HNDIT1032 Computer and Network Systems

Week 1- Introduction to Computer

Course Aims

- To develop the fundamental skills required in installation, configuration, maintenance, troubleshooting and management of computers and communication between computers

Course Details

Course Code	HNDIT1032
Course Title	Computer and Network System
Semester	1
Course Status	Compulsory, GPA
Number of Credits	3
Hours	Lecture= 30 Hours Practical=30 Hours
Mode of Delivery	Lectures, Discussion, Presentation,

Assessment Summary

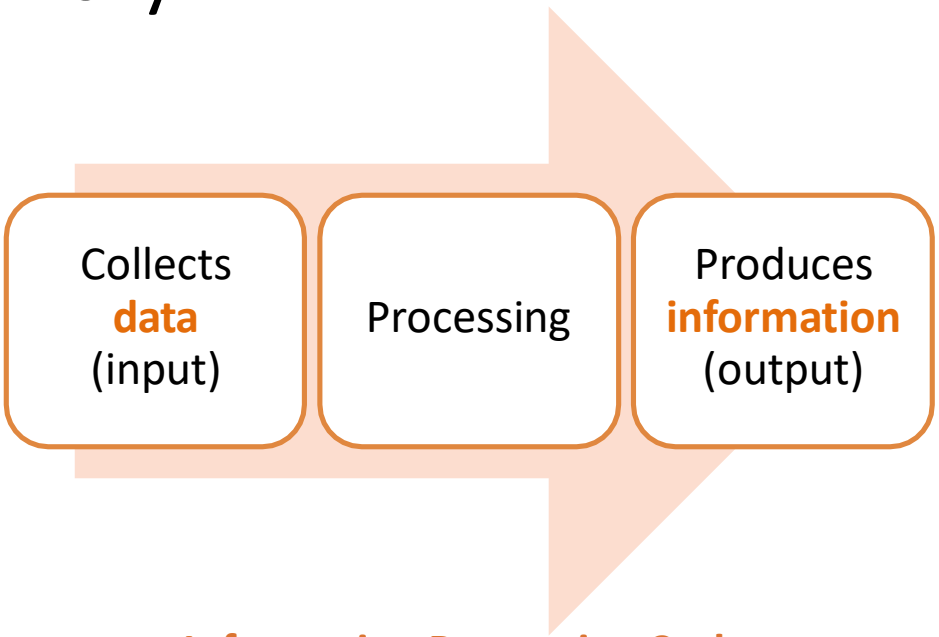
Assessment Method	Weightage
On-line quizzes and tutorials	20%
Assignments	20%
Final Examination	60%
Total	100%

Learning Outcomes(LO)

- After successful completion of this course the student should be able to:
  - LO1: describe how information and data are represented inside a computer system
  - LO2: assemble, disassemble and troubleshoot hardware related errors on a PC
  - LO3: install various operating systems, configure, maintain and troubleshoot.
  - LO4: identify the benefits of a networked environment and work in a networked environment

What is a computer ?

- A **computer** is an electronic device, operating under the control of instructions stored in its own memory



Information Processing Cycle

Data and Information

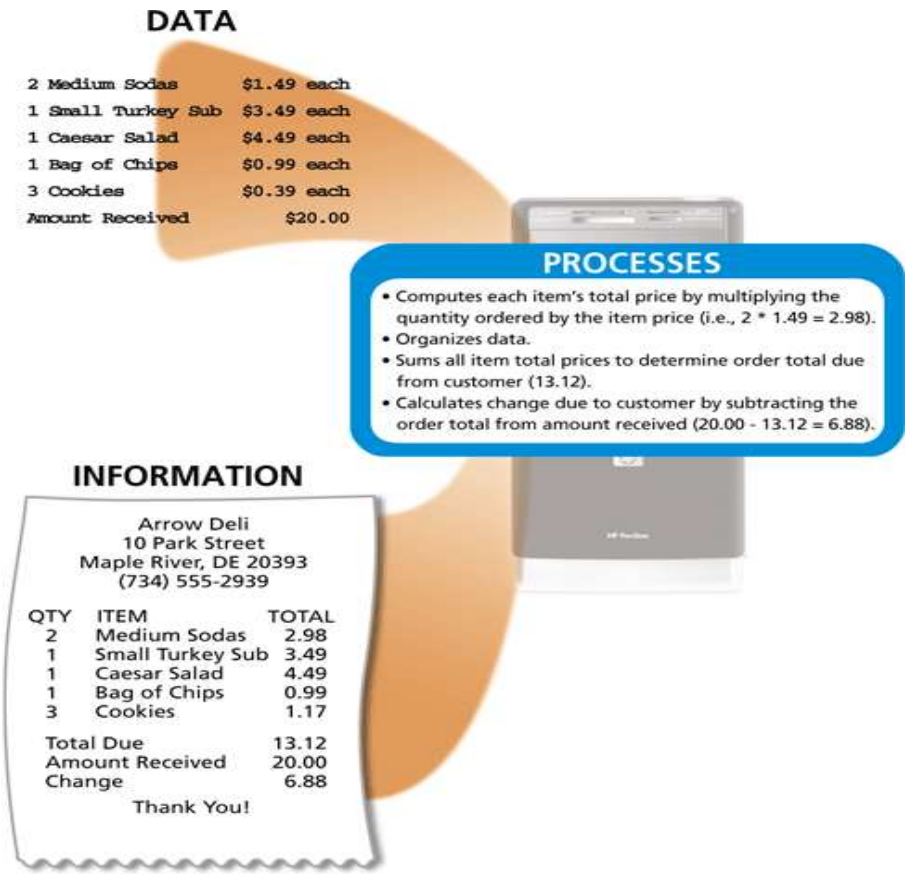
- Data :
  - collected row facts
  - Cannot be used for decision making

