COMPUTER STUDIES NOTES

FORM 1

**INTRODUCTION TO COMPUTERS**

In today's lesson, we shall discuss the meaning of a computer. We shall also learn more about parts and functions of a computer.   
  
The following are names of electronic devices.

**Lesson Objectives**

**By the end of the lesson the student is expected to:**

1. Understand the major milestones in the development of the modern computers
2. Understand the historical development of electronic computers

1. Define a computer
2. Identify major parts of a computer

**Define a computer**

Definition of the terms   
The activity below shows input, processing and finally output. Input refers to the basic facts and figures to be processed. Processing on the other hand refers to the manipulation of data into meaningful information. Output is the end product of data processing.   
  
**Parts of a Computer**

A typical computer consists of the following main physical parts:

1. System unit

2. Monitor

3. Keyboard

4. Mouse

**Functions of parts of a Computer**

**System unit**: Houses the internal parts of a computer.  
**Keyboard** : Is used to key in data into a computer   
**Mouse:** Is used to control the pointer on the screen Monitor Is also referred to as the screen or visual display unit (VDU). It displays operations carried out by the computer.   
  
**What is a Computer?**

A computer is an electronic device that uses instructions (programs) to accept data as input and processes it to produce information (output).

**By the end of the lesson you should be able to:**

1. Explain the major milestones in the development of the modern computers
2. Outline the historical development of electronic computers

**Evolution of Computers**

Over the years, computers have kept on developing. In this lesson, we shall learn how computers have undergone change by discussing the history and generations.

**History of computers**

The concepts that form the basis of computer technology have a long history that stretches back over 2000 years.

**The Abacus**The abacus, is a calculator. Its first recorded use was Circa 500 B.C. The Chinese used it to add, subtract, multiply, and divide. However, the abacus was not unique to the continent of Asia. Archeological excavations have revealed an Aztec abacus in use around 900 or 1000 A.D.

**Some of the major inventions are:** In 1614, Scottish mathematician, John Napier, invented logarithm as an aid of calculation. The logarithm of a given number to a given base is the power or exponent to which the base must be raised in order to produce the given number.

**John Napier**In 1620, English mathematician, William Oughtred, invented the slide rule as an aid of calculation.   
William Oughtred   
  
**Slide rule**In 1642, a Frenchman Blaise Pascal invented a calculating machine(Pascaline) that could add and subtract number.

**Blaise Pascal**Gottfried von Liebniz   
In 1671, a German mathematician, Gottfried von Liebniz invented Liebniz Wheel that could perform the operations add, subtract, multiply and divide.  
Gottfried von Liebniz  
  
In 1822, Charles Babbage of England invented the analytical engine that could perform arithmetic operations and store values and answers to calculations. Charles Babbage is referred as the father of modern computers.

**Charles Babbage**In 1843, Augusta Ada, countess of Lovelace designed and proposed programs to be used by the analytical engine. She is considered to be the first computer programmer.

**Augusta Ada**In 1959, Howard Aiken, developed punched paper tapes, to be used as an input medium. He also invented the first electro-mechanical computer called Mark 1.

**Howard Aiken**  
A person who designs and writes computer programs   
History of Computers   
In 1938, Claude Shannon demonstrated the similarity between logical circuits and Boolean algebra.   
  
He also formalized information theory which allows precise measurement of information delivered through a communication channel.   
Claude Shannon  
  
**Computer Electronic Generations**

Form the invention of mark 1, rapid advancements in computing industry have been realized and can be categorized into five generations.  
First generation computers.(1940s to late 1950s)

1. They used vacuum tubes(thermionic valves) to process data making them unreliable, produced alot of heat, consumed a lot of power, they huge.
2. Drums were used for storage and provided a maximum memory size of 2 Kilobytes.

3. The processing speed was 10 kilo instructions per second  
Examples included:-ENIAC (Electronic Numerical Integrator and Computer), EDVAC (Electronic Discrete Variable automatic Computer), UNIVAC (Universal Automatic Computer) AND LEO 1 (Lyons Electronic Office)

**Second generation computers**

1. They were developed between 1958 and 1964.
2. They used transistor technology making them smaller in size than 1st generation.

3. magnetic core memories were used for storage provinding a memory size of 32KB   
4. The processing speed increased to 300,000 instructions per second. Examples included:-LEO III, IBM 7000 Series and CDC-6600 mainframe, IBM means International Business Machines

**Third generation computers**

1. They were developed between 1964 and 1970.
2. They used ICs technology and magnetic disks were developed for storage purposes.

