Applications of Information and Communications technology

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Lecture 01

ICT (information and communications technology

- ICT (information and communications technology - or technologies) is a term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries.

Data and information

Data is a collection of unprocessed items, which can include text numbers, images audio and video. Data is raw facts and figures by its self it doesn't provide anything meaningful.

Information: Is processed data. It has meaning and is useful to one or more people.

Digital divide

- Digital divide is a term that refers to the gap between demographics and regions that have access to modern information and communications technology, and those that don't or have restricted access. This technology can include the telephone, television, personal computers and the Internet.

INTRODUCTION TO COMPUTERS

- What is a computer?

- A computer is a general-purpose electronic machine that receives / accepts, processes, stores and output data into meaningful information.

- A computer can also be defined as an electronic device operating under control of instructions stored in its own memory that can accept data, manipulate the data according to specified rules, produce results, and store the results for future use

Characteristics of Computers

- Speed: The computers process data at an extremely fast rate, at millions or billions of instructions per second. A computer can perform a huge task in a few seconds that otherwise a normal human being may take days or even years to complete. The speed of a computer is calculated in MHz (Megahertz), that is, one million instructions per second.
- Accuracy: Besides the efficiency, the computers are also very accurate. The level of accuracy depends on the instructions and the type of machines being used. A computer in other wards does not make any mistakes. For example a computer can accurately give the result of division of any two numbers up to 10 or more decimal places
- Diligence: Computer, being a machine, does not suffer from the human traits of tiredness and lack of concentration. If four million calculations have to be performed, then the computer will perform the last, four-millionth calculation with the same accuracy and speed as the first calculation.
- Reliability: Generally, reliability is the measurement of the performance of a computer, which is measured against some predetermined standard for operation without any failure.

- Storage Capability: Computers can store large amounts of data and can recall the required information almost instantaneously i.e. data can be retrieved whenever required.
- Versatility: Computers are quite versatile in nature. It can perform multiple tasks simultaneously with equal ease. For example, at one moment it can be used to draft a letter, another moment it can be used to play music and in between, one can print a document as well.
- Resource Sharing: In the initial stages of development, computers used to be isolated machines. With the tremendous growth in computer technologies, computers today have the capability to connect with each other. This has made the sharing of costly resources like printers possible. Apart from device sharing, data and information can also be shared among groups of computers, thus creating a large information and knowledge base.

Parts of a computer system

A complete computer system comprises of four distinct parts.

- Hardware
- Software
- Data
- User

Information processing cycle

- A computer processes input (data) into output (information). Most people refer to the series of input, process, output and storage activities as the information processing cycle.
- Input: this is the first stage in the cycle. This stage involves collection of data from the outside or also from within the system. The commonly used input devices are keyboard, bar code readers, mouse, scanners e.t.c
- Processing: This is the stage where by the computer works on the data entered and makes it usable.
- Output: this is the stage in which the processed information is now transmitted to the user. The output can be given inform of audio, video, text and graphics. Results can be viewed on the screen or printed on a physical medium.
- Storage: after the data has been processed into information the results can be kept for future use.

How a computer represents data

The computer reads and stores data of all kinds in form of numbers. Computers use the binary number system while humans normally use decimal number system.

Binary number system

Has two distinct digits, 0 and 1

0 and 1 combine to make numbers.

Decimal number system

Contains ten distinct digits e.g 0 up to 9.

Digits combine to make larger numbers.

Digital data representation

- The form in which information is conceived manipulated and recorded.
- Bit (binary digit)

  It is the smallest possible unit of data a computer can recognize or use.

  In other words, it is the smallest unit of data representation.

  0 (off, No) OR 1 (on, Yes).
- Byte

  The Smallest unit of data Storage.

  A byte is 8 bits, about one character of data.

  Half a byte is a nibble.

- 0 (off, No) OR 1 (on, Yes).
- Byte The Smallest unit of data Storage.
- A byte is 8 bits, about one character of data.
- Half a byte is a nibble. Bits and bytes
- One bit is a single 0 or 1.
- One byte consists of 8 bits.
- One kilobyte consists of 1,024 bytes approximately 1000 bytes.
- One megabyte is 1,024 kilobytes or approximately 1 million bytes.
- One gigabyte is 1,024 megabytes or approximately 1 billion bytes
- One terabyte is 1,024 gigabytes or approximately 1 trillion bytes.