Chapter 1  What is an Information System
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Chapter 3  The Input and Output
Chapter 4  Storing data
Chapter 5  Software
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Chapter 1  

What is an Information System

What is a System?

A group of interdependent items used to perform a task.

An information system is a system that collects and stores data.

Data: are raw facts and figures.
Information: are data after processing.

Data → Process → Information

Example

This number 250299 is data
After processing it maybe
□ The number of cars going down a certain road in a week. or
□ The date 25th February 1999.
So this number after processing it will be information.

Types of Information system:

□ Computerized Information system: there is processor or computer used to store and fined the data.
   Such as:
   A. The driver vehicle Licensing Authority.
   B. Computerized school Management System.

□ Manual Information System: such as telephone directory, Bus timetable or any Catalogue.

□ Advantages of Computerized information system:
1. You don’t need lots of filing cabinets to hold all the pupils files and other forms.
2. Terminals can be used.
3. There is no duplication of information.
4. The system can be used with other programs.
5. Some information can be transferred to the system without using the key Board Such as OMR (Optical Mark Reader).

- **Disadvantages of Computerized information system.**

  1. Everything depends on the computer system, so if the power failure or the system breaks down then an alterative system will need to be used.
  2. The staff will need to be trained. To use the system.
  3. Security will need to be provided.

Use the following link to find the solutions for each chapter in our website
http://it2.weebly.com/summaries.html

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**Chapter 2 The components of an Information system**

**Hardware and software:**

**Hardware:** is the term used for the parts of the computer that you can touch and handle.

Such as all devices that make up computer system, **Basically these devices may be split into:**

1. **Input devices:**
   - Which are used to get data into the computer, such as: mouse, Key Board, scanner.

2. **Output devices:** which are used to provide output in the form of printouts, screen displays, etc. such as Visual Display Unit (VDU), Speakers, Printers.
3. **Central processing unit (CPU):** This is the brain of the computer.

4. **Backing devices:** It's used to store data when the power is switched off (permanent data).

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**Why we use computers?**

1. Computers are extremely fast.
2. Computers are very accurate. Computer only do what you tell him.
3. Computer can keep a large amount of info in a small space.
4. Computer can work continuously for 24 hours a day.
5. Computer can work the job that would be impossible without them.
   Such as: space exploration, weather forecasting.

**Disadvantages of using computers: (drawbacks)**

1. Computer can replace people.
2. Computer holds personal info.
3. Problems arise when Computers cannot be used.
4. Staffs need to be trained.

**Processing data:**

- **Process:** is doing something to the data.
Processing: includes:
- Calculating.
- Sorting.
- Searching.
- Storing.
- Drawing.

Central processing unit (CPU)

Processes the data and turns it into Information

![Diagram of data processing]

There are three main elements of the CPU:
1. Control unit: responsible for coordinating the input and output devices.
2. The arithmetic and logic unit (ALU)
   Where all the calculations and logical decisions are made.
3. The immediate access store (IAS): This provides immediate memory for holding data.
**Types of signals:**

There are two types of signals that pass between the CPU and the other hardware:

A - **Control signals:** these include signals sent out by the main processor to printer to tell it to be ready to receive some data.

B - **Data signals:** groups of Binary digits that are used to represent characters.

**Types of Computers:**

1. **Micro Computer:** Are the Computers that you are most like to encounter at home or in school.

2. **Personal digital assistants (PDAS):**
Are small hand-held devices which you can use to organize a bus schedule.

3. Palmtop Computers:
A Small Computers that usually contain a limited number of applications.

4. Laptop and note book Computers:
These Computers are bigger than PDAS and palmtop they normally come with battery and LCDS screen (liquid crystal displays)

5. Mainframe Computers:
- large, power full
- capable of supporting large number of terminals
- Carry out 250 million instructions per second (MIPS).

6. Mini Computer: have a size power and cost some where between those of Micro Computer and main frames.
**Peripheral devices:** are devices outside the central processing unit but under its control they may be input devices or storage devices.

**Microprocessors:** A Single chip that performs the functions of central processing unit.
Chapter 3  The Input and Output

Input devices?
It's used to get data into a computer system.
Examples:
1…. Key Board:
The micro-processor scans the key Board hundreds of times a second to see if a key has been pressed, if it has, a code that depends on which key has been pressed is sent to the processing unit, the CPU translates this code into an ASCII code.

ASCII code: The code that Computers use to represent characters on the Computer key Board.

2…. Mouse: is an input device that translates its movements on the desktop into digital info.
3…. Tracker ball: is like an up side down Mouse the Ball is rotated by the user.

4…. Touch sensitive pad:
Touch sensitive pad or track pads are commonly found on note Book or laptop computers.
5.... Joystick:
- Similar to tracker ball.
- Used for games.

6.... Light pen: A screen cursor can be moved by touching the screen with a light pen.

7.... Touch screen:
- Sensitive to touch
- Ideal for use in Banks and Building societies
- You don’t need a keyboard.

(Reading)
8.... Graphics tables (digitizers):

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ITAHHSS.TK
9.... Magnetic stripe reader: used to read info contained in the magnetic stripe of credit card.

10.... Bar code readers:

- Readers can record bar codes at distances of five meters or more.

11.... Optical character reader & optical character recognition (OCR)

OCR Recognition is a method of inputting text using scanner along with special software to turn the scanned image into standard ASCII code.

12.... Punched card:

Contain holes in different positions which mean something when they are read by a reader.

Its old method

13.... Voice recognition: you can speak directly to the computer.
The computer can convert your voice to text on the screen or commands by special software.

14.... Microphone: is used as the input device for a speech recognition system.
15. .... Electronic point of sale (EPOS) terminal:

EPOS terminal are the cash registers.

16. .... Electronic funds transfer at point of sale (EFTPOS):
It’s similar to EPOS terminals with some additional features.
--They are able to transfer funds from your Bank account to store account by using card called a debit card.

*** Disadvantages with debit card
- May be stolen.
- Encourage people to spend more money

17. .... Video digitizer:

Is a combination of hardware and software.
Used to
- Convert an analogue video signal into digital signal.
- Convert frame from video sequence into a picture.
- Make television adverts and produce pop video.

18. .... Scanner: are used to scan text or pictures into computer memory, but here you will get image file by using special software (character recognition software) you can change it to text file.
19.... Digital camera:
Advantages:
1. No film is need.
2. Cheap.
3. No need to scanner.
4. You can (enlarge and reduce) size the image as will as crop it (cut out the part of photo).

20.... Web cameras (web cam)

Digital camera that is used to captures still images then changes them to video file.

Used to
☐ Advertising.
☐ Checking on children in nurseries.
☐ Checking on the weather in another part of the world.

21...magnetic ink character reader (MICR):

The characters are printed using an ink which contains iron or may be magnetized
The magnetic pattern of the numbers is read by special reader called:
Magnetic ink character reader

Branch code and cheque number are all printed in a magnetic ink

22...microphone:
Microphone is used as the input device for a speech recognition system.

Speech recognition system:
You can speak directly to the computer for:
1. Execute commands
2. Inputting data.

23... Sensors:
Small device contains Microprocessor used to obtain data automatically for instance.

Such as:
-- Traffic lights: have a sensor which records the frequency of the traffic. The microprocessor can then alter the sequencing of the lights to improve the flow of the traffic

-- Burglar alarms

Output devices:

Which are used to provide output in the form of printouts, screen displays, etc. such as Visual Display Unit (VDU), Speakers, Printers.

1. Visual display unit (VDU) or Monitors:
VDU comes in many different size and resolution
The size is measured by inch and the resolution is determined by the number of dots of light (pixels) displayed on the screen
2. **Liquid crystal display (LCD):**
- They are small and light
- (LCD) screens are most often seen on portable or laptop computers.

3. **Graphical display units:**
   Are usually larger than normal VDUs and greater resolutions also it’s used in conjunction with light pens.

