# Introduction to Computers

## Definition of terms

**Data** - the raw facts or inputs that require to be converted to another form.

**Information** - the processed data.

**Processing** - the art of changing data into information.

**Hardware** - refers to all physical components of a computer.

**Software** - refers to set of instructions used to process data into information.

**Computer** - a high speed programmable electronic device that accepts and converts data to information, and displays output. It also stores data or information

## Parts of a computer

A computer consists of both hardware and software components. Any device connected to the system unit is called a peripheral device.
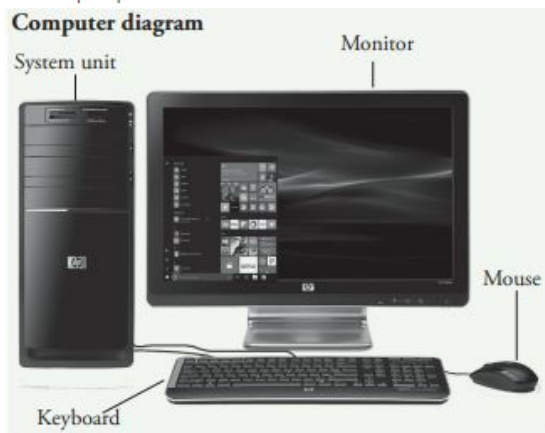


A system unit is the main part of a typical desktop computer. It houses the Central Processing Unit (CPU), storage devices and other electronic components. Non-physical parts of a computer include programs, data files, music, movies and games.

## Characteristics of computers

a) They are faster and accurate than human beings.

b) Can perform repetitive and tedious tasks.

c) Have massive and permanent storage.

d) Are diligent in that they do not get tired and bored.

e) Have standardised and uniform output

# Introduction to Computers

## Historical development of computers

| First (1st) | Second(2nd) | Third(3rd) | Fourth(4th) | Fifth(5th) |
|---|---|---|---|---|
| Main electronic component was vaccum tubes(thermionic valves)<br>Used Punched cards and magnetics drum for storage | | | | |

Computers are categorised based on historical development into five generations.

Table: Comparison of the five computer generations

| First (1st) | Second (2nd) | Third (3rd) | Fourth (4th) | Fifth (5th) |
|---|---|---|---|---|
| • Main electronic component was vacuum tubes (thermionic valves)<br>• Used punched cards and magnetic drum for storage<br>• Very slow and complex<br>• Produced a lot of heat and UV rays<br>• Very large and heavy<br>• Used machine language<br>• Consumed a lot of electric power<br>• Had a very small memory capacity<br>• Required special cooling<br>• Frequent breakdowns | • Main electronic component was transistors<br>• Used magnetic tapes for storage<br>• Faster than 1st generation<br>• Less complex to use than 1st generation<br>• Produced less heat and UV rays than 1st generation<br>• Smaller than 1st generation<br>• Used assembly language<br>• Consumed a lot of electric power<br>• Had larger memory capacity than 1st generation<br>• Less prone to failure than 1st generation | • Main electronic component was Integrated Circuit (IC)<br>• Used magnetic disks for storage<br>• Faster than 2nd generation<br>• Simpler to use than 2nd generation<br>• Produced less heat than 2nd generation<br>• Small and light<br>• Used procedural programming language (a type of high level language)<br>• Consumed less electrical power than 2nd generation<br>• Had a larger memory capacity than 2nd generation<br>• Less prone to failure than 2nd generation | • Main electronic component was Large Scale Integrated Circuit (LSIC)<br>• Faster than 3rd generation<br>• Simpler to use than 3rd generation<br>• Produced negligible heat<br>• Smaller and light than 3rd generation<br>• Used structured query language and Object-Oriented Programming Language (OOP) (type of high level language)<br>• Consumed less electric power than 3rd generation<br>• Had a larger memory capacity than 3rd generation<br>• Less prone to failure than 3rd generation. | • Main electronic component is Very Large-Scale Integration (VLSI) and parallel processing<br>• Fastest in processing<br>• Very user friendly<br>• Smaller than the other generations<br>• Use artificial intelligence language (a type of high level language)<br>• Consume little electric power<br>• Have huge memory capacity<br>• Very reliable |

Comparison of the five computer generations

| First (1st ) | Second (2nd ) | Third (3rd) | Fourth (4th ) | Fifth (5th ) |
|---|---|---|---|---|
| • Main electronic component was vacuum tubes (thermionic valves)<br>• Used punched cards and magnetic drum for storage | • Main electronic component was transistors<br>• Used magnetic tapes for storage | • Main electronic component was Integrated Circuit (IC)<br>• Used magnetic disks for storage | • Main electronic component was Large Scale Integrated Circuit (LSIC)<br>• Faster than 3rd generation | • Main electronic component is Very Large-Scale Integration (VLSI) and parallel processing<br>• Fastest in processing |

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### Classification of computers

Computers are classified based on size, functionality and purpose

**1. Physical size** - Based on this category, computers are classified as follows:

    **i) Supercomputers**
- They are the fastest, largest, most expensive and powerful of all computers.
- They perform many complex operations such as parallel processing.
- They consume a lot of power and generate a lot of heat. Therefore they require special cooling systems.
- They are mainly used in advanced scientific research.

    **ii) Mainframe computers**
- They are slower, smaller, cheaper and less powerful than supercomputers.
- They can support a large number of peripherals of different types.
- They can handle hundreds of users at the same time.

    **iii) Minicomputers**
- They are physically smaller than a mainframe.
- They support the same peripheral devices supported by a mainframe.
- They support several users at a time.
- They are cheaper than the mainframes, but more costly than the microcomputers
- They are slower, less powerful and have less memory capacity than mainframes.