  Ex: Student Name, Exam marks, exam status
- Information:
  - Processed data
  - Can be used to decision making

  Ex: - Students name in alphabetical order.

  - Students who have passed the exam.

Data and Information…

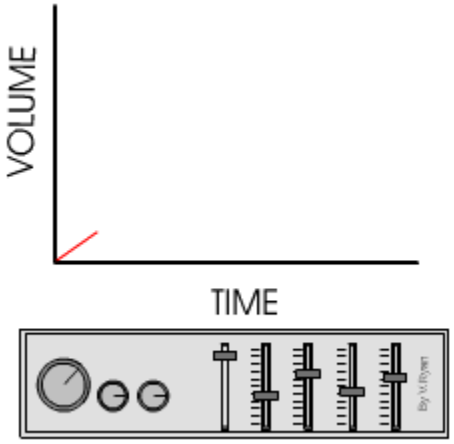


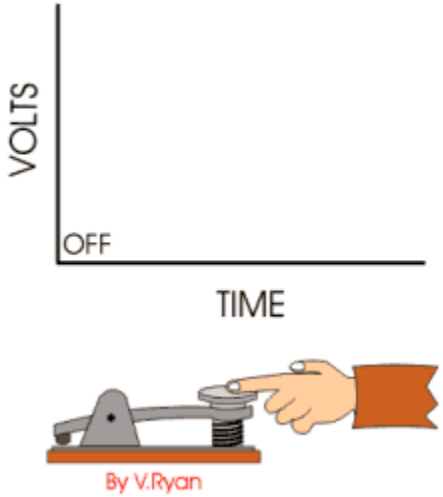
Data in Computing System

- Usually the computing systems are complex devices, dealing with a vast array of information categories
- The computing systems store, present, and help us modify:
  - Text
  - Audio
  - Images and graphics
  - Video

Forms of Data Representation

- The data can be represented in one or two ways
  - Analog
  - Digital



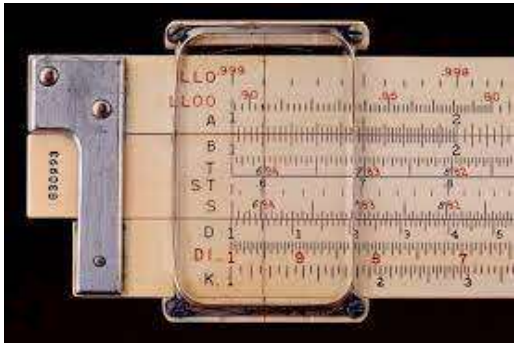


History of Computers

- Calculating Machines
- Napier’s Bones
- Slide Rule
- Pascal’s Adding and Subtraction Machine
- Leibniz’s Multiplication and Dividing Machine
- Punch Card System

History of Computers…

ABACUS

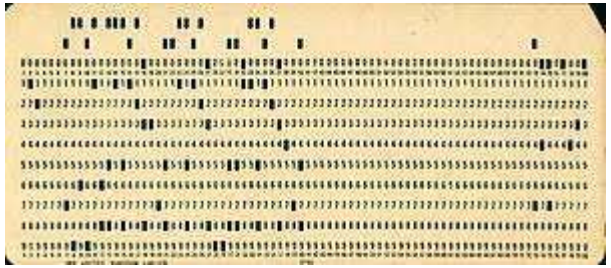


Slide Rule

Leibniz's Machine

Napier's Bones

Pascal's Machine



Punch Card System

Generations of Computers

- First Generation (Vacuum Tubes)
- Second Generation(Transistors)
- Third Generation(Integrated Circuit)
- Fourth Generation(Microprocessors)
- Fifth Generation(Artificial Intelligence)