4. **Printers:**
   A: **laser printers:**
   Laser printer offer both high speed and excellent print quality for text and graphics.
   
   B: **ink-jet or bub-blue-jet printers:**
   Are cheaper to buy than laser printers
   And they can print high quality colored images.
   
   C: **Dot-matrix printers:**
   It’s used to print multi-part sheet where, for example: The white top sheet goes to the customer, the yellow goes to accounts, and the blue to the stores.

Advantages and disadvantages of laser printer page 25

D: **Graph plotters:**
   Its large printer used to print plans, maps, line diagrams and three Dimensional drawings, work by using pens to produce image.
   
   There are two types:
   1. **Drum plotter:** it’s very large printer so very large drawing can be produced.
   2. **Flat bed plotter.** Large printer but smallest than drum
Robots: can convert computer signals into movement.
Robots are used in factories because they can reduce cost and improve the quality of the finished products.

CNC: Computerized Numerical Control
Is a way of controlling a machine or process by using commands that are coded for a numerical machine.

CAM: computer aided manufacturing.
CAM describes the uses of computers to assist in the manufacturing of components or products.
Control devices:
Devices which are use embedded computers (micro processor) to control the following.

1. **Motors:** used in automatic washing machines, automatic cookers, robots, and production line control.
2. **Heaters:** automatic coolers, control heating controllers, computer controlled green houses.
3. **Light/ lamps:** computer controlled green houses.
The storage of data:
The amount of data can store in memory and measured in byte.
**Byte (B):** 8 bit.
**Bit:** short for binary digits, 0 or 1.
1 KB = 1 Kilo byte = 1024 byte
1 MB = 1024 KB.
1 GB = 1024 MB.
1 TB = 1024 GB.
Computers are works by using pulses of voltage which represents a 0 or 1.
A low voltage pulses represent a 0 and high voltage pulse a 1.

Main memory:
Rom: is held on a chip inside the processor and it used to hold data. This data can not be changed by the user. These data used to tell the computer how to load operating system (called the boot program).
EPROM: stands for erasable programmable read only memory.
RAM: Random access memory held on a chip but data is held only temporarily, which means that the data disappears when the power is switched off.

Magnetic media: include hard disks and floppy disk
1. Hard disks usually consist of several disks with read/write heads. Each disk surface is able to store data.
2. Magnetic tape: large spools of tape are used by very large computer system that needs to hold huge amounts of data.

Optical disks:
CD: Rom drives: data is stored on the disk digitally and the laser beam is used to read the data.
1- CD
--- Huge capacities
--- CD-Rom is read only disks. (You can’t alter it or store new data.
--- A typical CD holds around 700 MB of data.
2- CD-R: (CD-recordable)
Drive has read/writes capability
□ can’t be erased, but you can store new data in it.
□ It has capacity and if the software keeps the CDs track is open.

3- CD-RW you need to suitable drive with read/write capability
□ Can be written, erased and rewritten.
□ More expensive than CD-R disk

4- DVDs (digital versatile disks):
- Store data between 4:7 GB and 17 GB so it’s used to store big movies.
- DVD-R:
- DVD-WR.

5. Blu-ray Disc: (also known as BD) is an optical disc storage medium designed to supersede the standard DVD format.

Main uses: for storing high-definition video, PlayStation 3 video games, and other data, with up to 25 GB per single layered equates to 2 hrs HDTV, 13 hrs standard definition TV,

, and 50 GB per dual layered disc.

. 200 GB discs are available, and 100 GB discs are readable without extra equipment.

The disc has the same physical dimensions as standard DVDs and CDs.

Back up devices:
Back up:
Taking another copy of data or program for security purposes
Devices such as:

1. Tape steamers:
2. **Zip drives**: they use high storage capacity floppy disks which are larger twice as thick as normal floppies. They can store from 100 MB to 250 MB.

3. **Jas drives**: is a removable disk drive which is very fast of transferring data, each disk can hold up to 2 GB (2048 MB) of data.

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**Chapter 5  Software**

**Software**: Is the general name given to all the programs that can be run on computer hardware.

There are two categories of software:

1. **System software** (operating systems): Are operating systems that control the hardware directly.
2. **Applications software**: used to perform specific tasks.

**Operating systems performs the following tasks:**

1. They provide a way for application software to communicate with the hardware.
2. they manage the system resources such as memory and CPU
3. They manage the transfer of data.
4. They manage the system security.

**Operating system allows the following:**

1. Multi tasking: the ability of computers to run two or more program at the same time.
2. Multi user: allows several users to access the same data at the same time.
3. User interface: is what you see when you turn on your computer it consist of cursors, prompts, icons, menus........ etc.

Types of user interface:
1. Command driven: with this type you have to type instructions to get something done.
2. Menu driven: with this type the user can make a selection by using either the keyboard or mouse such as windows and apple Macintosh.
3. Graphical user interface: (GUI) using WIMP which stand for window, Icon, menu, and pointing devices.

Designing a user interface:
Take into your account the following point:

1. consistency
2. positioning of items of the screen
3. use of color
4. use of sound
5. Availability of help

Utility programs:
Utility programs are often provided as part of the operating system, although they may be bought separately. A utility program is a program that performs a task which is often needed.

Tasks carried out by utility programs include:
• renaming files
Listing files on a disk
- deleting files
- copying files
- sending files to a printer
- sorting data
- repairing damaged files
- backing up files.

Translation programs:
Translation programs are also part of the systems software and we will look at these in more detail later.

Applications software:
Applications software is used to perform specific tasks.

Types of applications software are described below.

Applications packages:
There are many different types of applications software,

Examples of applications packages are:

1. Word processing software, such as Word and WordPerfect
2. Spread sheet software: such as Lotus 1-2-3 and Excel
3. Database software, such as Access.

Integrated software:
Integrated software consists of a collection of application package which share a common set of commands.
Such as transferring files between these programs wordprocessor, spreadsheet, database and graphics package.

General purpose packages:
Much applications software is not specific to a particular type of business for instance; a wordprocessing package can be used by any business so M-S Word is called General purpose packages

**Programming languages:**
A program is a set of instructions that the computer can understand.
Since the computer can only understand binary code (A series of 1's and 0's)
All computer languages must convert to binary code.

**Low-level languages**
Low-level languages are languages that are easy for the computer to understand but more difficult for the programmer to understand. Assembly language and machine code are called low level language.

**Machine language (or machine code)**
Is the language directly understood by the machine.
In other words, it consists of a series of is and Os. All other languages must be translated into machine code before the instructions can be carried out unless the program is already written in machine code.

**Assembly language**
An assembly language is a language that uses Simple instructions such as SUB ADD and is used in preference to machine.

**High-level language**
High-level language instructions are similar to English which means that programming is made easier.
Include such commands as PRINT, GOTO and READ which are easy for us to understand and remember.

Some high-level languages:

- BASIC is mainly used as a teaching language.
- FORTRAN is used mainly in scientific applications.
- C++ is an increasingly popular language. It is very good for graphics and good for developing commercial software.
- LOGO is used primarily for teaching children about programming and using computers. Children are taught to write a series of instructions to control the movement of a ‘turtle’, which draws a line behind it on the screen.
- JAVA A language especially suited for writing software used to search for things on the Internet.
- HTML Hypertext Markup language. A language used for the development of websites.

Translation programs:

Translation programs are part of the systems software and are used to convert the program commands into machine code. There are three types of translation programs: compilers, interpreters and assemblers.

Compilers and interpreters:

Compilers and interpreters are both programs that change high-level language instructions into machine code.
Assembler:

Assemblers translate assembly language instructions into machine code. This translation is easy because one instruction in assembly language usually corresponds to one machine code instruction.

Chapter 6  Collecting your data

Every computerized information system contains a user interfaces which allows the user to deal with the system.

To collect data about any thing you have to create and design form.
This form must have the same data fields in the user interface.