    **iv) Microcomputers**
- Their processor is called microprocessor because it is quite small in size.
- They are smallest in size of all computers and support one user at a time.
- They can support fewer peripheral devices compared to Mini and Mainframes.
- They are the cheapest, least powerful and have smallest memory capacity.
- Microcomputers are categorised as desktops, laptops and Palm tops.

**Note:** Personal Digital Assistants (PDAs) were discontinued due to widespread usage of smartphones.

**2. Functionality** - Based on this category, computers are classified as follows:

    i) Digital computer - receives and processes discrete data only.

    ii) Analogue computer - receives and processes varying data.

    iii) Hybrid computers are designed to process both discrete and varying data.

**3. Purpose** - Based on this category, computers are, classified as follows:

    i) General purpose computers are designed to process a wide variety of tasks.

    ii) Special purpose computers are designed to process a specific task only.

**Note:**

    • A Dedicated computer is a general-purpose computer that is customised to processing one task only.

    • Embedded computer is a special purpose computer that is found within another device to control its functionality

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## Application of computers

**1. Supermarkets** - for stock control, security reinforcement, Point of Sale terminal, Electronic Funds Transfer (EFT) and communication.

**2. Banks** - to manage financial transactions using Automated Teller Machines (ATMs), cheques processing, mobile banking, EFT, communication and teller banking.

**3. Hospitals**

• To keep and retrieve patient's medical records.

• For automatic diagnosis of diseases.

• To control life-supporting machines in the Intensive Care Units (ICU).

• Collaboration and sharing of knowledge.

• Health expert systems in disease diagnosis and treatment.

**4. Offices** – communication, production of documents, keeping of records and for decision support systems.

**5. Government institutions**

• To store or keep records and improve the efficiency of work within the Civil service.

• To produce bills and statements.

• In e-Government services such as driving licences, passports, tax returns and work permits.

**6. Education**

• In Computer Aided Learning (CAL) and Computer Aided Teaching (CAT).

• To assist in Long distance learning in universities usually referred to as the Open University Concept.

• To analyse academic data.

• Computer based simulation such as flight simulators for training pilots.

**7. Entertainment** - watching movies, making movies, Internet use and mobile phones call back tunes.

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## Computer laboratory

A computer laboratory is a special room installed with computers for teaching and learning of computer studies.

Factors to be considered when setting up a computer laboratory include:
1. Security of computer hardware and software.
2. Reliability of the source of power.
3. The floor, space and number of computers to be set up.
4. Maximum number of users

### Safety precautions in a computer laboratory

1. **Ventilation -** Good air circulation in the computer room to avoid suffocation and overheating. Smoking is also not allowed. Smoke and dust particles can damage computer components.
2. **No food and drinks-** Spillage can damage computer components while liquids can cause rust and electrical shocks.
3. **Lighting -** Computer room should be well lit to avoid eyestrain that leads to headaches, stress and fatigue.
4. **Precaution against fire and accidents -** Computer rooms should have adequate firefighting equipment. The room should be painted with water-based paint as these do not spread fire quickly as opposed to oilbased paints. There should also be accessible fire exit points. Note: Accidents should be reported immediately to safeguard property and safety of learner.
5. **Dust control-** The computer room should be fitted with special curtains to reduce entry of dust particles. Computers should remain covered with dust covers when not in use. Computers should also be dust blown regularly.
6. **Damp Control -** Use of dehumidifiers. High humidity leads to rusting of computer metallic parts.
7. **Standard furniture -** Use of furniture that is strong, proper size and height to hold the computer devices and for the safety of the user.

8. **Cabling -** All cables must be insulated, well laid and properly connected to avoid electric shocks and fires.
9. **Burglar proofing-** This is to minimise theft of computers by reinforcing the doors and windows as well as locking them to prevent unauthorised access.

### Other safety precautions include:
• No running or playing- Accidents can occur and cause injuries. Peripheral devices can fall and be damaged.
• Follow correct procedure for starting and shutting down computer so as to avoid corrupting software and hardware.
• Ask for assistance when in doubt- To avoid accidents and risks

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## Hands-on skills when handling a computer

**Booting-** is the process of starting up a computer. There are three types:

- **Cold booting-** The process of switching on a computer, which was completely off.
- **Warm booting** - the process of re-starting a computer that is already on.
- **Shutting down** - the process of closing all software programs in a computer so as to turn off the computer.

## The keyboard and its parts

The keyboard is a keying input device. The keyboard consists of the following keys:
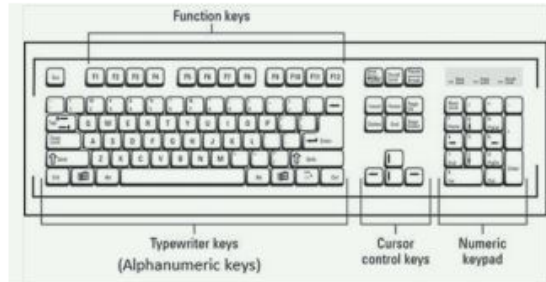


## Mouse techniques

a) **Pointing** –taking the cursor where changes are needed in a document.

b) **Clicking** - pressing and releasing the left mouse button once.

c) **Double clicking** - pressing the left button twice in quick succession.

d) **Triple clicking** – pressing the left mouse button thrice in quick successions.

e) **Right clicking** - pressing the right hand side mouse button once.

f) **Drag and drop** -moving an item from one location on the screen to another.

g) **Drag** - pressing and holding down the left button and then moving the mouse to a new location.

h) **Drop** - Releasing the button immediately after relocating the item to the new location.