INFORMATION TECHNOLOGY:

This is the combination of computer and communication technologies to process data into information.

APPLICATIONS OF IT

In everyday life

(a)   Payment by phone services at home.

(b)   Payroll system in a factory.

(c)   Electronic funds transfer system in a bank.

(d)   Traffic control system in transportation.

(e)   Point of sale system in a super market.

At home:

(a)   Budgeting and financial management.

(b)   Entertainment (Listening to music, watch movies and videos, play games)

(c)   Research and education.

ADVANTAGES OF USING COMPUTERS FOR PROCESSING INFORMATION

(a)   Computers with communicating capability can share data and information with other computers.

(b)   Tasks can be completed faster because computers work at amazing speed.

(c)   Computers can store enormous amounts of data for future use.

(d)   The high reliability of components inside the modern computers enables computers to produce consistent results.

(e)   Efficiency and productivity can be raised.

(f)   Running cost becomes higher in the long run.

(g)   Tasks can be completed with little human intervention. I.e. automatic.

(h)   Overall security can be raised due to less human intervention.

(i)   The management can observe new information and new trends more quickly.

(j)   Customer services can be improved due to more efficient management and operations.

DISADVANTAGES OF USING COMPUTERS FOR PROCESSING INFORMATION

(a)   Initial investment cost can be high. (Setting up)

(b)   Extra costs is required to employ specialized staff to operate and design the data processing

(c)	Some jobs may be lost due to computerization and thus lower the morale of staff members.

(d)	Some staff has to be trained or retrained.

(e)	Easy transmission of viruses via the internet, which may lead to creating untimely costs to the recipient and sender computers.

(f)	Problems may arise when computers cannot be used either because they are malfunctioning or damaged. This can bring an organization to a halt if no back up exists.

(g)	Face to face interaction among staff may be reduced

(h)	High rate of forgery.

CHARACTERISTICS OF MODERN COMPUTERS

For a device to be characterized as a computer, it must manifest some or all of the following characteristics.

(a)	Speed: Computers are quite fast in their operations in that their speed is measured in millions instructions per second (MIPS) e.g. a computer with 15 MIPS is capable of processing 15 million instructions per second.

(b)	Accuracy: Computers are known to be so accurate that they hardly make any mistake. In fact computers are capable of detecting and correcting errors. It follows therefore that if wrong data is fed into the computer, wrong results are expected out of the computer hence the saying Garbage in Garbage Out (GIGO)

(c)	Storage: For a computer to be able to work, it must have some form of work space where data is stored before being processed or information is stored before being output to particular devices. The storage is called Memory.

(d)	Diligence (Consistency): Computers have the ability to perform the same task and over for a long time without getting tired. Therefore computing devices must be able to perform the same routines repeatedly. This evidenced in industrial robotics like those in car assembling lines.

(e)	Artificial intelligence: Computers are artificially intelligent. They can respond to requests given and then provide solutions. This is accomplished by its programmability i.e. it can be taught to make decisions and function accordingly. An example of this is the washing machine today, which incorporates some form fuzzy logic. Such machines are capable of taking in required amount of detergent and water for washing after assessing the amount of dirt in the clothes.

(f)	Automation: Computers also work automatically, they do not need any supervision in order to perform programmed routines e.g. traffic light, digital watches etc.…

(g)	Versatility: With respect to the inputs it can accept, a computer can do computations of different kinds and can change from one activity to another e.g. sounds, image captured, etc..…

LIMITATIONS OF COMPUTERS

(a)	Data correctness. All the data that is processed into information is usually correct. However, we all have heard stories or seen movies that tell us how computers have done mistakes. Perhaps the data that is entered contains the mistakes. People enter data and perhaps do make mistakes.

(b)   Program correctness. After data correctness, the question of program correctness comes up. If the data entered is correct and a program written to process this data has mistakes, once again, the information obtained will be incorrect.

(c)   Computers cannot think. Unlike the human brain, the computer cannot think but can effortlessly execute all instructions given to them any number of times without errors.