☐ Form elements:

1. Text field
   Small area allows you to insert any text.
   Name: ____________________________

2. Radio buttons: A small circle allows you to select only one of the options.
   Math  ☒  Computer  ☐

3. Check box: A Small Square allows you to select one or more option.
   Math  ☒  Computer  ☐

4. Text area: Big area allows the user to insert any paragraph or any text.

Comments: ____________________________

All This elements must have label (Name)

☐ For designing a good form you should bear in your mind the following points:
   1. Who will be use the form?
   2. heading (title)
   3. Instructions: should be in a prominent position and should be clear.
   4. layout: should be simple and follow logical sequence
   5. Sections.
6. Testing: by asking the people to fill it, and then to ask them whether they found it easy to understand.

Example:

Crate&Barrel Customer Feedback

We hope your shopping experience has been informational, efficient, and fun. If you have a few minutes, please participate in our short survey.

Please rate your experience on our site.
Select the topic of your feedback.

Enter your comments here.

Overall Rating
- -
- 
+ 
++

Have a customer service issue?

Personal Information (Optional)

First Name:

Last Name:

Email Address:

What brought you to crateandbarrel.com today?

Would you like to participate in future research efforts from Crate and Barrel?

Please choose one...
Yes  No
Coding data: used to represent information.
why do we use the codes?:
1. Codes are quicker to type in and quick to search.
2. Using codes reduces the sizes of files
3. Codes are often unique

Designing codes:

Certain points to remember when designing a coding system:
1. Codes should always the same length
2. Codes must be easy to use
3. Codes must be not too short

Example

The following code represents student details:
KENNE98120

<table>
<thead>
<tr>
<th>Digits</th>
<th>first five letters of name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5</td>
<td></td>
</tr>
<tr>
<td>6 and 7</td>
<td>year of birth</td>
</tr>
<tr>
<td>8 and 9</td>
<td>mouth of birth</td>
</tr>
<tr>
<td>10</td>
<td>if 1 male else female</td>
</tr>
</tbody>
</table>

Data capture: getting the information into a structure in which it can be processed by the computer.

There are various methods that can be used to putting the details into the computer.

Manual data capture
1. **Key to disk:** used if the number of students files is small. But if the number is 10000 for example, this could take too long.

   **Automatic data capture:**
   **So there are alternative methods of data capture:**

1. **Magnetic ink character recognition (MICR)**
   With this method you can detects character written in magnetic ink.

2. **optical mark reading (OMR)**
   With OMR the student would make marks on a form, a machine (optical mark reader) is then able to read the marks and convert them into characters in the student file.

3. **Bar code readers:**
   Are Suitable only for preprinted information.

4. **optical character recognition (OCR):**
   With OCR the computer scans a page containing text, looks at each character in turn and compares it with characters it has previously stored.

5. **taking order quickly:**
   For example when you typed post code and house number, provides all address details automatically related to this code.

   **Reading the Bar code:**
   A. First the bars must be linked to the data you want to capture.

   B. the Bar code can then be printed out using either an ink jet printer or laser printer.

   C. the Bar code may then be read with a scanner

6. **talking to your computer- speech recognition**
A speech recognition system usually consists of a multimedia computer with microphone, headset and special speech recognition software when you talk into the microphone your words are turned into commands or text on the screen.

☐ **Flood warning: an example of automatic data capture.**

The problem is that the river or any water could burst its banks at any time of day or night.

Solution: instead sensors are used to measure the water level. Sensor can send Radio link to the main computer, and if there is a danger of flooding, the emergency services can be alerted.

☐ **Automatic data capture using signals:**
Entering directly into a computer in a form of electronic signals, this data usually comes from sensors which produce a signal that depends on physical property.

Sensor: Small device contains Microprocessor used to obtain data automatically for instance.

Such as:
System to automatically monitor traffic flow along roads

Designing user interface
LOGO Instructions
Chapter 7  Checking data

☐ Reasons for errors: not accurate inputting data or incomplete receiving data.

☐ GIGO: garbage in garbage out.
☐ How are errors avoided?

1. **Verification**: method to checking that what is on the input document is exactly the same as what is entered into the computer.

1. **A. proof reading**.

Involves carefully checking what has been typed in against what was on the original document this is called proof reading.

B. **double Entry**: involves two people typing in the same data and only if the data is identical is it accepted for processing.

2. **Validation**: is the process of detecting any data that is inaccurate, unreasonable, this process performed by computer program. Validation program usually performed some or all the following types of checks:
   1. **character type check**:
      Make sure that:
      Right type of characters has been entered.

   For example: Only characters. No numbers.

2. **Range checks**:
   For example
If you have field box like this and this field programmed before to accept 5 characters only. If you have entered more than 5 characters, your data will be not accepted.

3. Presence checks:

There are a certain fields which must contain data and the system will not allow them to remain blank.

EX1: 07_____________
First two digits with any telephone number must be 07

4. Hash totals: (meaningless totals)

Suppose we had the following invoice

<table>
<thead>
<tr>
<th>Price</th>
<th>Item</th>
<th>Item name</th>
</tr>
</thead>
<tbody>
<tr>
<td>12345</td>
<td>1001</td>
<td>Erasers</td>
</tr>
<tr>
<td>12101</td>
<td>41001</td>
<td>wallet folder</td>
</tr>
<tr>
<td></td>
<td>66448</td>
<td>sellotape</td>
</tr>
</tbody>
</table>

Hash total

The Item numbers could be added up and input separately when the details of the invoice are keyed in.

--if the computer does not calculate this total----→that means not all the items on the invoice have been keyed in.

5. Control total:

Is like the hash totals except that the control has some meaning. For example the total of a batch of invoices has some meaning and could be used to check that all the invoices have been entered. Such as: total of unit price.

6. Check digit:
Additional number placed at the end of large original number, and it’s calculated from the other numbers. Suppose the following number keyed in the computer 0091729815

2. The computer removes the last number which is the check digits 009172981.

3. we now have nine numbers, working from the left hand side the first number is multiplied by 10 the second number multiplied by 9 and the third is multiplied by 8 ......... and so on.

\[0 \times 10 + 0 \times 9 + 9 \times 8 + 1 \times 7 + 7 \times 6 + 2 \times 5 + 9 \times 4 + 8 \times 3 + 1 \times 2 = 193\]

4. The total (193) divided by 11 (it is always divided by 11 and the remainder is note. 193/11 = 17 with remainder of 6.

5. The remainder then subtracted from 11

\[11 - 6 = 5\]

The result = 5 equal the number which we removed it so No errors.

7. spelling checkers:

Shah as word program or any program need to accurate text.

8. Custom dictionaries:

Also like MS word.

9. Length checks:

Some times a certain item of info is always of a certain length. So the length check will alert you to the fact that it has been entered incompletely.

10. Look up tables:
For example: Stock items are given unique code to identify them, whenever this code is used it is checked against a table stored by the computer to make sure that it’s a valid stock code, if the code is not in the table it is rejected.

11. Parity errors:
Suppose we have communication line

And we need to send the letter C along communication line.

ASCII code used to represent C is 1000011

** If number of 1's is odd → Odd parity is being used.

By adding 0 to left hand side of group of bits 01000011

Now the total for the byte is odd

** If the even parity were being used a 1 would need to be added so the total for the byte would be an even number

Now we know the method: odd or even

So if the first digit is 1
The number of 1’s must be even otherwise there is error.

And if the first digit is 0; the number of 1’s must be odd otherwise there is error.

Modems have a chip inside them to deal with parity checks.

- types of error:
2. **Transcription error**: May occur due misreading or mistyping data like 5 with letter S or 0 with 0.

2. **Transposition error**: Occurs when two digits or and letters are swapped around 5124  --------  5214

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Chapter 8 **Data base**  How data is stored

- **Basic Definitions**
- **Database**: A collection of related data.
- **Data**: Known facts that can be recorded and have an implicit meaning.
- A software package/ system to facilitate the creation and maintenance of a computerized database.
- **Database System**: The DBMS software together with the data itself. Sometimes, the applications are also included.