First Generation(1940 to 1956) Using Vacuum Tubes

- Hardware Technology – The first generation of computers used vacuum tubes for circuitry and magnetic drums for memory.
- Software Technology- The instructions were written in machine language.
- Computing Characteristics - The computation time was in milliseconds.
- Physical Appearance- These computers were enormous in size and required a large room for installation.
- Application- Scientific application
- Example- Universal Automatic Computer (UNIVAC), Electronic Numerical Integrator And Calculator (ENIAC)

First Generation(1940 to 1956) Using Vacuum Tubes…

Second Generation(1956 to 1963) Using Transistors

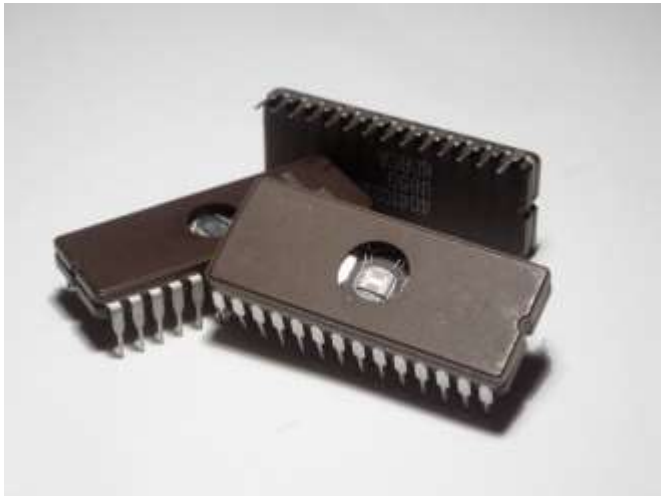
- Hardware Technology- Transistors, used magnetic tapes and magnetic disks for secondary storage.
- Software Technology – Assembly language
- Computing Characteristics- computation time was in microseconds.
- Physical Appearance-The size of the computer was also reduced.
- Application-commercial production of these computers was very high
- Examples PDP-8, IBM 1401 and CDC 1604.

Second Generation(1956 to 1963) Using Transistors…

Third Generation (1964 to 1971) Using Integrated Circuits

- Hardware Technology -Integrated Circuit (IC) chips. multiple transistors are placed on a silicon chip.
- Software Technology-High-level languages
- Computing Characteristics-computation time was in nanoseconds
- Physical Appearance-The size of these computers was quite small
- Application-Computers became accessible to mass audience.
- Examples IBM 370, PDP 11.

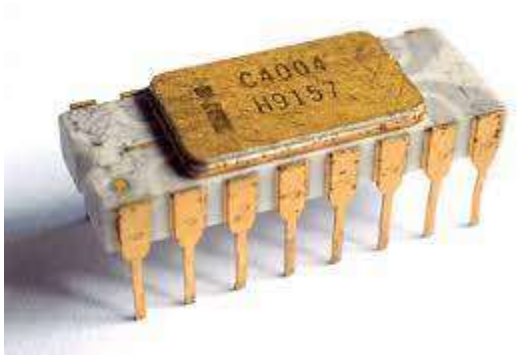
Third Generation (1964 to 1971) Using Integrated Circuits…



Fourth Generation(1971 to present) Using Microprocessors

- Hardware Technology -Microprocessor is a chip containing millions of transistors and components.
- Software MS-DOS and GUI based MS Windows
- Computing Characteristics-computation time is in picosecond
- Physical Appearance - smaller than the computers of the previous generation
- Application – Commercial purpose and personal computers
- Examples- IBM, Apple Macintosh