**Integrated Circuit**Magnetic disk   
  
3. The memory size increased to 2 megabytes, with the speed of up to 5 million instructions per second.  
4. The first Minicomputers a multi-user computer designed to meet the needs of a small company or department) were developed in this generation.  
Examples included:-ICL 1900 Series and IBM 360 Series.  
Fourth generation computers 1971

1. They were developed between 1971 to now.
2. They used LSI (large Scale Integrated circuit) and VLSI (Very large Scale Integrated circuit) technology for main memory and logic circuitry.
3. Microprocessors were introduced during this period (around 1971).
4. Microprocessors enabled the development of very small computers with very high processing speed.
5. Optic disks were developed for storage purposes.

6. The memory size increased to several hundred megabytes, with the speed of up to 50 million instructions per second.  
Examples included:-supercomputers  
Fifth generation computers

1. These are the computers that are being developed now and in the future.
2. The technology been used include: 3-dimensional circuit design, superconductors and parallel architectures.
3. These generation has seen the merging of telecommunications and computing technology and the development of distributed computing systems.
4. The memory size is in terms of giga and tera bytes and the speed in terms of giga (1 billion bytes ( 109)) and tera (1 trillion bytes ( 1012)) hertz. Hertz is a unit for measuring electrical vibrations. 1 hertz is equivalent ot one cycle per second.

Examples included:-IBM 380 Series and IBM 370 Series.  
First generation computers.(1940s to 1958)

1. They were developed between 1940s and 1958.
2. They used vacuum tubes (thermionic valves) to store and process information.

1. They were developed between 1958 and 1964.
2. They used transistor technology and magnetic core memories.
3. They consumed less power and produced less heat.
4. The computers memory size increased to 32 kilobytes, with a speed of up to 300,000 instructions per second

Examples included:-LEO III, IBM 7000 Series and CDC-6600 mainframe.  
( IBM means International Business Machines)  
  
2. They used ICs technology and magnetic disks for storage purposes.  
  
3. The memory size increased to 2 megabytes, with a speed of up to 5 million instructions per second.  
1. Their development started in 1971 and has continued upto date.   
6. The memory size increased to several hundred megabytes, with the speed of 50 million instructions per second.

* These are computers currently under development and also for the future.
* The technology used include: 3-dimensional circuit design, superconductors and parallel architectures.
* These generation has seen the merging of telecommunications and computing technology and the development of distributed computing systems
* The memory size is in terms of giga and tera bytes and the speed in terms of giga (1 billion bytes ( 109)) and tera (1 trillion bytes ( 1012)) hertz. Hertz is a unit for measuring electrical vibrations. 1 hertz is equivalent to one cycle per second.

Computers around us come in various forms. The diagrams below shows examples of popular computers in use.   
Mobile phone  
  
  
**Digital watch  
  
Desktop computer   
  
Camera**

**OPERATING SYSTEM**

**Definition**: It is a software that controls the hardware and the software resources and the activities that take place in a computer. It also creates a link between the liveware, the hardware and the software.

**Some of the resources are:**- Input/output devices eg Keyboard, mouse, printers   
- communication devices eg. modems, network cards  
Processor  
Memory i.e. both secondary eg. hard disk and primary memories eg RAM

**FUNCTIONS**

The functions of an operating system are:  
  
**1. Input/Output handling**

Flow control is also part of the operating system's responsibilities. The operating system must manage all requests to read data from disks or tape and all writes to these and to printers.

To speed up the output to printers, most operating systems now allow for print spooling, where the data to be printed is first put in a file. This frees up the processor for other work in between the times data is going to the printer. A printer can only handle so much data at a time. Without print spooling you'd have to wait for a print job to finish before you can do anything else. With it you can request several print jobs and go on working. The print spool will hold all the orders and process them in turn.

**2. Memory management**

Memory must be managed also by the operating system. All those rotating turns of CPU use leave data waiting around in buffers. Care must be taken not to lose data!! One way to help out the traffic jam is to use virtual memory. This includes disk space as part of main memory. While it is slower to put data on a hard disk, it increases the amount of data that can be held in memory at one time. When the memory chips get full, some of the data is paged out to the hard disk. This is called swapping. Windows uses a swap file for this purpose.

**3. Job Scheduling**

Time in the CPU is divided into time slices which are measured in milliseconds. Each task the CPU does is assigned a certain number of time slices. When time expires, another task gets a turn. The first task must wait until it has another turn. Since time slices are so small, you usually can't tell that any sharing is going on. Tasks can be assigned priorities so that high priority (foreground) tasks get more time slices than low priority (background) tasks.

**4. Error handling  
5. Interrupt handling  
6. System Security**

Some system security is part of the operating system, though additional software can add more security functions. For multiple users who are not all allowed access to everything, there must be a logon or login procedure where the user supplies a user name or ID and a secret password. An administrator must set up the permissions list of who can have access to what programs and what data.

**TYPES OF OPERATING SYSTEMS**

Operating systems are classified according to three criteria

1. Number of Users i.e. Single user and Multi-user
2. Number of programs/Tasks
3. User-interface