**Typical DBMS Functionality**
- Define a database : in terms of data types, structures and constraints
- Construct or Load the Database on a secondary storage medium
- Manipulating the database : querying, generating reports, insertions, deletions and modifications to its content
- Concurrent Processing and Sharing by a set of users and programs - yet, keeping all data valid and consistent

**A Database program lets you:**
- **Store Information**
  A database stores lists of information that are related to a particular subject or purpose. A database stores personal information or business information, a database is also makes it easy to update, organize, and delete information.
- **Find Information**
  You can easily and instantly locate information stored in a database.
- **Analyze and Print Information**
  you can perform calculates on information in a database.
For example, you could calculate what percent of your total sales comes from the state of Texas. You can also present information in a professional-looking printed report.

- **Manage Information**
  Databases make it easy to work with and manage huge amounts of information.

- **Share Information**

  Databases usually consist of several parts. A Microsoft access database may contain up to six different database object types as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tables</strong></td>
<td>Tables store a database’s data in rows (records) and columns (Fields).</td>
</tr>
<tr>
<td><strong>Queries</strong></td>
<td>Queries ask a question of data stores in a table. E.g. query might only display customers who are from Texas.</td>
</tr>
<tr>
<td><strong>Forms</strong></td>
<td>Forms are custom screen that provide an easy way to enter and view data in a table or query.</td>
</tr>
<tr>
<td><strong>Queries</strong></td>
<td>Queries ask a question of data stores in a table. E.g. query might only display customers who are from Texas.</td>
</tr>
</tbody>
</table>

**Components of a Table:**
A field: a specific type of information, such as a last name of your employee.
- **A Field Name**: A name that identifies the information in a field.
- **A record**: A collection of information about one person or thing.

**Data Types:**
- **Numeric**: which means it contains only numbers.
- **Character text**: numbers, letters and other symbols can be entered.
- **Date/Time**: Date and time is entered.
- **Boolean / logical**: which allows Y/N or T/F

**Data types in access:**
1. **Text**: Stores text, numbers, or a combination of both, up to 255 characters long. Text fields are the most common of all data types.
2. **Memo**: stores long text entries - up to 64,000 characters long (equivalent to 18 pages of text). Use memo fields to store notes or anything else that requires lots of space.
3. **Number**: stores numbers that can be used for calculation.
4. **Date/Time**: stores dates/times or both.
5. **Currency**: stores numbers and symbols that represent money.
6. **Auto number**: Automatically fills in a unique number for each record. Many tables often contain an auto-number field that is also used as their primary key.
7. Yes/No: stores only one of two values, such as yes or no, true of false.
8. OLE object: stores objects created in other programs such as a graphic, excel sheet, or work documents.
9. Hyperlink: stores clickable links to files on your computer or on the network of to WebPages on the internet.
10. Lookup wizard: a wizard that helps you create a field whose values are selected from a table, query or a preset list of values.

A criteria:
A criteria is used to display a certain type of information on your query taken from the table. E.g. display only USA countries.

Criteria And OR rows defines one or set of limiting conditions.
- To define condition with AND insert the criteria on the same row.
- To define the condition with OR insert the criteria on the first and second row.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>=”MN”</td>
<td>Finds records equal to MN</td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>&lt;&gt;”MN”</td>
<td>Finds records not equal to MN.</td>
</tr>
<tr>
<td>&lt;</td>
<td>&lt;10</td>
<td>Finds records less than 10</td>
</tr>
<tr>
<td>&lt;=</td>
<td>&lt;=10</td>
<td>Finds records less than or equal to 10</td>
</tr>
<tr>
<td>&gt;</td>
<td>&gt;10</td>
<td>Finds records greater than 10</td>
</tr>
<tr>
<td>&gt;=</td>
<td>&gt;=10</td>
<td>Finds records greater than or equal to 10</td>
</tr>
<tr>
<td>BETWEEN</td>
<td>Between 1/1/99 AND 12/31/99</td>
<td>Finds records between 1/1/99 and 12/31/99</td>
</tr>
</tbody>
</table>
| LIKE     | Like “S*”  | Finds text beginning with the letter S. you can use LIKE with wildcards such as *.

Sorting a Query:
Tables normally display records in the order they were entered. Instead of working with table’s jumbles record order, you can create a simple query that sorts the table information and presents it in an ordered, easy-to-read display. You can sort
records alphabetically, numerically, or chronically (by date) in ascending (A to Z) or descending (Z to A) order. You can also sort by multiple fields.

Chapter 9 Types of computer operations (processing)

1. Real time processing:
The system is automatically updated when a change is made due to transaction accruing.

Used when you want up-to data system such as travel agency and many shop system, computer control traffic lights, robots, air traffic, control system, on-line cinema seat reservation.

**Advantages with real time system:**
The current situation is always being shown.

2. Batch processing (doing all processing in one go):
Collecting all the inputs together and putting them into the computer in one go batch.

Used when a particular job needs to be done such as preparing a company’s payroll, recording the temperature in an experiment.

**Multitasking and multiprogramming:**
Allow the computer to work on several programs at the same time.
3. Transaction processing:
Demand processing is usually performed on individual item of data

Ex: monthly-paid employee, instead of waiting for the payroll to be done.
- Step by step processing

Multi-access and time sharing
- Time sharing: many users can have access to the same data apparently at the same time.

Connections are made
Very quickly so that it seems
That each user has sole use
Of the CPU
For Example:
For instance, in the airline booking, other travel agents could be using the same airline database at the same time.

Multi user system give impression that she is the only one using the computer. In fact the computer serves other people during the time she takes to press the keys.

Multi access: allow many terminals (screen with keyboard) to access the CPU.

Chapter 10
Data Transfer

ASCII: ASCII stands for American standard code for information interchange and is a code for representing characters (letter, numbers)

Comma separated variables: (CSV)
This file format can be read by most spread sheets and databases.

File handling package:
Are files that hold a series of instructions that enable a computer to perform a useful task.
For example:
- A file used to hold drawing you have drawn using a paint package
- A file used to hold paragraphs or text you have written using a word package

**Backing storage:** devices such as disk drives are able to store files outside the CPU.

**Data/file compression:**

It’s used to reduce the size of any file using special software.

<table>
<thead>
<tr>
<th>Compress</th>
<th>Decompress</th>
</tr>
</thead>
<tbody>
<tr>
<td>File → zip, RAR file</td>
<td>File ←</td>
</tr>
</tbody>
</table>

**Digital and analogue computers:**

Digital quantities have values which jump from one to the next without any "in between" value.

An on/off switch on a radio is a device that could be as digital device because there is no state between on and off

**Analogue quantities:**
Quantities which have infinite number of values.
Such as temperature, since it can be 10, 10.01, 10.008, 10.07, 10.00009 °C
Also Sound is an analogue waveform
Very important examples in page 81

**Analogue to digital conversation:**
There are two devices

ADC: analogue to digital converter
And
DAC: digital to analogue converter.
Modem is ADC and DAC

Chapter 11 ways to represent your data

You can present computer output by:

- screen display
- hard copy i.e.: printouts on paper
- multimedia presentation: (sound, text, picture, charts)
- virtual reality:
  The user can be as near to the real thing as possible by
  wearing headset and gloves
- sound

(MIDI)
Stands for musical instrument digital interface.

There is software and hardware that are designed to send electronic
message to MIDI Devices such as keyboard and drum machine

RAR:
Roshal Archive

Chapter 12 How to Describe an information system

Information system
**System:** is a group of connected operations or things

![Diagram of processing steps]

(Steps) of processing

Diagram like this doesn't tell us so much

**Structure diagram:**

Drawn tasks can be used to describe information system.

Each of these tasks can be broken down into smaller tasks. This way of describing tasks is described as the top down approach.