(d)   Alternatives: Human beings know how to try out a new option when one alternative to do a job fails. Computers lack this ability.

(e)   Experience: Computers cannot learn from experience.

THE HISTORY AND EVOLUTION OF COMPUTERS

Few historians can agree on who was the first inventor or what was the first computer because of a number of categories of machines, which were being invented. However, certain advancements were so outstanding.

Simple calculating devices:

(a)   Abacus: Before the 19th Century, the early Babylonians invented Abacus which was used as a mathematical instrument. The abacus is listed to as the first computation device. It was used for volume of computing in China and Japan for thousands of years before Christ.

(b)   Napiers' bones: John Napier developed the first logarithm tables. He published his log tables in 1614. Napiers' bones were rectangular rod with readings written on them that led users to do division and multiplication by adding number position bones.

(c)   Slide Rule: In 1620, An English Mathematician William Oughtred developed the first analog device and it was based on the concept of logarithms. This was a ruler with numbers written on it and can do some simple math by sliding a bar to a form.

Early Discovery – Mechanical Era

In the 17th Century, two further significant developments took place. Computers composed of mainly movable parts i.e. wheels and axles.

(a)   Pascal's Arithmetic Machine or Calculator: In 1647, A Frenchman Blasé Pascal is given credit for the first mechanical adding and subtracting machine that used a system of gears and wheels. It had digits arranged from 1-9 on wheels similar to odometer on a motor car.

(b)   Leibnitz' Stepped Reckoner: In 1694, Coltfried William Leibnitz a German Mathematician improved Pascal's design to create Leibnitz's calculator that could perform arithmetic operation of addition, subtraction and Multiplication, division and subtraction.

Start of the computer age:

In the 19th Century, other developments were outstanding in computing. Computers that are electronic and movable parts.

(a)	Babbage's Analytical Engine: Charles Babbage of England (1792-1871) developed the analytical engine. The analytical engine was recognized as the milestone signifying the start of the computer age Charles Babbage as the father of modern computing.

This machine introduced the idea of memory for storing results and the idea of printed output. It could also follow programmed instruction to perform mathematical operation.

A lady called Ada Lovelace was the first person to come up with the idea of programming loops.

(b)	Jacquard weaving loom: Joseph Jacquard invented a machine for controlling the weaving process when making complex patterns. This system could use metal cards punched with holes in storing data. This machine could store programs or instructions using the hole and non-hole method.

(c)	Hollerith's Tabulator: Herman Hollerith invented a tabulating machine that used punched cards to store and tabulate data. The U.S government in the 1890's census first used this machine. He started a tabulating machine company and sold machines all over the world. This company merged with other to form the popularly known as International Business Machine (IBM)

ELECTRONIC COMPUTER GENERATIONS:

Computer generations refer to the advancement of computer technology over years. In the 1950's, first widely operational computers came in and we divide them into generations. Each generation is characterized by dramatic improvement over:
(a) Technology used to build the computer.
(b) Internal organization of the computer.
(c) Programming languages.

FIRST GENERATION COMPUTERS (1946 – 1956)

Technical developments or innovations
1. The first generation of computers relied on **Vacuum tubes** to store and process information.
2. They used magnetic drum memories.
3. The maximum memory size was approximately 2000bytes (2kilobytes)
4. Used punched cards for input and output.
5. Programming was done in machine language.

Setbacks include:
➤ Limited primary memory.
➤ Consumed great quantities of electricity and generated a lot of heat.
➤ They were short lived and needed a standby technician.
➤ They were expensive and few people could monopolize computers.

Examples of computers in First generation:
(a) ENIAC (Electronic numeric integrator and calculator)
(b) EDSAC (Electronic Delay Storage Automatic Computer)
(c) EDVAC (Electronic Discrete Variable Automatic Computer) invented by Dr. John Von Newman
(d) UNIVAC (Universal Automatic Computer)
(e) IBM 650

SECOND GENERATION COMPUTERS (1957-1963)

The second generation of computers relied on **transistor technology**.

