, shopping centres, and other public places. People can also withdraw cash from their accounts when banks are closed.

6. List some important benefits of e-retailing.

Some important benefits of e-retailing are listed below.

1. People can avoid crowds and traffic by shopping from home.
2. People can select from a greater variety of goods.
3. People do not have to make payments in cash.
4. Goods are delivered by the seller.
5. Online businesses can attract a larger number of customers.

7. What is meant by infrastructure? What are some of the infrastructure requirements for e-commerce?

Infrastructure consists of the basic facilities for carrying out commercial activities. The infrastructure requirements for e-commerce include a fast Internet connection, proper laws for e-commerce, electricity, a good network of fibre-optic cables, a trained workforce, and security controls.

8. What progress has Pakistan made in the field of e-commerce?

Pakistan has made good progress in e-commerce since the year 2000. People can now operate their bank accounts and pay their utility bills through their computers and mobile phones. The NIFT system has speeded up the processing of cheques. People can also file their tax returns online.

E. Write paragraphs to answer the following questions.

1. **Ahsan wants to buy an exercise machine online. The website requires him to enter his credit card number. What things should Ahsan consider before sharing the information with the website?**

Ahsan should first ensure that the website he is visiting is a genuine website and has not been set up by a phisher. He should check the URL to confirm that he is visiting a genuine website. Ahsan should avoid entering information in any pop-up windows or empty tabs on the website.

2. **Mansoor wants to start a shop but he cannot afford to rent premises. Is there any other way he can start a business? Explain how Mansoor could run such a business.**

Mansoor can save rent costs by setting up an online business. He can create a website and pay for hosting services. On the website, Mansoor can put up pictures and price details of all the products on sale. He can also take orders and have them dispatched to their destination through the website. He can receive online payments and have them transferred to his account.

F. Lab exercise

For the teacher: Students can be asked to visit any online retailing websites. It is better to suggest websites that sell books and other educational aids for children. The payments section is navigated in a similar way for all websites; however, you should caution children against entering credit card or bank account details. They should simply compare the different ways in which e-retailing works.

G. Project

For the teacher: Students should be able to accomplish this project on their own with minimal help from the teacher. Where necessary, this activity could be assigned as pair or group work as some of the information may be difficult to interpret for the students. It is also a good idea to invite progress updates from students and guide them accordingly.

Additional information for the teacher

- In Pakistan, most of the progress in e-commerce has taken place in the field of **banking**. There are some websites where businesses can transact with one another, but people use them mostly to share information rather than to buy and sell products and materials.
- More than 90 per cent of bank branches in the cities have been computerized. This enables account holders to make withdrawals from branches other than the branch where they have an account. Many banks also offer facilities for **international transfer of funds**. This enables people to receive funds remitted by family members living abroad.
- Pakistan also needs to develop its infrastructure to benefit from the fruits of e-commerce. The number of telephone lines needs to be increased and the electricity shortage needs to be controlled. The government needs to take steps to increase the number of people connected to the Internet. Adequate security controls are needed so that people feel confident enough to conduct online transactions.
- Progress is being made on some fronts. The number of Internet users and the fibre-optic network in the country have been growing steadily since the **deregulation** of the telecommunications industry in 1999. Other laws have made it very attractive for foreign telecommunications companies to do business in Pakistan. The United Nations and World Bank also provide assistance for the development of IT infrastructure in the country.