Example:

Doing the weakly shopping → this task is then divided up into a series of tasks required to do the main task.

![Task diagram]

They are performed in this Order
Structure diagram for doing the weekly shopping

Structure diagram for to make a roast dinner

Data flow diagrams:
Are used to consider the data without bothering about the equipment used to store it and are used as a first step in describing a system.

Four symbols are used:

1. The box:
The box is either a source of data, such as an order from customer, or part of the system which uses or consumes the data.

2. the sausage: or circle used to denote a process performed on the data

3. Open rectangle: represents the data store, this is where the data is held.

4. the arrows: used to show how the other symbols are connected
The data flow diagram for adding a new video to the library
The data flow diagram for students registration

System flow charts:
Is a diagram which given an overall view of system. It shows the task that are performed on the data, such as sorting, or updating, and also shows the type of media (Magnic disk, tape) used to stored data.

Main Symbols used in systems flowchart
Terminator – Indicates the beginning or ending of a process and links to other related processes.

Process Step – Describes a procedure or activity.

Data – Defines data that are required to support a process step.

Decision – Describes a decision point in the process and the subsequent process steps that depend on which option is selected.

Connection – Connects and shows sequence of process steps using arrowheads.

All Symbols used in systems flowchart
Figure 12.12
System flow chart for a simple database system in your book page 92

Example of System flow chart for control systems

Hints:
If you want to use the database in your system, (registration systems, and information system) your system flow chart for this system must contain the transaction file and master file.
Transaction file: are used to hold temporary data which is used to update data the master file.

Master file: file used to hold permanent data.

For each transaction file there are two processes (validate and sort)
Performed by programs for producing sorted transaction file.

Sorted transaction file together with the master file by special program are produce updated master file.
Also with any validation process there is report error.
Systems flow charts for processing the bills file: 93

System flow charts for payroll system page 94.
Chapter 13 System Analysis

The steps involved in system analysis are:

1. fact finding
2. feasibility study
3. an analysis phase
4. system design
5. Implementation.
6. testing
7. documentation
8. evaluation

1. **Fact finding or info gathering** is concerned with finding and gathering about the existing system: by the following ways.
   a. interview people
   b. Questionnaires
   c. Observation (observe how the job is done) final step in fact finding is to produce report which describes the existing system

2. **feasibility study**
   Study the ability to solve a particular problem at reasonable cost

   At the end of study, feasibility report is produced
   Feasibility report should include the following page 99

3. **Analysis phase**: using feasibility study to design new system.
   In the analysis phase, the charts (system flow charts and data flow diagrams) should be drawn.

4. **System design**: what inputs, processes, and outputs will be needed.
A. Outputs
   1) what output is needed
      - An invoice which is send out to each customer
   2) A copy of invoice to be sent to the accounts office
   3) Dispatch note to be sent with the goods.
   4) Screen display

B. Inputs:
   1- where does the data come from
   2- what data needs to be input system
   3- Too much data needs to be entered
   4- Which input devices should be chosen

C. Data preparation: involves getting the raw data into a form
   that can be processed by the computer

   Verification and validation are used for data preparation.

D. Code design:
E. File design: we need to design how many files are needed
F. Hardware configuration:
   □ if more then one computer is used (network)
   □ includes deciding on the type of computer, peripheral
      device

G. Software used: deciding what software to use.

5. Implementing: (introducing the new system)
   Using any programming language to writing the code and
   design an interfaces.
Types of Implementation:
a. Direct Implementation:
This method is only used for small computer program this
implementation is performed by one programmer.
- all jobs being introduced in one go

b. Phased implementation: each job is introduced separately
rather than all jobs being introduced in one go.

C. parallel running:
- The new system is run alongside the existing system
- If the new system fails, then because we still have the
old system, we can use it until the problems are sorted out.

6. Testing the system:
Test the system by using the following
1/ regular data to produce list of errors
2/ insert very large amount of data
3/ test all the tasks
4/ insert extreme data to make sure range of checks
included in the validation.

7. Documentation:
Types of Documentation:
A. User Documentation (user guide) (manual): includes
instructions describes:
- how to load the software
- how to perform certain functions;
Such as: how to save or print.

b. Technical documentation:
- used to explain a system specialist
- this Documentation will be needed when the system is
improved or upgraded

8. system evaluation
Last stage used to make sure that it is still meeting its objectives.

Used by asking the users of the system:

How they find the new system?
Is all the requirements has been covered?

Chapter 15  
Networks

Network

Network: is a series of computer systems that are linked together so they are able to share compacting power or storage facilities.

- Local area network (LAN): are confined to a small area, such as single building or building at the same area. Ex (our computer lap)
- Wide area network: cover a wide geographical area such as banks and building societies may be linked together in different countries by satellites, micro waves or telecommunication links . (internet)

Advantages of network:

1. Expensive peripheral devices such as printer and scanner can be shared
2. Messages can be sent
3. All users can access to same files
4. Network software can be purchased which is often cheaper than buying an individual package for each machine
5. Data and software can be stored centrally which makes them easier to maintain and back up
6. User can easily be prevented from accessing these files

Disadvantages page 118

Network topologies: line (bus), Star, Ring, and hierarchical

1. Ring topology:
The terminals are connected in circle one of the main disadvantages in the ring topology is that if there is a break in any part of the communication line then all the devices will be affected

2. Line (or bus) topology: the data is sent to all the devices on the network at the same time
   - If terminal is not working properly other are not affected
   - Cheap and reliable
3. Star topology:
   There is a computer at the center that used to control the whole of network, if this machines break down then the whole network breaks down

4. Hierarchical networks (client server network):
one or more computer are more powerful than the rest
its called client- server network
the powerful computer is called server
there are two types of server

1. Print server: this server has a printer connected, to manage all the print requests from the users.
2. File server: used for managing the files on a network.

Modems: short for modulator-demodulator, allow data to be passed along telephone lines from one computer to another by convert digital signals to analogue signals.

The bits which make up a network.

Software: can be any operating system or special software for managing networks (windows server 2003)
cables: or radio or microwares to provide a link
Connectors: are used to contact network cables to other devices. Such as RJ 45 (used to connect network card with the router)(RJ=(Registered Jack))
network card:
Its like a small circuit board, connected with mother board.

Data transmission: (communication lines)
Data is transmitted as signals (which can be electrical or light signals)

Cable media:
1. metal cable: consist of metal wires (Usually copper)
2. Fiber optic cable: works by transmitting data as a series of pulses of light along a thin glass fiber.
   • Very fast
   • do not suffer from interference like metal cables
3. Wireless media:
   With wireless media, electromagnetic waves provide the medium (a carrier signal).
There are several ways of transmitting the data, using different wave length ranges:

- **A. Radio waves:** the data is transmitted as a series of radio waves
- **B. Micro waves:** the data is sent contained in micro waves
  - mobile and satellites are use microwaves
  - long distance
- **C. infrared:** this works a bit like your television remote control
  - short distance (from lap top to printer or to desktop computer)

**Data transfer speed:**

Measured in Kbits/s

- is the speed at which data is transferred between a server and terminal.
- If the speed is slow:
  3. the response will be slow
  4. the response maybe will be not right away

Download time: is the time to transfer a file from the server to the terminal

**Networks security:**

The difference between a password and user ID

- A user ID: is number or name that is unique to a person using the network, *this ID tell the operating system that a certain person is using the terminal*
- Password word: is a string of characters (letter and/or numbers) which are used to *authenticate the user to the system.*
  
- Access rights
Are a facility offered by most organizations network software, they enable certain rights to be allocated to files and users.

- **ISDN** (Interacted services digital network)
  Is a service provided by the telephone communication companies that enable ordinary telephone lines to carry digital communication.

  **Video conference:**
  Transfer files such as video to another person at the same time holding a telephone conversation with them.

