



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, Assignment, Practical, blended learning

Assessment Summary

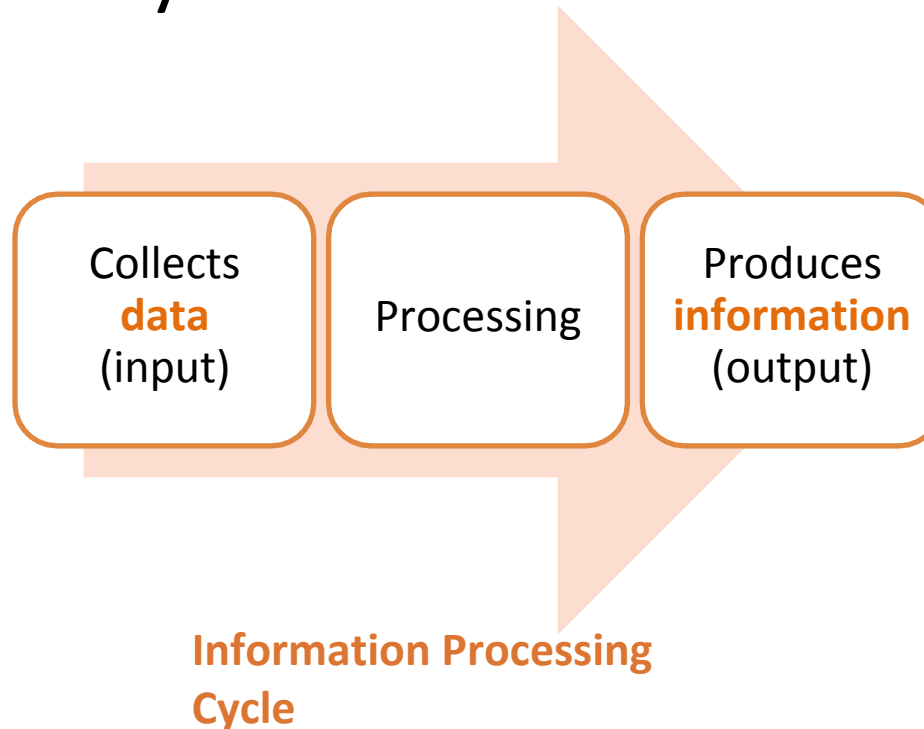
Assessment Method	Weightage
On-line quizzes and tutorials	20%
Assignments	20%
Final Examination	60%
Total	100%

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



Data and Information

- Data :
 - collected raw 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

2 Medium Sodas	\$1.49 each
1 Small Turkey Sub	\$3.49 each
1 Caesar Salad	\$4.49 each
1 Bag of Chips	\$0.99 each
3 Cookies	\$0.39 each
Amount Received	\$20.00

PROCESSES

- Computes each item's total price by multiplying the quantity ordered by the item price (i.e., $2 * 1.49 = 2.98$).
- Organizes data.
- Sums all item total prices to determine order total due from customer (13.12).
- Calculates change due to customer by subtracting the order total from amount received ($20.00 - 13.12 = 6.88$).

INFORMATION

Arrow Deli
10 Park Street
Maple River, DE 20393
(734) 555-2939

QTY	ITEM	TOTAL
2	Medium Sodas	2.98
1	Small Turkey Sub	3.49
1	Caesar Salad	4.49
1	Bag of Chips	0.99
3	Cookies	1.17
Total Due		13.12
Amount Received		20.00
Change		6.88

Thank You!

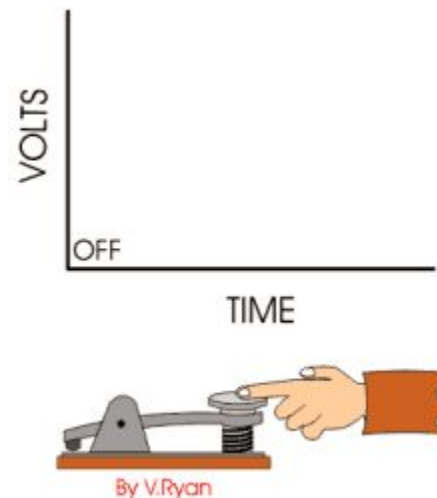
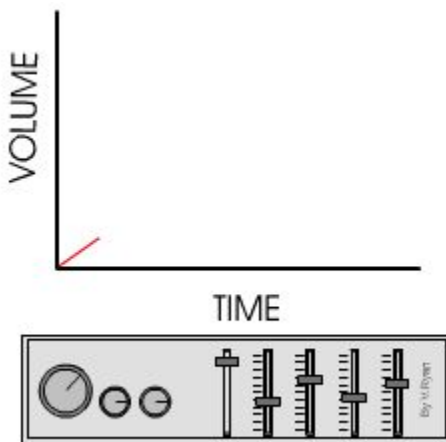
Data in Computing System