Activity Sheet

I. Why...?

1. Why are credit cards important for e-retailing?

2. Why do we need separate laws for e-commerce?

3. Why is there a need for more IT universities?

4. Why was EDI introduced?

5. Why is e-commerce good for society?



Test Sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. The person to whom a credit card is issued is called the _____ of the card.
 - a. holder
 - b. buyer
 - c. customer
 - d. issuer
2. An automated teller machine has a _____.
 - a. keypad
 - b. slot
 - c. screen
 - d. all of the above
3. Tim Berners-Lee invented _____.
 - a. the Internet
 - b. the World Wide Web
 - c. online banking
 - d. online shopping
4. A large number of e-commerce websites were launched in _____.
 - a. 1979
 - b. 1990
 - c. 1998
 - d. 2000
5. Online businesses can generate revenue from _____.
 - a. phishing
 - b. online advertisements
 - c. hosting websites
 - d. b & c
6. ATMs have helped in the growth of _____.
 - a. e-retailing
 - b. online banking
 - c. websites
 - d. online chatting
7. E-commerce is good for _____.
 - a. customers
 - b. businesses
 - c. society
 - d. all of the above
8. E-commerce infrastructure requirements include _____.
 - a. electricity
 - b. water
 - c. newspapers
 - d. televisions
9. The NIFT program was introduced in Pakistan in _____.
 - a. 1990
 - b. 1995
 - c. 2000
 - d. 2005
10. E-retailing involves making purchases through _____.
 - a. ATMs
 - b. cash
 - c. an online showroom
 - d. warehouses

Answers to activity sheet

I. Why...?

1. Credit cards are important for e-retailing because people cannot make payments in cash for online purchases.
2. We need separate laws for e-commerce because there are new threats of hackers and Internet frauds in e-commerce.
3. There is a need for more IT universities because more software programmers, network administrators, and call centre professionals are needed to help e-commerce grow.
4. EDI was introduced to help businesses share data with one another across a computer network.
5. E-commerce is good for society because it is easy to set up an online business. This creates jobs and helps to reduce poverty and crime.

Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

- | | | | | |
|------|------|------|------|-------|
| 1. a | 2. d | 3. b | 4. c | 5. d |
| 6. b | 7. d | 8. a | 9. b | 10. c |



Teaching objectives

The objectives of this chapter are to:

- define the term robot and describe various applications of robots
- explain personal area networks and the importance of wireless communications
- introduce satellite communication and describe the different types of satellites
- explain GPS technology and its applications.

Learning outcomes

After completing this chapter, students should be able to:

- identify robots being used in different environments around them
- evaluate wired and wireless communication networks
- explain how satellites enhance communication on a global scale
- explain the scope of GPS technology

Introduction for the teacher

While chapters 9 and 10 explore the impact of computer technology on work processes and economic and commercial activities, this chapter examines emerging and developing technologies that have the potential to impact on the future.

Start this chapter by continuing the thread of automation from chapter 9 and discuss robots. However, explain that their use is no longer restricted to manufacturing but has been extended into scientific research, space exploration, and nanotechnology. Discuss the advantages and disadvantages of robots so that students are able to create a fair picture in their minds about the choices they might have to make in the future.

Similarly, discuss wireless communication technologies so that students can compare them with existing wired communication networks and make appropriate choices.

Next, discuss personal area networks with an emphasis on the growing use of radio signals. Once again, discuss the advantages and disadvantages of this development to help students analyse its potential for the future of computing.

Discuss satellite communication and explain how it has enabled us to communicate with people all over the world within seconds. We can not only send email to people in different countries, but also watch their television channels and learn about their cultures and customs. Discuss astronomy, communications, weather, navigation, and space exploration satellites along with their applications.

Finally, discuss GPS technology. Explain how it works and identify the various devices that now come equipped with GPS technology.

By the end of this chapter, students should be able to describe some important developing technologies and project how they might change our lifestyles in the future.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

Can we use robots for things other than work in factories?

Why does a mobile phone not have a cable or wire like a land-line telephone?

Reading and explanation (30 minutes)

Discuss sections 11.1 and 11.2 on pages 135 to 138 of the textbook.

After collecting students' responses to the starter questions, ask them where else robots might be used. Students are likely to give very imaginative responses. Acknowledge all of them as future possibilities. Then direct students' attention to the concept of robots as understood in terms of this course. Discuss how robots are being used in manufacturing (you could refer to CAD and CAM) and medicine. Explain how they play an important role in space exploration and surgery. Explain the term **nanotechnology** and explain that this technology holds great promise for the future. Nanotechnology might result in reducing the size of machines to unimaginable levels.