- **ISDN versus modem:**
  - Modem: convert digital signals from the computer into analogue signal.
  - ISDN does not need a modem, instead an ISDN terminal adapter is used
    So the connection and download to any site will take less time by using ISDN

- Deciding when to use ISDN or a modem:
  - The required speed of data transfer
  - The amount of data to be transfer

- **Message sending:**

  There are standards for communication of PCs which enables communication between all the components this is called open system interconnection (OSI)
  Such as:
  **Protocols:**
  Protocols: set of rules that controls the communication.

  **Handshake:**
Is the exchange of signals which establish the communication between devices, a computer should do this operation before sending any data.

**Get way:** special program use to translate the protocols between computers to be able to communicate with each other.

**File compression:**
Is the process of condensing repetitive information. It's used when sending data through a telecommunications link, performed by special software like Win RAR program.

**Speed of access:**
Speed of Surfing on the web depends on:
1. The speed of your modem and receiver’s modem.
2. Types of cabling also influence the speed, with fiber optic cable being much faster than metal wires.

**Bandwidth:**
Sending data along communication line is like trying to get water through a pipe; through thin pipe the water will be slower.

The bigger bandwidth makes high speed of flow data.

Bandwidth is determined by the medium through when the data is transmitted.

**Cost of installation for any network depends on:**

1. Terminals cost (PC's)
2. Server cost
3. Cabling cost wires is cheaper than fiber optic which is most expensive.
4. Network card (Ethernet card) each terminal usually has its own network card.
5. Software.
6. Back up devices like tap streamer or external hard disk.
7. The cost of modem or ISDN adapter.
8. Internet service provider (ISP) if the access to the web is needed.
9. Telephone or other communications charges
10. Connectors
11. Cost of software installation (administrator cost), and cost of network maintenance.

**EDI**

**Electronic data interchange:**
Many companies are using system called electronic data exchange, which link them to their banks so that they can make immediate payments to their suppliers electronically.

It’s like special connection

Now you should solve all the following questions.

Questions (Page 116)
Questions (Page 116)
Questions (Page 123)
Questions (Page 123)
Test Yourself (Page 126)

Things to do (page 127) is Homework

**Chapter 16  System Security**
Computer security: Is taking care of software and hardware And data.
Types of hardware security: - Physical security and software security.

- Physical security: Taking care by using equipments. It’s used to protect from physical harm such as fire, water damage, etc.

Computer theft:
Preventing computer theft: Page 130

Protection from fire: By using
1. Fire proof.
2. Smoke detectors.
3. Gas flooding system.
-Protection from dust and extremes of temperature:
Air conditions must be used.

- software security:
  
  1) **Antivirus software:**

  **Viruses:** Are programs to disrupt the sensible use of computer.
  Viruses are able to spread by infecting other disks (or any memory) which are used by the computer.

-Avoiding viruses: Page 131

  1. Don’t buy second hand software, unless you scan it first.
  2. Check your computer for viruses.
  3. Don’t download software from bulletin board.
  4. Be careful of all free software, these have sometimes viruses on them.
  5. Try not to use too many of computers.
  6. On your own machine, install updated antivirus software.

  2) **Backing up data:**
It means taking a copy of the data and keeping it a way from the computer in secure place.

3) **Protecting your files:**

By using the following methods:
1. Using User Name and Password.
2. **Encryption:**
   Convert the data from its format to another format (Code)
   It’s usually used when data is transmitted from one place to another.

- The difference between security and integrity:
  - **Data integrity:** It’s concerned with the correctness of data.
  And avoiding the errors by using the validation and verification.
  **Chapter 7**
  - **Data security:** Is concerned with keeping data safe from anything, maybe it will destroy it.

- **Transaction logs:** Its set of operations or actions (Each bit of business is called a transaction)

**Ex:**

- 1. Entering account details.
- 2. Add money to your account (Credits).
3. Transfer money from your account

All these Actions stored in transaction logs file

Test your self page 134

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Chapter 20 Controlling Things

When the people think of computer they usually think of them used in offices and administrative purposes.

They are other things that the computer can do:

They can used to control things.

Robots:

Robots are used in factories because they can reduce cost and improve the quality of the finished products.

A robot may be defined in the following ways:

1. An industrial robots:

   Is a reprogrammable, multi-function manipulator designed to move material, parts, tools and they have other tasks.

   For example it could be use to spray paint or welding body panels.

   An industrial robot may be considered to three parts:

   1.1 The manipulator:

      This is the moving part
1.2 The power supply:
For robots that need a lot of strength this will be a compressor, which will work the hydraulic system

1.3 Controlling computer:
They comes with something called an interface, this interface used to compensate for the difference in the operating characteristics (E.g. speed, codes, instructions, etc) of the peripheral units and the computer. That means you can control your machine (industrial robot) by using its interface.

Robots on the move:
When the robots start move from place to place there are several problems to solve:

1. How are robots able to navigate themselves?
   - Tracks are provided which are set into the floor and the robots follow these. This type of system is used in factories.
   - The robots also keep a record of distance they have traveled and the angles they have turned.
2. How do the robots avoid colliding with each other and with the objects?
On each of the robots there is an ultrasonic detector which emits a beam infrared radiation. If anything gets the way of the beam the robots just stop.

3. How is the power provided?

Power are usually provided by batteries, When the batteries need recharging the robots goes automatically to a place where the batteries can be recharged. Such as:
Restaurants and human being

Computers in control:

Using Sensors:
Sensors are used to detect various physical quantities Such as temperature, pressure, sound, light, distance, intensity ...etc.

Types of sensors:
1. Light sensors:
Used to detect low light levels so that street lighting is turned on

2. Push switch:
Used to detect any door is open or closed for taking new action Such as if fridge door is opened then the light is switched on.

3. Temperature sensor:
Such as central heating systems
To keep the temperature of houses constant.

4. Sound sensor:
It's used to record level of sound.
5. Proximity sensor:

Is made of two halves. If the halves are moved away from each other then the signals (alarm) is activated. You often see these sensors on windows and doors.

6. Position sensor:
Used to detect angle of spindle. Its could be used to feed back the position of robot arm.

7. PH sensor:
Used to determine a solution is basic or acidic.

8. Humidity sensor:
Used to determine the amount of humidity present (in the air or soil)

Question page 165

Buffers:

Special store area used to store temporary data or commands To compensate for any difference in speeds

Such as printer’s buffers:

If you made order to print 5 pages on very low speed printer (dot matrix) then you turned off your computer, the printer will continue printing 5 pages although the device is off. Because they are (printers) have small memory called buffers.

Or

Key board’s buffer
When you type quickly there is a buffer to store the ASCII code for each character before sending it to CPU.

**Actuators:**

Actuators are used to convert computer signals into movement. Some devices such as motors are considered to be actuators in their own right.

**Stepper motor:**
Is a motor which turns in a series of small steps. Used in robot arms

Using sensors in hospitals:
The medical condition of patient in an intensive care unit can be continually monitored using sensors connected to the patient respiration, blood pressure, temperature and electrical activity of the heart. And pulse can be all measured by sensors. And the computer is used to continually monitor the results from the sensors. For taking any action if up normal something happened.

**Disadvantages of using sensors in hospitals:**

Every thing depends on computers so if any thing happened (power failure, wrong readings on the interface)

Patient will be close to grave

**Process control:**
Process control is used in nuclear power stations oil refineries and in the chemical industry
Various sensors are used to relay electronic signals back to computers

Any control system must use real time processing, why?

To be able to respond instantly to any variations

The advantages of computer control include the following:

Page 166

Disadvantages:

Page 167

**Pseudo-code:**
Writing instructions in ordinary English before these are translated into a language that the computer can understand it.

