Chapter 1

An Introduction to Computer Fundamentals

1. In your own words, explain what a computer is.

A computer is a programmable machine. It can receive and store information and change or process it.

2. Describe four different types of computers.

Mainframe computers

- large-sized

- Powerful multi-user computers that can support concurrent programs. That means, they can perform different actions or 'processes' at the same time.

- Mainframe computers can be used by as many as hundreds or thousands of users at the same time.

- Large organisations may use a mainframe computer to execute large-scale processes such as processing the organisation's payroll.

Mini-computers

- mid-sized multi-processing computers.

- they can perform several actions at the same time and can support from 4 to 200 users simultaneously.

- In recent years the distinction between mini-computers and small

mainframes has become blurred.

Workstations

- Powerful, single-user computers.

- They have the capacity to store and process large quantities of data.

- workstations are typically linked together to form a computer network called a local area network, which means that several people, such as staff in an office, can communicate with each other and share electronic files and data.

- A workstation is similar to a personal computer but is more powerful .

Personal computers (PCs), also called microcomputers

- The PC is a small-sized, relatively inexpensive computer

- designed for an individual user.

- Today, the world of PCs is basically divided between IBM-compatible and Macintosh-compatible machines.

- Computers may be called 'desktop' computers, or 'laptop' computers.

3. **Briefly explain how a computer works.**

A computer functions in the following manner:

The computer accepts input. Computer input is whatever is entered or fed into a computer system. Input can be supplied by a person (such as by using a keyboard) or by another computer or device (such as a diskette or CD-ROM). Some examples of input include the words and symbols in a

document, numbers for a calculation, instructions for completing a process, pictures, and so on.

The computer performs useful operations, manipulating the data in many ways. This manipulation is called processing. Examples of processing include performing calculations, sorting lists of words or numbers, modifying documents and pictures according to user instructions, and drawing graphs. A computer processes data in the CPU.

The computer stores data. A computer must store data so that it is available for processing. Most computers have more than one location for storing data (the hard drive or C:\, and the floppy drive or A:\). The place where the computer stores the data depends on how the data is being used.

The computer produces output. Computer output is information that has been produced by a computer. Some examples of computer output include reports, documents, music, graphs, and pictures. Output can be in several different formats, such as paper, diskette, or on screen.

4. What is hardware?

The physical equipment required to create, use, manipulate and store electronic data.

5. What is software?

The computerized instructions that operate a computer, manipulate the data and execute particular functions or tasks.

6. **What is the central processing unit of a computer? Why is it so important to the operation of the computer?**

Central processing unit (CPU): The chip or chips at the heart of a computer that enable it to process data. Also known as a processor.

7. **Describe at least four different applications, or uses, of computers.**

Applications software includes programs that users access to carry out work. They include applications for the following functions.

• **Word processing** is the most common applications software. The great advantage of word processing over using a typewriter is that you can make changes without retyping the entire document. Word processors make it easy to manipulate and format documents.

• **Spreadsheets** are computer programs that let people electronically create and manipulate spreadsheets (tables of values arranged in rows and columns with predefined relationships to each other). Spreadsheets are used for mathematical calculations such as accounts, budgets, statistics and so on.

• **Database management applications** are computer programs that let people create and manipulate data in a database. A database is a collection of related

information that can be manipulated and used to sort information, conduct statistical analyses or generate reports.

• **Presentation packages** and graphics are computer programs that enable users to create highly stylised images for slide presentations and reports. They can also be used to produce various types of charts and graphs. Many software applications include graphics components including: paint programs, desktop publishing applications and so on.

8. What is a binary number system?

A numerical system where in each digit stands for a power of two. The binary system uses only two symbols, 0 and 1, to represent values.

9. What is a bit?

Bit is A digit within the binary number system. A bit is the smallest unit of information held in a computer.

10. What is a byte?

Byte is a combination of bits that represent one character. A byte is usually composed of 8 bits.

11. What is the meaning of computer 'memory'?

Memory: An area within a computer system that *holds data* waiting to be processed.
The main type of memory and the most familiar to users is (RAM).
- RAM is the same as main memory.
  - A computer can both write data into RAM and read data from RAM.

- o Most RAM is volatile, which means that it requires a steady flow of electricity to maintain its contents.
- • ROM (read only memory):
  - o ROM is non-volatile and only permits the user to read data.
  - o Computers almost always contain a small amount of read-only memory that holds instructions for starting up the computer.
- • PROM (programmable read-only memory):
  - o a PROM is a memory chip on which you can store a program.
  - o Once the PROM has been used, you cannot wipe it clean and use it to store something else.
  - o PROMs are non-volatile.
- • EPROM (erasable programmable read-only memory):
  - o an EPROM is a special type of PROM that can be erased by exposing it to ultraviolet light.
- • EEPROM (electrically erasable programmable read-only memory):
  - o an EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge.

12. What is RAM?

Random access memory (RAM): An area in the computer system unit that temporarily holds a user's data, operating system instructions and program instructions.

13. What is a storage device?

Storage: The area within a computer system where data can be left on a longer term basis while it is not needed for processing.

14. What is a diskette?

Diskette. A small, removable, flexible mylar plastic disk covered with a thin layer

of a magnetisable substance, onto which digital data can be recorded and stored. Also known as a floppy disk.

15. What is a hard drive?

Hard drive: The storage area within the computer itself, where megabytes of space are available to store bits of information. Also known as a hard disk.

16. What is a database?

- a collection of information stored on one or several computers.

- A structured assembly of logically related data designed to meet various applications but managed independently of them.

17. What are the key differences between a diskette and a hard drive?

18. What is magnetic tape and how is it different from a hard drive?

- A continuous plastic strip covered with magnetic oxide;

- the tape is divided into parallel tracks onto which data may be recorded by selectively magnetising parts of the surface, or spots, in each of the tracks. The data can then be stored and reused.

19. What is an optical disk?

Optical disk: A storage device that uses reflecting surfaces and laser technology to read and write data on a disk. Also known as a laser disk

20.Covert the following numbers to binary:

$(15)_{10} = (1111)_2$

$(21)_{10} = (10101)_2$

$(35)_{10} = (100011)_2$

$(42)_{10} = (101010)_2$

21.Covert the following binary numbers to decimal:

$(1\ 0\ 1\ 1)_2 = (11)_{10}$

$(1\ 0\ 1\ 10)_2 = (22)_{10}$

$(1\ 0\ 0\ 1\ 1)_2 = (19)_{10}$

$(0\ 1\ 0\ 0\ 10)_2 = (18)_{10}$