- 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



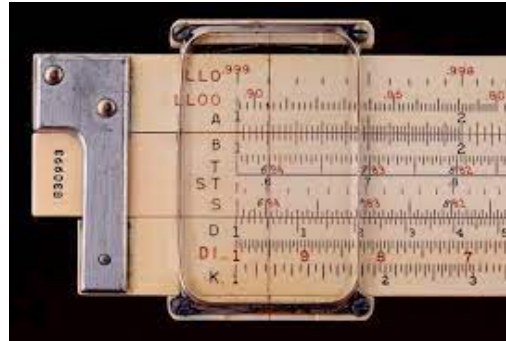
History of Computers

- 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...



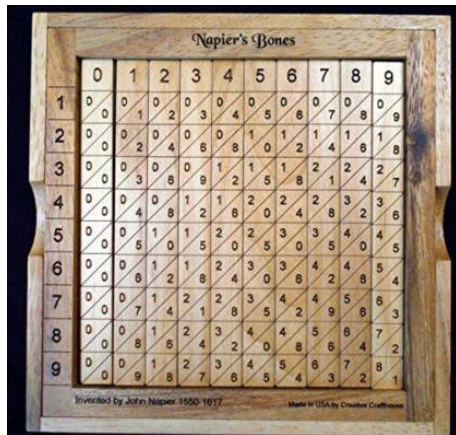
ABACUS



Slide Rule



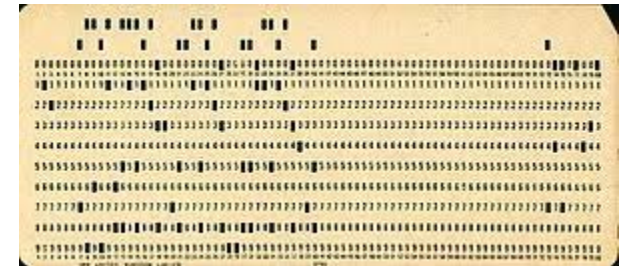
Leibniz's Machine



Napier's Bones



Pascal's Machine



Punch Card System

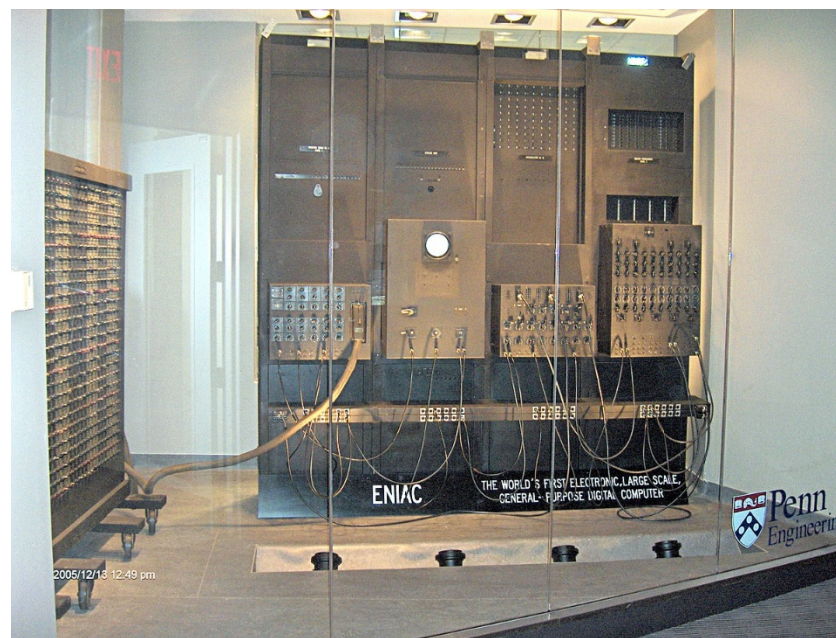
Generations of Computers

- 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.