Ask students whether they think robots would make life better for them. Ask them to think and give reasons for their responses. Use their responses to discuss the advantages and disadvantages of robots.

Next, introduce wireless communication and explain how it works. You might display a mobile phone in the classroom and ask students how it works without being connected by a wire to a socket. Explain that the technology being used is called wireless communication. Explain further that just as a mobile phone can work without being connected by a cable, computers can also share data with one another without being connected to one another by cables. Discuss the role of wireless access points.

Conclude the session by discussing the advantages of wireless communication technologies over wired communication.

Homework assignment (5 minutes)

Assign questions 1 to 3 from section D (page 146) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 11.3 and 11.4 on pages 138 to 141 of the textbook.

Homework assignment (5 minutes)

Assign questions 4 to 6 from section D (page 146) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (30 minutes)

Discuss sections 11.5 and 11.6 on pages 141 to 144 of the textbook.

Assign sections A, B, and C (pages 145 and 146) to be completed in the classroom.

Homework assignment (5 minutes)

Assign questions 7 and 8 of section D and section E (page 147) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Suggested answers to end-of-chapter questions on pages 145 to 147

A. Fill in the blanks.

1. nanotechnology 2. GPS 3. Cloud 4. mobile 5. Embedded

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. False. Wireless communication enables computers to communicate through radio signals transmitted through the air.
3. False. A personal area network is a small network consisting of 8-10 devices.
4. True.
5. False. Navigation satellites are used to track distance and time.

C. Select the correct option for each question.

1. d 2. a 3. b 4. b 5. d

D. Answer the following questions.

1. What is a robot? Describe two fields where robots are commonly used.

A robot is a machine that is controlled by a computer. It is used to perform tasks that are too dangerous, complicated, or boring for human beings.

Robots are used in many areas. They are used in factories to lift heavy objects and to do monotonous jobs. Robots are also used to perform surgery by surgeons who control the robot from a distant location, such as another country.

2. How can a computer connect to a wireless network?

A computer can be connected to a wireless network simply by being placed within the range of the wireless network.

3. List three advantages of wireless networks.

Wireless networks have several advantages. Three of them are listed below.

1. Wireless networks allow people to work on their laptops without being connected to other computers by cables.
2. Wireless networks make it easier for people to share files across computers.
3. Students do not have to be present in computer labs to work on the computer. They can carry their laptops anywhere around the campus and do their work.

4. How do devices share data in a personal area network?

In a personal area network, devices share data by continuously giving out radio signals. When another PAN device comes close enough to such a device, it catches the radio signal and receives data.

5. What is a satellite? How does a satellite help to communicate across large distances?

A satellite is a natural or man-made body that travels around another body in space. The satellite travels in a circular path called an orbit.

An artificial satellite helps to communicate across large distances by orbiting the Earth and receiving signals from ground stations on the Earth. The satellite then sends the signals to another ground station on the Earth located far away from the first ground station. The satellite can do this easily because it is located high up in space.

6. Explain the purpose of a weather satellite.

The purpose of a weather satellite is to help people monitor the weather. A weather satellite helps people know about rain, storms, and hurricanes in advance. This enables people to make suitable arrangements for their safety.

7. What is meant by GPS? How can GPS help a person to recover a lost car?

GPS stands for Global Positioning System (GPS). It uses satellite communication to identify the location of a person or a thing.

GPS can help a person to recover a lost car in the following way: The person should have a GPS device fitted to his car. This device sends signals that are received by a satellite in space. The satellite sends these signals to ground stations on the Earth. The police can use these signals and find the location of the device that is sending them. This helps the police recover the lost car.