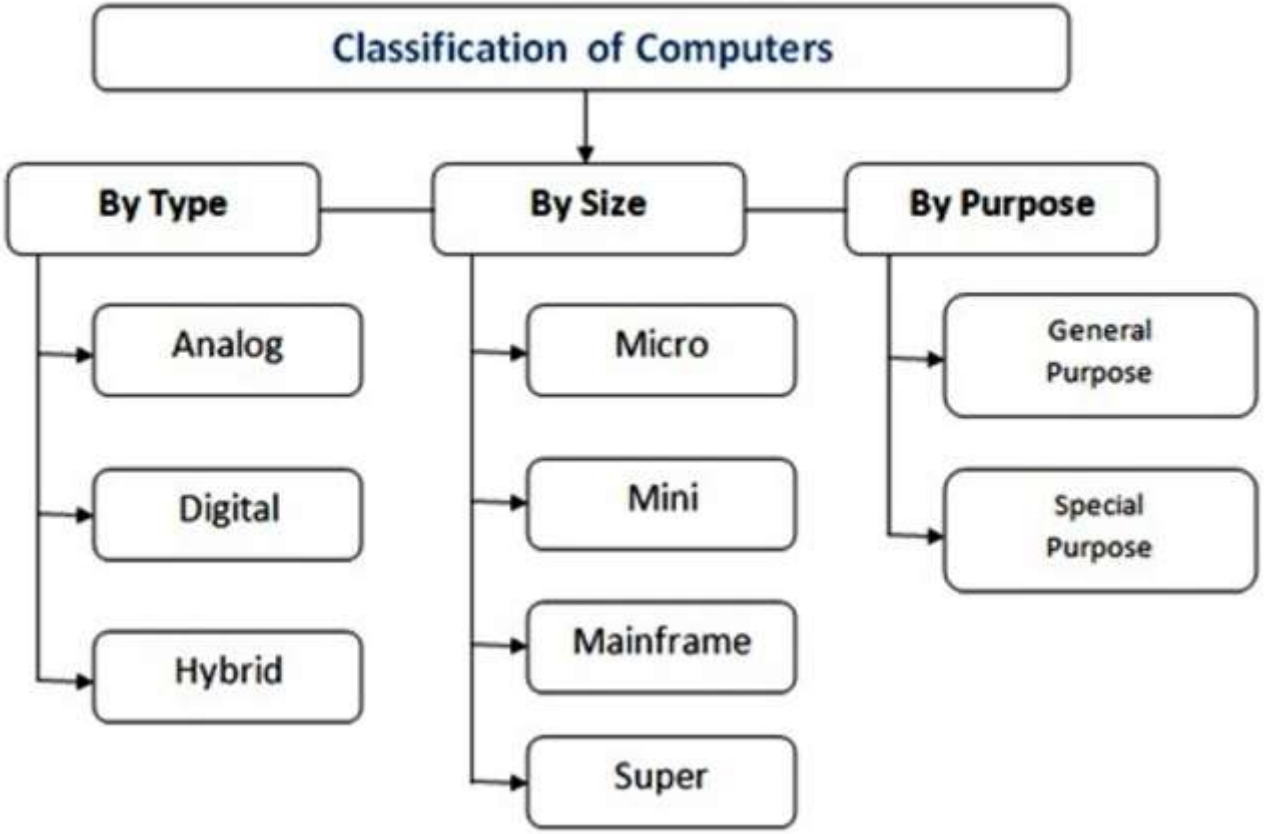
Fourth Generation(1971 to present) Using Microprocessors…



Fifth Generation(Present and Next) Using Artificial Intelligence

- Super Large Scale Integration
- Parallel processing
- Artificial Intelligence
- Natural Language Processing
- Speech Recognition
- virtual reality generation
- Satellite links
- Robotics

Classification of Computers



Microcomputers

- Microcomputers are
- Small
- Low-cost
- Stand-alone machines
- CPU, I/O devices, storage unit and OS
- Example-

Minicomputer

- Multi-user systems.
- High processing speed
- High storage
- Real-time applications in industries, research centers, etc.
- PDP 11, IBM (8000 series)

Mainframe Computers

- Multi-user, multi-programming and high performance computers.
- very high speed, very large storage capacity
- Large and powerful systems generally used in centralized databases.
- Examples -CDC 6600 and IBM ES000 series.

Supercomputers

- Fastest and the most expensive machines.
- The speed measured in FLOPS (Floating point Operations Per Second).
- Trillions of calculations per second.
- Interconnecting thousands of processors that can work in parallel.
- Example- IBM Roadrunner, IBM Blue Gene, PARAM

Applications of computer

- Home
- Education
- Science
- Industry
- Entertainment
- Banking
- Government

Applications of computer…

- At Home
  - Mostly to check mails
  - Small documentation
  - Gaming
  - Music and Video
  - To solve homework
  - Photo Printouts using Good Printers
  - Work from Home concept

Applications of computer…

- In Education
  - Schools to Universities
  - To Educate necessary skills demanded by Industries
  - To give a demo or training
  - Server the purpose of Teaching Aids
  - To convey messages using Internet