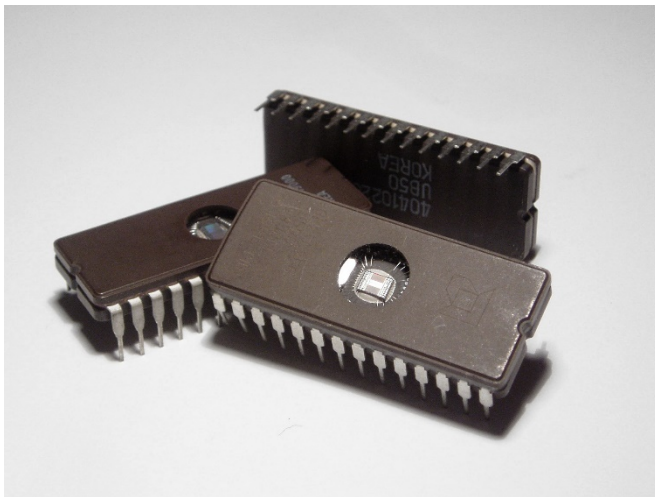
Second Generation(1956 to 1963) Using Transistors...



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...

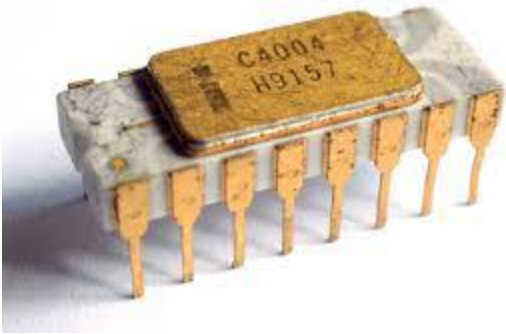


Fourth Generation(1971 to present)

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

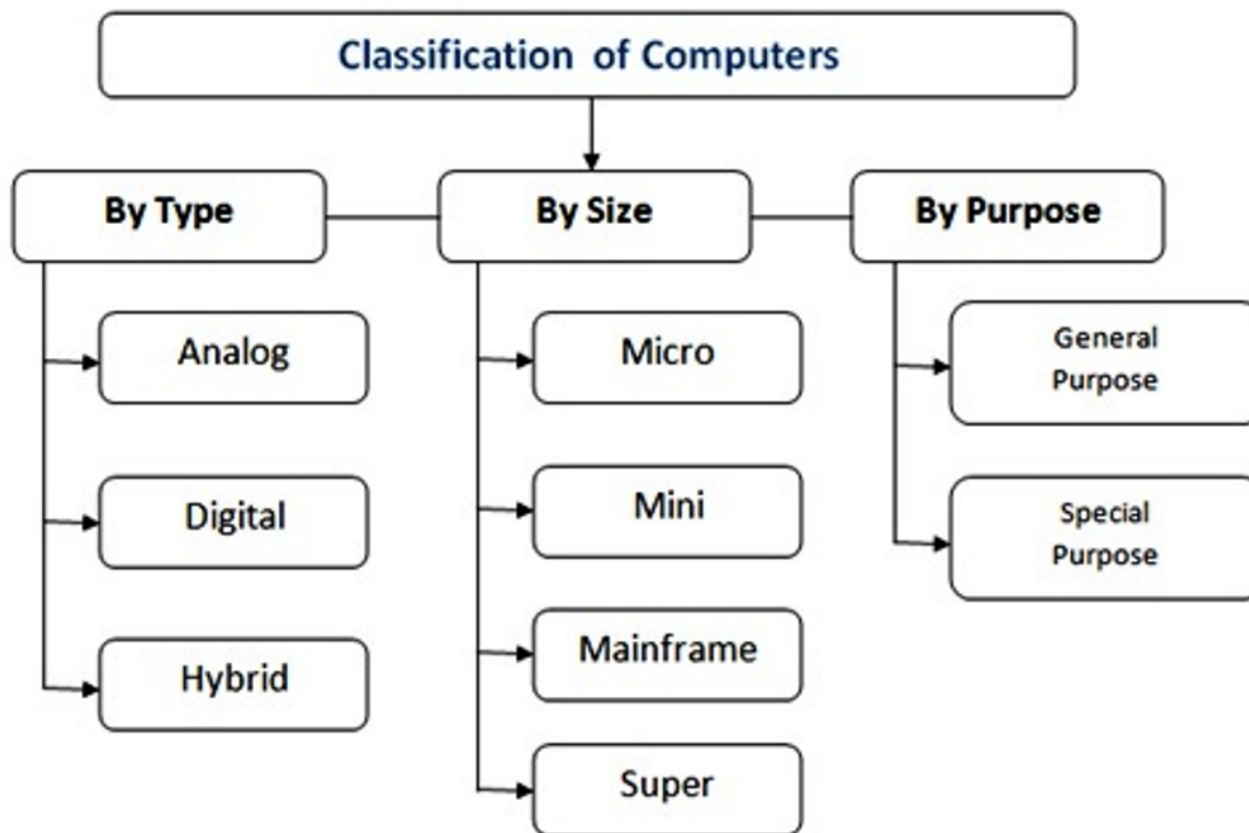
Fourth Generation(1971 to present) Using Microprocessors...