8. Describe the military applications of GPS technology.

GPS has important military applications. It can be used to target missiles. Soldiers can use GPS devices to discover one another's location on the field. GPS can also help rescue missions to locate missing soldiers and aircraft.

E. Write paragraphs to answer the following questions.

1. Saquib is downloading information from the Web to his laptop while seated in a coffee shop. There are no wires or cables connected to his laptop. How is he able to run his laptop and access the Internet without any cables?

Saquib is able to run his laptop without any wires or cables because it is powered by a battery. As long as the battery is charged, the laptop will continue to operate. Saquib is able to access the Internet by a Wi-Fi network through which signals travel through the air instead of cables. The coffee shop has wireless access points through which signals are transferred to the laptop.

2. Can you think of some uses of embedded technology in the future? Describe two such uses.

Embedded technology can be used to identify people at airports. People can have RFID chips installed on their passports and ID cards which can be detected as soon as they enter the airport. This will improve security and speed up the checking-in process. Embedded technology can also be used to trace objects in a factory and track them after they are sold to customers.

F. Lab exercise

For the teacher: Students can be encouraged to use Google Maps or other similar applications on the Web. They can enter the name of their neighborhood or a nearby landmark to locate it on the map. They can also mark their school or house on the map and name it, e.g. "Salman's school" or in any other way. Make sure that students do not make a lot of information available online. You could also ask them to calculate the distance from their home to the school on the map.



G. Project

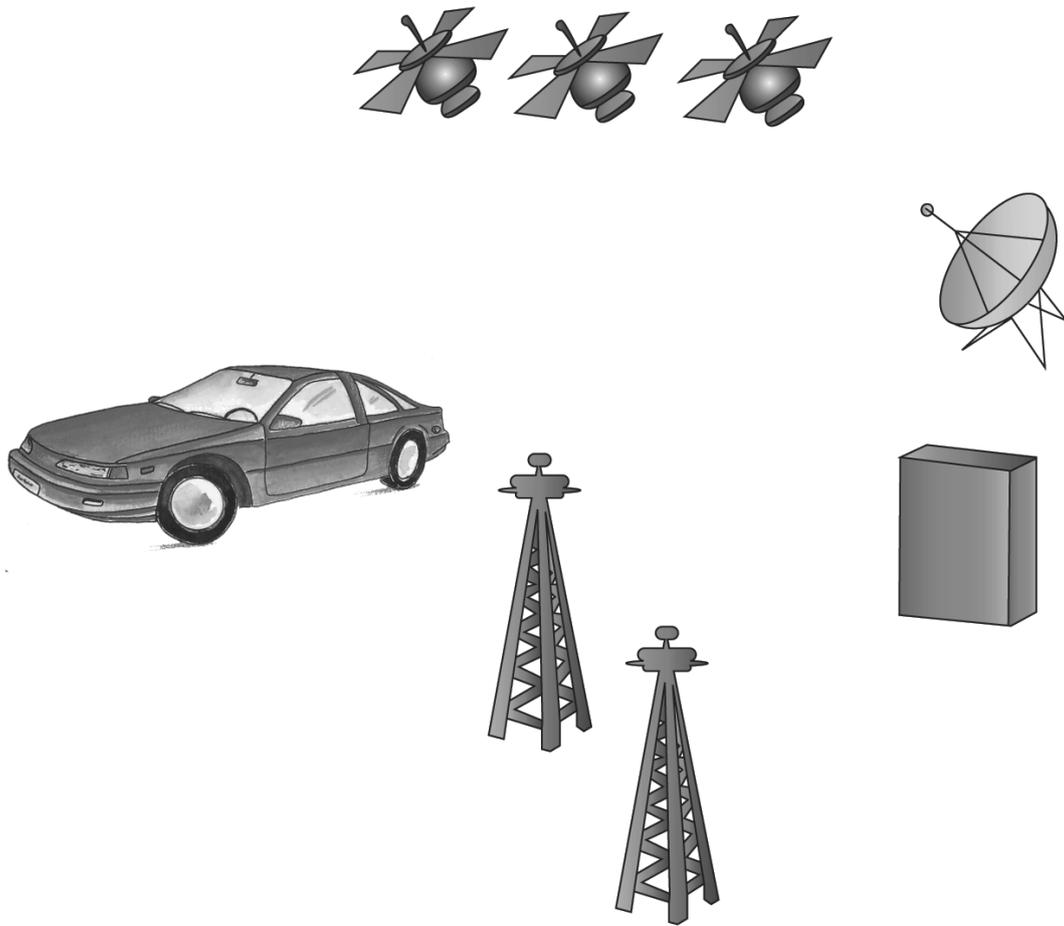
For the teacher: You should suggest that students consult the latest technology articles published in magazines and newspapers for this project. Websites that carry syndicated articles are a rich source of information for this project. Encourage students to include photographs and diagrams in their report.