Key characteristics:
    (a) Use of transistors for internal operations.
    (b) Computers were built from individual transistors and connected by wires.
    (c) Memory size expanded to 32kilobytes of Ram memory.
    (d) Speeds reached 200,000 to 300,000 instructions per second.
    (e) The second generation of computers used magnetic core memories.
    (f) Introduction of high level programming languages e.g FORTRAN, COBOL e.t.c
    (g) Introduction of super computers e.g Livermore Atomic Research Computer (LARC) and IBM 7030
    (h) Computers became less expensive, gave less heat and were smaller, increased in processing speed and reliability. E.g IBM 1401
    (i) Transistors were much more stable and reliable than vacuum tubes.
    (j) They generated less heat and consumed less power.
    (k) The transistorized computer contained 800 transistors and was built by Bell laboratories in 1954.

Examples of second generation computers include:
    ✓ NCR 501
    ✓ IBM
    ✓ CDC6600 Mainframe Computers

THIRD GENERATION COMPUTERS (1964-1979)

The third generation of computers used **Integratedcircuits** (ICs) which are made by combining several transistors together with integrated circuits or IC semiconductor devices with several transistors built in one physical component.

    (a) Magnetic disks were developed during this period for storage purposes.
    (b) Computer memory expanded to 2 Megabytes of RAM.
    (c) Speed accelerated to 5 million instructions per second. (5MIPS)
    (d) This period also saw the production of the first Microcomputers (in 1974)
    (e) Use of parallel processing.
    (f) Introduction of operating systems e.g. Multics.
    (g) Introduction of simpler programming languages like BASIC.
    (h) Low cost, high reliability, small size, low power made computers popular.
    (i) The third generation of computers consisted of fast mainframe such as IMB 360, IBM 370, PDP-11 etc.
    (j) Introduction of networking of computers.

FOURTH GENERATION COMPUTERS (1979-1989)

Computers of the fourth generation used **LargeScaleIntegration** (**LSI**) and **Very Large scale Integration (VLSI)** circuits.

    (a) Both deal with the number of electronic components that can be placed on the computer chip e.g. 803876 chip contained 275,000 transistors (LSI). Pentium Pro chip contains about 5,000,000 transistors (VLSI)
    (b) Memories used included magnetic disks, bubble memories and optical speeds to 50MIPS. This made the faster fourth generation that included powerful mainframes such as IBM 308, Amdah 580 as well as 16 bits and 32 microcomputers.
    (c) Limited Artificial intelligence and expert systems.
    (d) Development of microprocessors.
    (e) Development of microcomputers.
    (f) Introduction of a wide variety of software.
    (g) Computers became more powerful and cheap enough that schools and homes were able to purchase them.

Examples of 4th Generation computers:
    - 8088, 80286, 80386, 80486, Pentium 1, Pentium II, Pentium III, e.t.c..

FIFTH GENERATION COMPUTERS (1990-Present)

1990 to present is the merging of Telecommunication and computing technology. The technology currently used and under research during this generation include:
- Parallel Architectures.
- Three-dimensional circuit design.
- Super conducting material.

These technologies have led to the development of extremely fast computers referred to as super computers with speeds in the range of 1 GIGA to 1 TERA instructions per second.

In addition to this, the development of computer networking has reached a level that turning the world into one single village (**World Wide Web/WWW**)

Summary

Generation	Major Innovation
Generation one	Vacuum tubes
Generation two	Transistors
Generation three	Integrated circuits
Generation four	Large scale integrated circuits
Generation five	Three dimensional circuit design

FAMILY PACKAGE OF TODAY

In many parts of the world, family package computers are sold for the entire family form junior to father. Companies like IBM, HP and Dell are now hitting the Global Market. Family computers are fully equipped with a monitor, keyboard, printer, CD ROM, speakers, Microphone and a Joy stick.

In conclusion computers are becoming increasingly more smaller, more powerful and less expensive.

USES AND FUNCTIONS OF COMPUTERS:

Computers are used in day today accomplishment of a number of tasks. Their uses cannot be imagined by the users. They include the following:

(a) **Scientificresearch**: Computers have made advancements in scientific research. New drugs have been introduced. Exploration into space is possible even in places where human beings cannot go.