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-



*Desktop
Computer*



Laptop



Netbook



Hybrid



Tablet



*Smart
phone*

Minicomputer

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



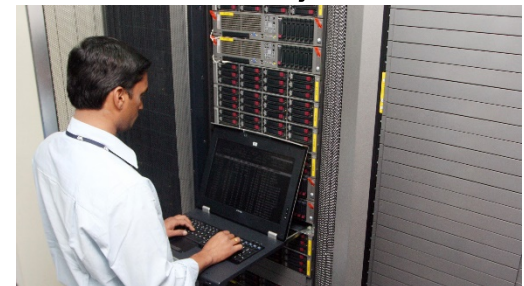
Mainframe Computers

- 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
 - Ill^{ly} 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.

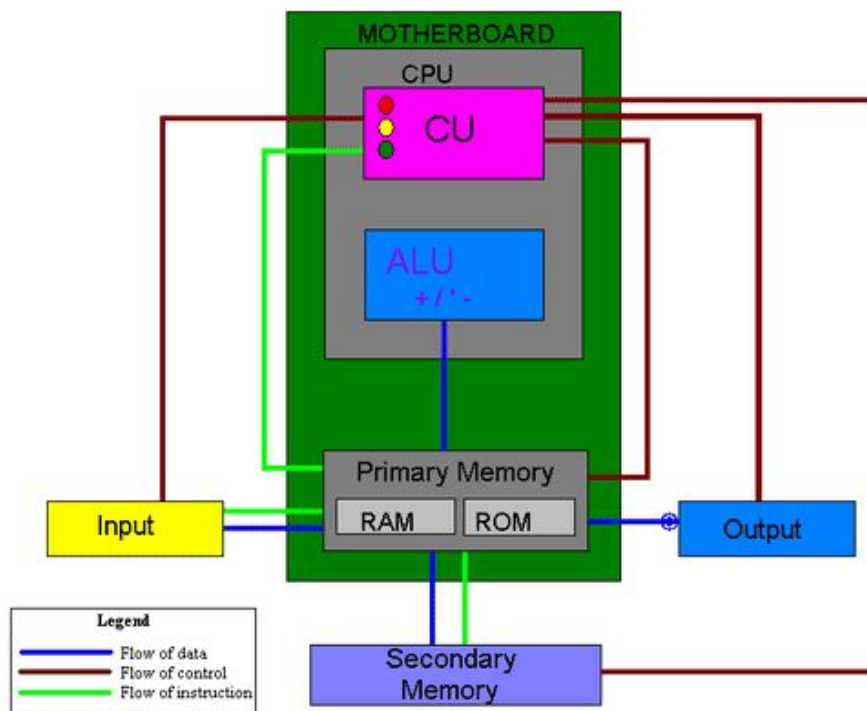
Central Processing Unit

- 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

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Next Week Discussion

- How to represent Data?