Using pseudo code you start at the highest level by writing a list of the tasks that the program must perform. You can then refine the program by making it more structured

Such as:

**Wash the dishes**

Then main task (highest level) be broken into sub task

Collect dishes
Take to the sink
Fill sink
Add small amount of washing-up liquid
Wash dishes
Put on the drainer to dry
Dry hands
Dry dishes with cloth
Put dishes a way

Also each of these sub tasks could be broken down
For instance 'fill sink' could be broken down into the:
Put in the plug
Turn on the hot tap
Turn off the hot tap
If the water if too hot
Turn on the cold tap
Turn off the cold tap

There is nothing that tells you when you should turn off or turn
on the cold tap, also it does not cover the situation where the
sink is about to overflow so we need to refine this program to
take into account these situations

If water in the sink
Put out plug
Wait for to drain away
End if

Put in plug
Turn hot tap half on
Turn cold tap half on
Do until water is deep enough

If water is too hot
Turn down hot tap
Turn up cold tap
End if

If water is too cold
Turn down cold tap
Turn up hot tap
End if

End do

**Computers in greenhouses:**

Sensors are used to keep the environment constant. Such as the temperature and humidity sensors are used to keep humidity and temperature constant.

**How:**

**Humidity sensors**
If the humidity falls:
1. Humidity sensor will send signals to a computer.
2. The computer will operate a motor to close any open windows, and then switch on the pump for a certain period, which will spray water inside the greenhouse.
3. An increase in the humidity will cause the windows to open. At the same way.

**Temperature sensor:**
If the greenhouses get too hot, the window are open.
If it gets too cold, the windows are closed and the heater switched on.
Data logging:

Data is often collected automatically over period of time then processed later. You may have seen pressure sensors which look like thick wires placed across the road to record volume of traffic passing. These sensors connected to black box, this box is called a data logger.

There are two main types of data loggers:

1. Data loggers with permanent computer connections:
   These data loggers take readings and then send them to the computer via wires or an electronic signal.

2. Data loggers with temporary computer connections:
   The readings are stored by the data loggers then at a later data loaded into the computer.

Data logging has many advantages:
1. It can perform 24 hours per day 365 days per year.
2. It is possible for processing to be carried immediately.

(Only with type one)
Chapter 21 Computers and your health

There are many problems that can occur when you are working with computers for long periods:

1. **Repetitive strain injury (RSI):**

RSI is caused by the joints in the fingers constantly being pounded by typing at high speed.

Good keyboard design, good typing technique and frequent breaks can help prevent RSI from accruing.

2. **Eyestrain:**

One way of avoiding eyestrain is to look at distant object now and again. Why? Homework.

3. **Reproductive hazards**

VDUs like a lot of other electronic appliances, give out radiation when they are working. This radiation may be affect pregnant women who have been using VDUs for along periods.

**Protecting the workforce:**

1. **Inspections:**
   
   For desks, chairs, computers, to make sure that they reach the required standard

2. **training:**

   Employee should have training on heath and safety matters

3. **job design :**

   should be designed so that the worker has a periodic breaks or change of activity when using a computer.

4. **eye test:**

   regular free eye test

**Minimum requirements for computer system : page 174**

1. Display screens ----------------------------→ software and heat
Things to consider when designing an office: page 174

Chapter 23 Simulations Almost as good as the real thing

Read pages 183 - 188

Then write summary of three lines for each of the following:

Simulation, Model, 3D modeling, Game, Model builder, Expert system, Expert builder, Flight simulators:

**Simulation:** is the imitation of some real thing, state of affairs, or process. The act of simulating something generally entails representing certain key characteristics or behaviors of a selected physical or abstract system.

Simulation is used in many contexts, including the modeling of natural systems or human systems in order to gain insight into their functioning.

Other contexts include simulation of technology for performance optimization, safety engineering, testing, training and education.

Simulation can be used to show the eventual real effects of alternative conditions and courses of action.

**Game:**
Many computer games are simulation. For instance, when you play a football game on your computer you are simulating a real game.

**Types of simulations without using a computer:**
Real time: where things happen at the real speed.
Non real time: where things happen slower than they would do in real life.
Model: Consist of a set of equations which describes the behavior of process or objects. In a computer model, we use the computer to solve these equations so that we can carry out a simulation.

An equation for part of the economic model might be:

Unemployment = people doesn't able to work - people working

3D modeling:
Are often set up by architects and design engineers to see what a finished building or product will look like before it is built or produced.

By Using CAD and 3D models for produce three dimensional views.

Model builder:
Is very useful software package used to design and build models.

You can use MS-paint to design illustrations for model

Models you can make include: page 185

Expert system: are programs that mimic the intelligence or human expert in a specific field of knowledge.
An expert system is software that attempts to provide an answer to a problem.
Such as expert system that give medical advice.

Medical advice system has database contains details information about symptoms of each disease.
These systems allows matching between the symptoms of patient which you entered and the records (database) for looking for disease name then produce the prescription.

Expert builder:
Is another package that enables you to construct logical diagrams of your knowledge for create expert system.

Flight simulators:
Airlines find it very expensive to tie up air-craft for the training of pilots so they used simulators instead.

### Chapter 25 Computer Applications

1. **The police national computer (PNC):**

This application can provide rapid access, day and night, to information of national as well as local significance to all force

This application has database contains details information such as:

A. Stolen and suspect vehicle index.
B. Vehicle owner index.
C. Names index.
   - 1. Person convicted of serious offences.
   - 2. Wanted persons.

2. **Using 3D modeling to help to solve crime:**

This application used to produce a picture of what the person might have Look.

3. **Electronic security camera:**
4. **Laser scanning system (barcode).**

Benefits of the system to the customers and system page 202 to 203

5. **EFTPOS and the use of debit card:**
   Stands for electronic funds transfer at point of sale.

6. **CAD applications.**

   Computer aided design used to plan and design new stores or buildings CAD is also able to show three dimensional views.

7. **Warehouses systems:**

   computer are used in the Warehouses to monitor and control stock procedures.

8. **Electronic mail:**

   Benefits or advantages of electronic mail: page 205
Information Technology and medicine:

1. Organ transplant:
Computers are very good for looking at and comparing lists. When a person dies and their organs are denoted, the computer can be used to match and identify a patient to receive them.

2. Intensive care:
Computers are used to monitor instruments which record important data about the patient, if the data move outside certain limits, an alarm is sounded.

3. Keeping patients' record:
Computers can be used to provide a complete, accurate, up to date and readily available source of information about patients' health at any time.

Information technology and banking:

List of topics that have been covered elsewhere in the book:
- MICR (magnetic ink character recognition)
- EFTPOS (electronic funds transfer at point of sale)
- EDI (electronic data interchange)
- EFT (electronic fund transfer)
- Smart card
- Credit card

1. Cheque clearing:
Subtracted (debited) from account and added (credited) to another account is called Cheque clearing.

2. Bankers' automated clearing services (BACS):
All processing transactions: such as monthly salaries and payments that are performed in banks.

3. ATM (automated teller machines):
You can use it for:
- Get cash out
- Find out the balance in your account
- Change your PIN (Personal Identification Number)
- Make deposits (i.e. put cash, cheques or both in your account)

Benefits to the customers and banks in using ATM:
Page 211

Traffic control system:
The main aims of traffic control system are:
Page 211

Weather forecasting and Pollution monitoring self reading

Chapter 26 The Internet

When you connect up your home computer to the internet you need two things:
1. modem
2. ISP

Internet service provider (ISP):
An Internet service provider (ISP), also sometimes referred to as an Internet access provider (IAP), is a company that offers its customers access to the Internet. The ISP connects to its customers using a data transmission technology appropriate for delivering Internet Protocol, such as dial-up, DSL, cable modem, wireless or dedicated high-speed interconnects.

ISPs may provide (services):
1. Internet e-mail accounts to users which allow them to communicate with one another by sending and receiving electronic messages through their ISP's servers

2. Download services.

3. Access to on-line shopping, news, weather, and sport.

4. Instant Message (such as any messenger program):

5. Access to the internet.

Content providers:

Companies that are create and maintain material that can be accessed using the internet.