(b) **Business environment**: Very many businesses have realized the benefits of computers. With most money markets (stock exchange), you only need to sit in front of your computer anywhere and share trade with various centers worldwide. Today, e-commerce (electronic commerce) has been more feasible with computers.

(c) **Architecture**: With the help of a computer, it is possible to look at a house you plan to build, furnished with flower gardens and pass ways. All these can be manipulated on a computer top. This enables one to furnish a house of his or her taste.

(d) **Recreational purposes**: One can kill boredom by playing various games on a computer(s) for example golf, cards, car racing etc. There are many computer games some of which exists free while other need a license to learn them.

(e) **Educational purposes**. Computers have led to the emergency of internet. Many local institutions have linked up with big universities and libraries overseas. This has led to the creation of **Virtual universities**. (These are Universities with no physical buildings or lecture rooms or halls or residence but giving necessary lectures on computers via the Internet thus the term "Virtual reality").

PLACES WHERE COMPUTERS ARE USED

Noteworthy is that, computers are used in all walks of life for example:
- (a) In banks.
- (b) Homes
- (c) Supermarkets
- (d) Offices of all types.
- (e) Companies for billing
- (f) Institutions of learning
- (g) Airplanes
- (h) Post offices.   etc.

COMPUTER MODELS

They include among others;
- ❖ Dell
- ❖ Compaq
- ❖ Macintosh
- ❖ Gateway
- ❖ Toshiba
- ❖ Mercury
- ❖ Samsung
- ❖ IBM (International Business Machine)

❖ Apple

THE COMPUTER LABORATORY

This is a place where computers are set for a particular task. While in the laboratory a teacher should work closely with students to see that they master basic techniques.

Fig: Typical computer laboratory

GENERAL OPERATION OF A COMPUTER

Starting a computer:
- Switch on the mains.
- Switch on the stabilizer/backup/UPS (in case you have one)
- Switch one the system unit because most of the parts including the power supply unit are in it.
- Switch on the monitor or Visual display unit reason being that what it displays comes from the system unit.

As the computer is switched on, it does the Power On Self-Test (POST). The post consists of RAM check, CMOS check, HDD controllers then an appropriate message is displayed on the screen. Sometimes, an error code is displayed with the message or an abnormal number of beeps are sounded and this is called booting.

N.B: Most microcomputers are switched on by the switch on the system unit and the monitor.

CARING FOR MICRO COMPUTERS

Like all electronic equipment, microcomputers need to be serviced regularly to maintain their operability. Some of the measures that should be taken are:

(a) Avoid abrupt switching off and on the computer system. Use the normal way of shutting down or closing down all the programs the shut down the computer from the start button.
(b) Avoid making connections when the computer is on power e.g keyboard connections, mouse, printer, monitor etc.

(c) Place the microcomputer in a dust free environment with good ventilation. Dust covers should be used to cover the microcomputers when not in use if you use polythene covers, do not cover immediately after switching off as it will trap heat.

(d) The microcomputer should not be exposed to direct sunlight.

(e) Food and drinks should not be allowed near the computers.

(f) The computers should be regularly serviced, at least once a year or more frequently if the environment is dusty. The service should normally include.
- Blowing dust from the system unit.
- Cleaning the floppy drives, keyboard including all the keyboard contacts.
- Also clean the monitor externally and the computer equipment regularly with a wet cloth. Make sure you do not drop water in the computer system. If water drops accidentally, do not use the computer immediately until water has completely evaporated.

(g) Do not open the computer for inside cleaning, this should handle by a qualified personnel.

(h) It is a good practice to keep a record of the daily condition in case of computer failure.

(i) In areas where the power fluctuates, it is important to use either a stabilizer or UPS to ensure a steady input power to the computer system.

(j) The floppy disks used for the installation of programs and backups should be kept safely in disk banks and kept away from sunlight and magnetic media.

(k) The peripheral devices such as printers and mouse should be regularly serviced.