Applications of computer…

- In Science
  - To analyze large data acquired over a period of time
  - To do complex floating point arithmetic
  - Image Processing
  - Research

Applications of computer…

- In Industry
  - To develop software, mostly to automate the manual work
  - To provide necessary solution to clients' needs
  - Software is developed for the needs of networking, banking, business, retail etc

Applications of computer…

- Entertainment
  - Music Industry
  - Games
  - Movies – to watch and create – 200 Linux Machines in parallel to create visualization in Titanic, the movie
  - IIIly Cartoons, special effects
  - Nowadays to promote theirs productions

Applications of computer…

- Banking
  - To store, access and modify huge amounts of data
  - Online business called e-business is becoming popular with a small amount of limitations
  - Paying bills become easy and time saving
  - online promotions

Applications of computer…

- Government
  - “Biometrics Attendance Monitoring”
  - Weather Forecasting and military applications
  - E- governance
  - Online payment of taxes, Insurances
  - Send Messages to virtually unreachable places at present
  - Wireless communication

Block Diagram of computer

- The computer system hardware comprises of three main components
  - Input/output (I/O) Unit,
  - Central Processing Unit (CPU),
  - Memory Unit.

Input/output Unit

- The user interacts with the computer via the I/O unit.
- The Input unit converts the data that it accepts from the user, into a form that is understandable by the computer.
- Output unit provides the output in a form that is understandable by the user
- Input devices like keyboard, trackball and mouse
- output devices are monitor and printer.

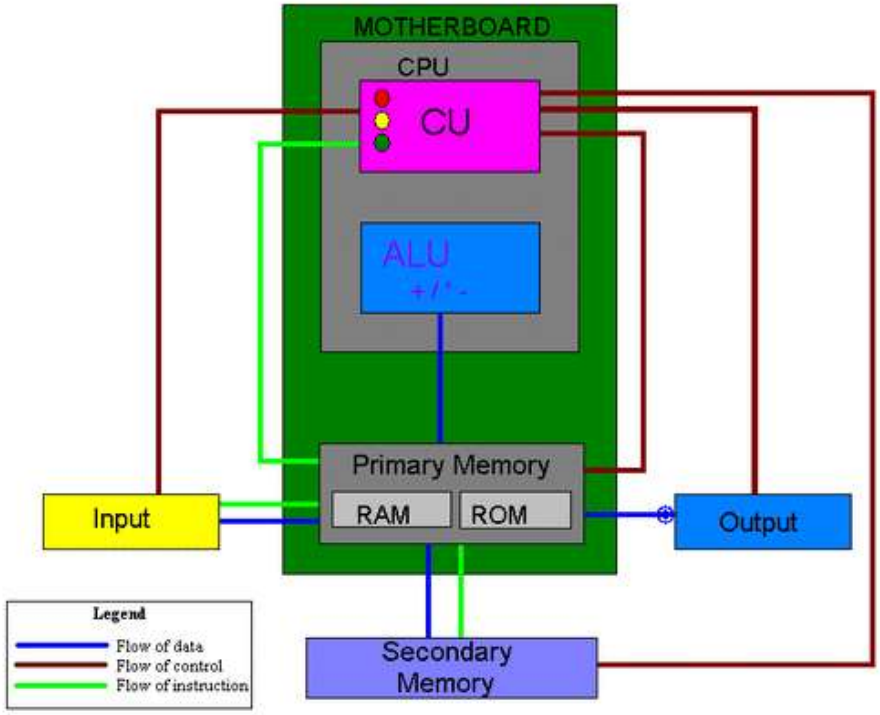
Central Processing Unit

- CPU controls, coordinates and supervises the operations of the computer.
- CPU consists of Arithmetic Logic Unit (ALU) and Control Unit (CU).
- ALU-performs all the arithmetic and logic operations on the input data.
- CU controls -checks the sequence of execution of instructions, and, controls and coordinates the overall functioning of the units of computers
- CPU also has a set of registers for temporary storage of data, instructions, addresses

Memory Unit

- Stores the data, instructions, intermediate results and output, temporarily, during the processing of data.
- The input data that is to be processed is brought into the main memory before processing.
- The output is stored in memory before being transferred to the output device.
- Main memory is primary memory of computers
- secondary memory - The data, the programs and the output are stored permanently in the storage unit of the computer.
- Magnetic disks, optical disks and magnetic tapes are examples of secondary memory

Block Diagram



Block diagram of Computer with sub-units of CPU

Created by: MUHAMMAD KAMRAN KHAN

Next Week Discussion

- How to represent Data?