Basic Concepts Of Information Technology (IT)

Dheeraj Mehrotra

www.computerscienceexpertise.com

The Basics – What is Information?

- **Information** is data processed for some purpose
- Information can only be considered to be 'real' Info if it meets certain criteria i.e.
- 1. it must be communicated to the recipient
- 2. it must be in a language that is understood
- 3. it must be in a suitable form
- 4. it must be relevant for achieving some purpose

Information -

- is any form of communication that provides understandable and useful knowledge for the person receiving it.

What Is A Computer?

- A computer is a *general purpose*, programmable device that is used for the production and processing of information

- capable of calculating and storing results

What do we mean by general purpose?

- Most devices can be described by their function e.g Washing Machine, DVD Player
- Computers, however, can be used for almost any purpose:
  - typewriter
  - video editor
  - accounts tracker
  - database / address book
  - DVD / CD Player
  - and many others…

Computers Are Programmable

- Computers repond to instructions in the form of *programs*
- *Programs* are written in order to make computers behave in specific ways i.e. word processor, systems control
- Programs are stored in the Computer memory

How computers process information

- Computers accept inputs (i.e. data)
- The input is translated into binary numbers and 'processed'
- The process produces output (i.e information)
- This sequence can repeat endlessly: outputs can be inputs!
- Illustrating this - the 'Black Box' model

Processing - the 'Black Box' model

- We can think of a computer as a 'black box' :

input	→	process	→	output

3+5

8
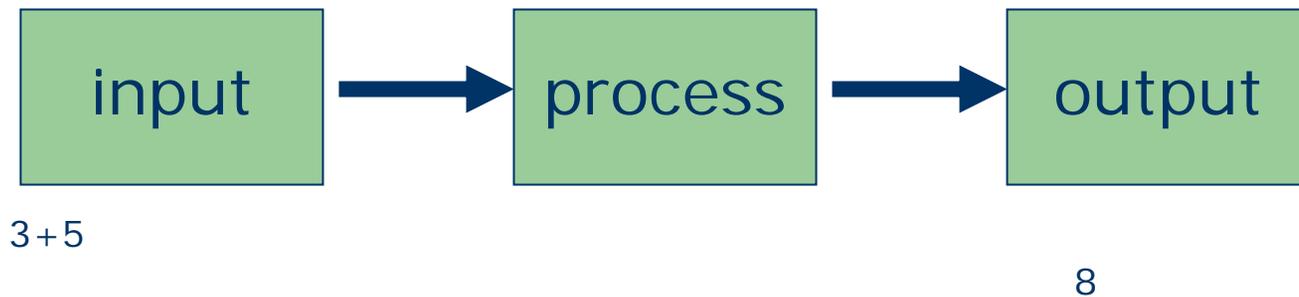
Components of a Computer System

- Computer Systems are made up of:
- Hardware – the physical parts
- Software - the instructions or programs that control the hardware
- The Human Being – the brains behind the whole system!

Types Of Computer

- Mainframe Computer
- Minicomputer
- Personal Computer (Microcomputer / Desktop)
- Laptop
- Network Computer / Server
  – Uses two types of terminal: "Dumb" and "Intelligent"

Computer Organisation – the Von Neumann model

- Most Computers are based on a model proposed by John Von Neumann in 1946
- The 'logical' units of this model are:
  - Stored program
  - Central Processing Unit: fetches and executes the program instructions sequentially
  - Memory
  - Input and Output devices

Computer Hardware components

- A typical PC System is made up of:
  - System Unit
  - Keyboard
  - Monitor (VDU)
  - Mouse
  - Printer
  - Modem
  - Multimedia Devices

Hardware – The System Unit

- The central component of the system
- Houses:
  - The Processor: corresponds to the CPU
  - Memory: RAM and ROM
  - Storage: Hard Disk, Removable Storage devices

The Processor (CPU)

- Types include Intel Pentium series, Celerion, AMD Athlon

- Chip at the heart of the computer- does the calculations

- Speed is very important – measured in megahertz (MHz): the faster the processor the more calculations performed per second.

Memory

- A computer must be able to store its calculations and programs
- Two types of memory: "Volatile" and permanent.
- Measured in *bytes*
- One byte = eight *bits*

Random Access Memory (RAM)

- Used by the Computer as the working area
- Holds the working program, the data being processed and the interim results
- Volatile - contents are erased if power is cut
- Can be accessed randomly: can get any piece of data directly.
- Faster than perminant storage
- Not to be confused with ROM (Read-Only Memory)

Storage - Hard Disk

- Permanent Memory - records and stores all programs and data / information magnetically
- Larger than RAM - average 12 - 120GB
- Slower - involves mechanical movement (read/write head, revolving disk)

Other types of Storage

- Floppy Disks
- CD/DVD ROM
- Zip Drive
- Magnetic Tape

Input Devices

- Keyboard
- Mouse: used in conjunction with the GUI (Graphical User Interface), point and click
- Other types of Input Devices:
  - Trackballs
  - Light Pens
  - Touch Screens
  - Tablets

Output Devices

- Monitor: also known as the Visual Display Unit (VDU)
- Printers
    - Laser Printer
    - Inkjet Printer
    - Impact

Software

- Generic name of all programs
- Made up of code interpreted by the hardware
- Written in *programming languages* - Java, C, C++, Perl
- Two kinds of Software:
  - System
  - Application

System Software

- Concerned with the computer itself: devices, file and storage management, error correction
- Main piece of SS: Operating System (OS)
- OS: the driving program of the computer
  - communicates between all programs and the hardware
  - controls timing and sequence of events
  - manages data to ensure security and integrity
  - Examples: Windows, Mac OS, Unix

Applications Software

- Concerned with the world outside the computer
- Gives the computer its general purpose nature
- Used for the things you want the computer to do
- Common Examples - Word, Excel, Internet Explorer
- Applications can be more specialised: e.g. Architecture package

How Software is made

- Involves a cycle of research, analysis, development and testing

- Systems Analysts - study the business processes and designs the software

- Programmers - develops the software

Problems with Software

- Software is complex
- Difficult to test comprehensivly
- Can have *bugs:* these can be trivial or major
- Symptoms of bugs
  - hanging
  - crashes

The Graphical User Interface (GUI)

- Represents all the program / computer resources as *icons*

- Workspace represented graphically - creates 'virtual' documents

- More usable: led to wider use of computers

- Adds to the unique nature of the computer as both a *tool* and a *medium*

Do's and Don't's

- **DO**
- give the computer room to breathe
- keep it in a dry place
- dust free
- shut down properly
- keep removable storage away from the screen

- **DON'T**
- block air vents
- eat or drink while using the computer
- expose to extremes of temperature
- just switch off
- move while the computer is in operation

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