Sometimes provided free, but a lot of providers charge a subscription

Content may include:

1. TV program listings

2. News and weather details

Many internet service providers are content providers.

World Wide Web (WWW):
Is a part of the internet where graphic, sound, video, and animation are used, as well as text.
The word used for this mix of media is 'hypertext'

Special hypertext links are built into World Wide Web that allows the user to move around by clicking with a mouse on words or graphic on the screen.
Special software is needed to take full advantages of WWW called **browser software**.

Such as:
Internet explorer, Netscape, Opera and Mozilla Firefox.

**Website:**
Collection of web pages that is stored in host servers.

**Website host:** computer permanently connected to the web used to store files and send files to the other sites

**Electronic mail:**
Read the paragraph page 219 then answer the question at the same page.

**Writing e-mail off-line and on-line:**

1. If you want to write an e-mail message you can simply login to your email package software like (yahoo mail) and write it. In this case you are said to be writing the e-mail on-line.

   In this case e-mails are usually short,

2. If you want to write a long letter you should use your word processor to write it, check it then save it.

   Finally you need to attach the document file to the e-mail.

   This is off line mail

**Address book:**
Contain names and mail addresses for all the people that you have their Emails.

**Mailing lists:**
Are list of people and their e mail addresses, they are used when a copy of e mail needs to be distributed to people in a particular group.

**Is Email private?**

Read the paragraph at the top page 221 then answer this question.

**Advantages and disadvantages of using e mail:**
Page 221

Some internet terms and other aspects of the internet:

**Web browser:**
- Is a program that allows access to the World Wide Web (WWW)

**Web server (website host):**
Is a computer that contains the information that users of the internet can access using their web browser. This server needs to be connected to the internet at all times so that users are able to access the information at any time.

Communication features common to the net software (browser software):
1. The ability to store links (favorites, favorite places or book- marks)
2. History:
A history list shows all the sites/pages that you have visited in the sequence you visited them.
3. Navigation buttons:
Next
4. Cache (temporary pages) or (cookies):

This is storage area on your hard drive where some text and images from web pages are stored so that they load quickly when they are re-visited by you.

There are three ways to find your way around the internet:
1. By typing in the web address. But you should know the web address.
2. by surfing the internet. Means: rapidly moving from one web page to another to find something.
3. by using special program called search engine:
   Such as: Google Yahoo Alta vista

Features of common Internet services:

Here are some of the main features of Internet services:

1. World Wide Web (WWW):
The World Wide Web is the multimedia branch of the Internet. Using the web, the user is able to view text, graphics, video and sounds.

   The user is able to use links called hyperlinks to move between web pages or webs sites.

2. Newsgroups
Newsgroups are text-based discussion groups for person who has similar interests. Newsgroups allow people to ask questions and hopefully receive answers from others.

3. Chat rooms

You will probably have used chat rooms. They are an ideal way of talking to people from around the world without leaving your home.

4. Services over the Internet, such as radio, video and music:

It is now possible to hear a radio programme over the Internet.

5. Services available through interactive digital television:

Interactive digital television brings television together with the latest computer and communication technology. Interactive digital television allows users to interact with the broadcaster and also allows the viewer to use television in new ways.

6. Services available through cellular mobile phones:

As well as the normal mobile phone services (phone conversations, text messaging) some mobile phones are capable of Internet access using a special protocol (i.e. set of rules) called WAP (wireless application protocol).

7. Advertising:

Often websites have links to other companies’ websites; when a person buys goods or services, the original website gets a small amount of money.

8. Customer support:
Customer support is the backup provided once a product or service has been sold. For example, if you buy a new scanner and cannot get it to work, you could access a website which tells you what you are doing wrong.

9. Distribution of software:

Software companies are able to send you software over the Internet.

10. E-commerce
This basically means conducting business electronically, over the Internet.

Advantages and disadvantages of the Internet as a source of information:

Advantages

1. You can access the Internet from anywhere and a huge amount of information is provided to you from all over the world.

2. Information is up to date.
3. Multimedia can be used. Information can be presented in the most interesting way possible, using video clips, animation, sound, etc.

4 You can access huge amounts of information. Encyclopedias, dictionaries, newspapers, magazines and many research papers.

5. Search engines are available to help you find the information.

6. Using e-mail you can access experts all over the world on certain subjects.
If you have a question about something on a website you can send an e-mail to its author and they can send you their reply using e-mail.

**Disadvantages:**

- The equipment and connection needed are relatively expensive. Computers, modems (or ISON adapters), telephone and/or Internet service provider (ISP) costs must all be met. The costs, however, are decreasing quite rapidly.

- You need some knowledge to perform searches successfully.

**E-commerce**

What is e-commerce?

E-commerce is selling goods or service over the Internet, as opposed to using traditional methods such as buying goods or services from shops or trading using the telephone.

**How could it change the way we shop?**

More and more people are able to access the Internet via their computers, special television sets, telephones or mobile phones. All these users will now be able to take advantage of e-commerce to buy their goods and services cheaper and more efficiently than before.

As well as needing the hardware and software to access the Internet, the user also needs a credit card to pay for purchases.
The battle for customers; shopping traditionally or shopping using e-commerce:

In the battle for customers e-commerce means some businesses will lose out while others gain business.

**Losers:**
- Some traditional shops may have to close
- Companies who fail to get involved in ecommerce will see lower profits.
- City centers may become deserted as shops close down.
- The gap between richer and poorer members of society may widen as the richer take advantage of the savings made by shopping on-line.
- Society in general may lose, as more people choose to interact with computers rather than people.

**Winners:**
- E-commerce sites have made some people wealthy.
- If many goods are delivered straight to customers’ homes, there is a huge increase in the number of staff employed by the delivery/postal companies.
- Those people employed to set up websites, such as programmers, etc. will be in great demand.
- Criminals may more easily take advantage of anyone off their guard when divulging credit card details.
- People with mobility problems
- The users of e-commerce sites could find it hard to decide whether a site is a reputable one.

Advantages of shopping on-line:
Shopping on-line has many advantages over more traditional ways of shopping, which include the following:

1 On-line catalogues can be viewed. Products can be searched for by a large number of criteria.

2 There is a much bigger choice of products.
3 Product reviews can be obtained before you buy. For example, you can see what previous buyers say about a book before you buy.
4 Orders can be placed on the Internet at any time of the day or night, on any day of the year.

5 You can buy software over the Internet and receive it by download it.

6 Goods or services are usually cheaper on the Internet.

7 There are programs that can search for the best price for a certain product.

8 You can buy goods from anywhere in the world.

Aspects of the Internet and other ICT developments that affect society:

Citizenship:
Citizenship means the development of social and moral responsibility, participation in community activities and the development of political thinking.

Negative aspects of the Internet:

1. Hackers
Hacking means gaining access to a computer system illegally; the people who do this are called hackers.
Even the most secure computer systems (such as the US Defense Department computer system at the Pentagon), have been successfully hacked into.

2. Breaches of copyright (copying games, software, music)

Just because material is on public display on the Internet does not mean that you can copy and distribute it. Some of the material is copyright free, but the majority is owned by someone, who is said to own the copyright in the material.

3. Pornography:
There are many pornographic images and videos on the Internet. There are laws covering the production and distribution of this material, but as much of this material comes from other countries where the material is perfectly legal, there is not much that can be done to stop it.

3. Loss of privacy:
Some Internet sites are able to drop a ‘cookie’ into your web browser each time you visit the site. These cookies are used to identify you to certain websites and find out what other websites you have visited.

4. Fraud
More and more financial information is being transferred between customers and organizations. Much of this information is credit card details and if intercepted, card details can be used to make fraudulent purchases.

5. Internet addiction
It is possible to get hooked on using the Internet or playing some games.
6. partner spying

Individuals are able, using special software, to check up on their partner’s Internet use. The software secretly records all the sites visited, all the chat rooms and what was said in them, all the e-mails and downloaded files.

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