Additional information for the teacher

- A personal area network is also called a **piconet**. A piconet may consist of devices connected together in a master-slave relationship. One of the piconet devices is the master, while the rest of the devices are slaves. These slaves communicate with one another through the master.
- A piconet is a very small network. Usually, a piconet can cover a range of ten metres. However, larger ranges are also possible.
- An important modification of a personal area network works by detecting signals from the human body. This feature makes it useful as sensors for door locks and automatic sliding doors.
- The personal area networks discussed in the textbook are also called wireless personal area networks. These are the networks used to connect a limited number of devices without the use of cables. These devices communicate or share data by **plugging in**. This means that when two devices that are part of a wireless personal area network (WPAN) come close to each other (as when a person with a mobile phone in his pocket enters a room where his laptop is located) they can detect one another's signals and start communicating.
- WPAN devices also have a useful feature of blocking out other devices on the same network while they are communicating with another device. For example, a laptop can block out signals from a mobile phone while it is communicating with a printer.

Activity Sheet

- Label the diagram below and draw arrows to illustrate how GPS might help to recover the stolen car.



Test Sheet

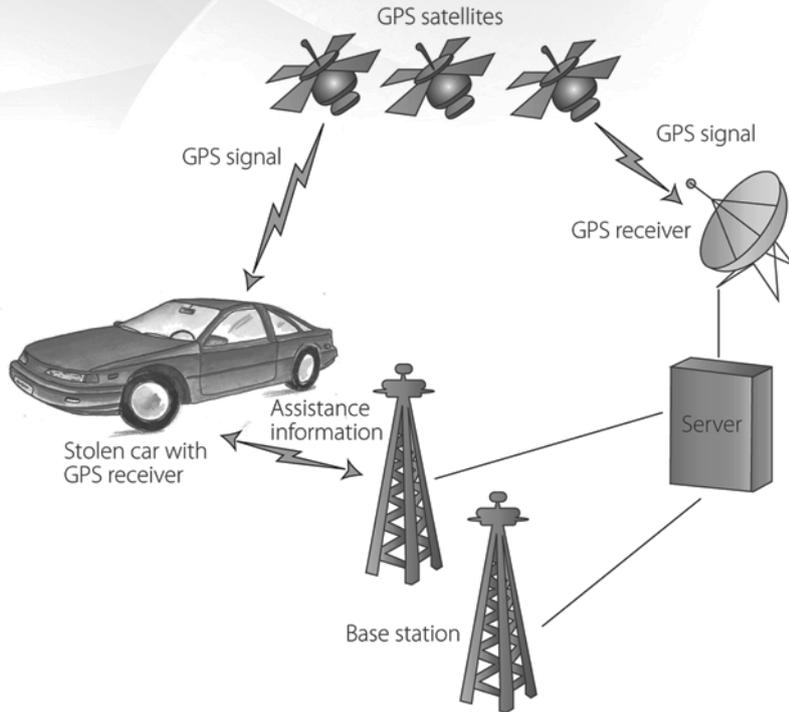
- I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks. (10 marks)

1. Robots are used to perform _____ work.
 - a. interesting
 - b. exciting
 - c. repetitive
 - d. simple
2. The field of science that helps us to produce extremely small machines is called _____.
 - a. microscience
 - b. nanotechnology
 - c. minirobotics
 - d. none of the above
3. Automated _____ vehicles are used to move sets and props in the entertainment industry.
 - a. guided
 - b. general
 - c. going
 - d. grand
4. A _____ connects a wired network to a wireless network.
 - a. wireless connection point
 - b. wireless entry point
 - c. wired access point
 - d. wireless access point
5. Devices in a PAN communicate by sending and receiving _____.
 - a. electric signals
 - b. radio signals
 - c. magnetic signals
 - d. light signals
6. _____ is a satellite.
 - a. The Sun
 - b. The Earth
 - c. The Moon
 - d. b & c
7. Hubble is a famous _____ satellite.
 - a. astronomy
 - b. space exploration
 - c. weather
 - d. navigation
8. GPS is based on _____ technology.
 - a. mainframe
 - b. satellite
 - c. robot
 - d. PAN
9. GPS can be used to track down lost _____.
 - a. luggage
 - b. cars
 - c. children
 - d. all of the above
10. Some people fear that robots might be able to _____ human beings in the future.
 - a. respect
 - b. obey
 - c. control
 - d. none of the above



Answers to activity sheet

I. Label the diagram below and draw arrows to illustrate how GPS might help to recover the stolen car.



Answers to test sheet

I. Select the correct answer by shading in the appropriate circle on the given answer sheet. Do not write anything in the blanks.

1. c

2. b

3. a

4. d

5. b

6. d

7. a

8. b

9. d

10. c

Teaching objectives

The objectives of this chapter are to:

- explain the function of HyperText Markup Language (HTML) in creating web pages
- explain the role of text editors
- explain the concepts of elements, tags, and attributes
- explain the use of HTML tags with the correct syntax.

Learning outcomes

After completing this chapter, students should be able to:

- differentiate between elements and tags in HTML
- write instructions in HTML code using the correct syntax
- insert title, headings, and body text for a web page using HTML code
- format content for the web page using font and body attributes
- insert images using the elements
- create and save HTML code to create a single web page with appropriate formatting
- view the web page in a browser.

Introduction for the teacher

The purpose of this chapter is to develop the students' practical skills so that they can appreciate how the knowledge of application software is applied in the real world of problem-solving. This chapter discusses the use of HTML to develop simple pages. Students should be taught how to create web pages using code. The method should be compared with the process of writing programs to solve simple problems in GW-BASIC. The importance of proper planning and charting the execution of the project should be stressed at every point.

The various formatting features should be taught as well as the steps for inserting pictures on the web page. Conclude with the project activity so that students can become independent practitioners of web code.

Number of allocated periods: 3

Period 1

Sample lesson plan for a 40-minute period

Starter activity (5 minutes)

Ask students the following questions:

Where do web pages come from?

Who makes web pages and websites?

How are web pages made attractive?

Reading and explanation (lab session) 30 minutes

Discuss sections 12.1 to 12.2 (up to body tags) on pages 149 and 150 of the textbook.

Open up a web page on the main computer and ask students what it is. After they have identified it as a web page, you should ask them if they would like to create a web page of their own. This should raise the motivation levels of the students as they would participate in the process of creating and publishing online content.

Explain the concept of text editors for writing web code and stress its simplicity. Have students recall some of the commands and statements used in GW-BASIC programming. Explain that HTML also uses commands of its own to insert and format text in the form of a web page. Demonstrate the use of <html>, <head>, <title>, and <body> tags to organize content on a web page.

Homework assignment (5 minutes)

Assign question 1 from section D (page 156) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 2

Starter activity (5 minutes)

Reading and explanation (lab session) 30 minutes

Discuss sections 12.2 (from bgcolor attribute) and 12.3 on pages 150 to 153 of the textbook.

Homework assignment (5 minutes)

Assign questions 2 to 4 from section D (page 156) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.

Period 3

Starter activity (5 minutes)

Reading and explanation (lab session) 30 minutes

Discuss sections 12.4 and 12.5 on pages 152 to 154 of the textbook.

Homework assignment (5 minutes)

Assign question 5 from section D (page 156) as homework. Clarify what is required of students in their answers. You should stress that reproducing from the textbook is not desirable.



Suggested answers to end-of-chapter questions on pages 155 and 156

A. Fill in the blanks.

1. text
2. HyperText Markup Language
3. container
4. paragraphs
5. <u>

B. State whether the following statements are true or false. Rewrite the false statements to make them true.

1. True.
2. False. The syntax for inserting a picture is Caption.
3. False. The text placed within the <title> tags is the title of the web page.
4. True.
5. False. We can insert more than one heading levels on a web page.

C. Select the correct option for each question.

1. c 2. c 3. d 4. d 5. d

D. Answer the following questions.

1. What does HTML stand for? What is it used for?

HTML stands for HyperText Markup Language. It is used to write the code used to create web pages.

2. Describe the functions of three text formatting tags along with their syntax.

The bold tag is used to make text appear in bold. Its syntax is text.

The underlined <u> tag is used to underline text. Its syntax is <u>text</u>.

The bgcolor <body bgcolor> tag is used to set the color of the text and background. Its syntax is <body bgcolor="colour" text="colour">.

3. Write the instructions to insert three different heading levels.

Use the <h1> element to insert different heading levels on the web page.

To insert a first-level heading, write <h1> Heading </h1>.

To insert a second-level heading, write <h2> Heading </h2>.

To insert a third-level heading, write <h3> Heading </h3>.

4. Explain the procedure to insert pictures on a web page.

The element is used to insert pictures on a web page. The align feature is used to specify the alignment of the image on the web page. The src feature is used to provide the caption for the picture. The border feature is used to specify the thickness of the picture borders.

5. How can one view the web page for the HTML instructions created in a text editor?

The web page can be viewed by clicking on the icon of the HTML file in the saved location. The file contains the code written in a text editor. When the icon is double-clicked, the web page opens in the browser.

E. Lab exercise

For the teacher: This activity can be assigned as an open-book activity as students can use the code given in the textbook as a model to create their own codes. However, you should encourage students to demonstrate sufficient creativity and avoid replicating the code with minimal modifications.

F. Project

For the teacher: Encourage students to access the library and the Internet to conduct research on this topic. The project could be assigned as a group project so that students can distribute research responsibilities and come up with highly informative web pages.

Activity Sheet

I. What is...?

1. What is HTML?

2. What is a container element?

3. What is `<p>` used for?

4. What is the `<title>` tag used for?

5. What is the element used to set the border thickness for a picture?

II. Rewrite the instructions in the correct syntax.

1. `<h1> heading </h2>`

2. ` 8 `

3. `<title>title of web page</title>`

4. ``



Answers to activity sheet

I. What is...?

1. HTML is a language that is used to write the code for creating web pages. HTML stands for HyperText Markup Language.
2. A container element is an element in HTML which has an opening and a closing tag.
3. The <p> tag is used to insert line breaks in a web page.
4. The <title> tag is used to insert the title of a web page. The title appears on the browser tab of the web page.
5. The border element within the tag is used to set the border thickness for a picture.

II. Rewrite the instructions in the correct syntax.

1. <h1> heading </h1>
2. text
3. <title>title of web page
4.

Answer to test sheet

- I. For the teacher: Students may attempt this question in any number of ways. While evaluating their submission, you must ensure that all the elements and tags discussed in the chapter have been incorporated correctly. Adequate information should be presented in creative ways.

Answer Sheet

Name: _____

Date: _____

Marks: _____

	a	b	c	d
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>