CMP1103: INFORMATION & COMMUNICATION TECHNOLOGY

- LECTURES: Monday 10am - 12pm

    Tuesday : 10am – 12pm

- Venue: CEDAT Conference Hall, M1

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    Room 163, Old Building

INTRODUCTION: DEFINITIONS

- **ICT:** - According to the International Literacy Panel , "ICT literacy" is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society."

- **ICT** is therefore an umbrella 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.

ICT DEFINITION CONT'D

- A diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony.

INFORMATION TECHNOLOGY (IT)

- As defined by the Information Technology Association of America (ITAA), "**IT** is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware."

- In general terms, it is any technology that deals with production, manipulation, storage, communication, and/or dissemination of information.

- Information Technology involves the use of hardware, software, services, and supporting infrastructure to manage and deliver information using voice, data, and video.

- It includes computers and communication systems.

THE RELATIONSHIP BETWEEN IT AND ICT

- **IT comprises the knowledge, skills and understanding** needed to employ information and communications technologies appropriately, securely and fruitfully in learning, employment and everyday life.

- **Any product that stores, retrieves, manipulates, transmits or receives information electronically in a digital form can be called an ICT product.**

COMPUTER HISTORY

- The First Calculators: **The Abacus**

- Originated from Asia

- For performing arithmetic pro

- 500-1000 BC
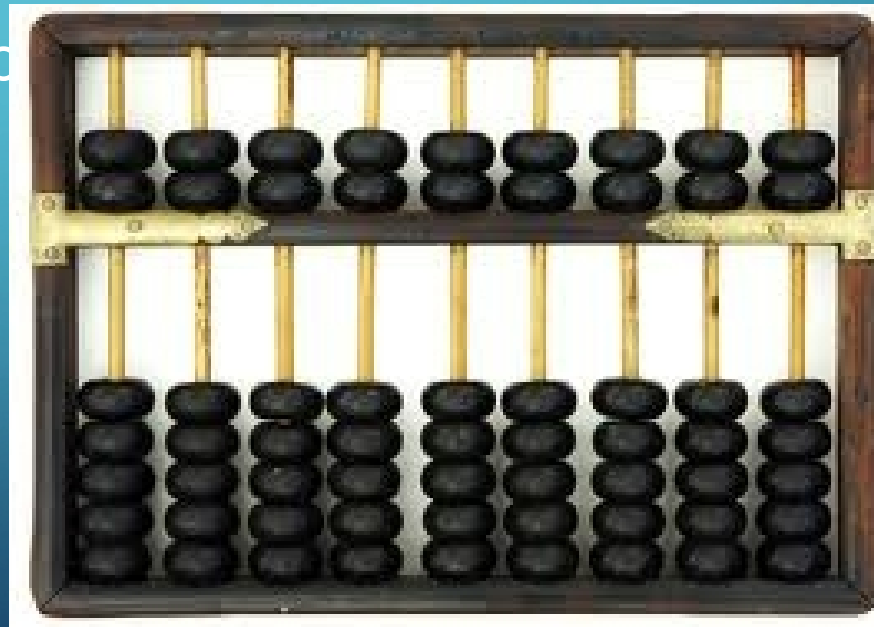
THE MECHANICAL AGE: 1450 - 1840
THE FIRST GENERAL PURPOSE "COMPUTERS"

- The **slide rule** in the **1620**

- Invented by William Oughtred and Edmund Gunter

- Based on the emerging work on logarithms by John Napier.

- Used primarily for **multiplication** and **division**, and also for functions such as **roots**, **logarithms** and **trigonometry**, but is not normally used for **addition** or **subtraction**.

SLIDE RULE
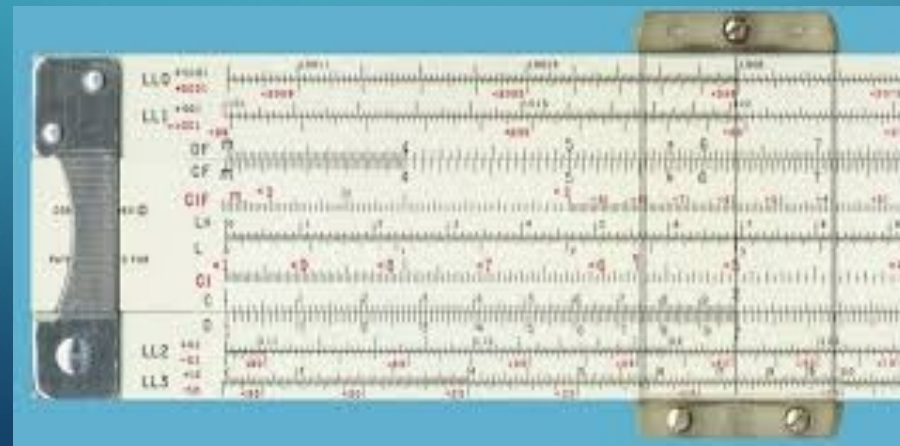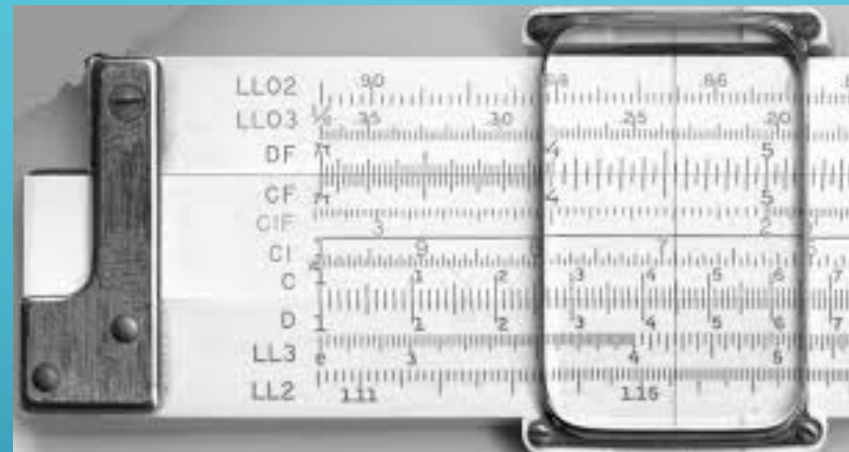
PASCAL'S CALCULATOR – THE PASCALINE

- Invented by Blaise Pascal in 1642

- Only add and subtract

- also called the "numerical wheel calculator

THE LEIBNIZ'S MECHANICAL MULTIPLIER

- Gottfried Wilhelm von Leibniz, the German philosopher and law professor in 1673.

- Multiplication by repeated addition and shifting

THE DIFFERENCE ENGINE

- Proposed by Charles Babbage in 1822

- Automatic mechanical calculator designed to tabulate polynomial functions

THE ELECTRONIC AGE: 1940 – PRESENT

- Four generations of computers have evolved.

- Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, and more powerful, efficient and reliable devices.

THE FIRST GENERATION: 1946-1958

- The Electronic Numerical Integrator and Computer (ENIAC)

- Built by Presper Eckert and John Mauchly

- Used vacuum tubes

- Took up a lot of space and gave off a great deal of heat

- Could perform 5,000 simple addition or subtraction operations

- weighed more than 30 short tons (27 t), was roughly 8 by 3 by 100 feet (2.4 m × 0.9 m × 30 m), took up 1800 square feet (167 m^2), and consumed 150 kW of power.
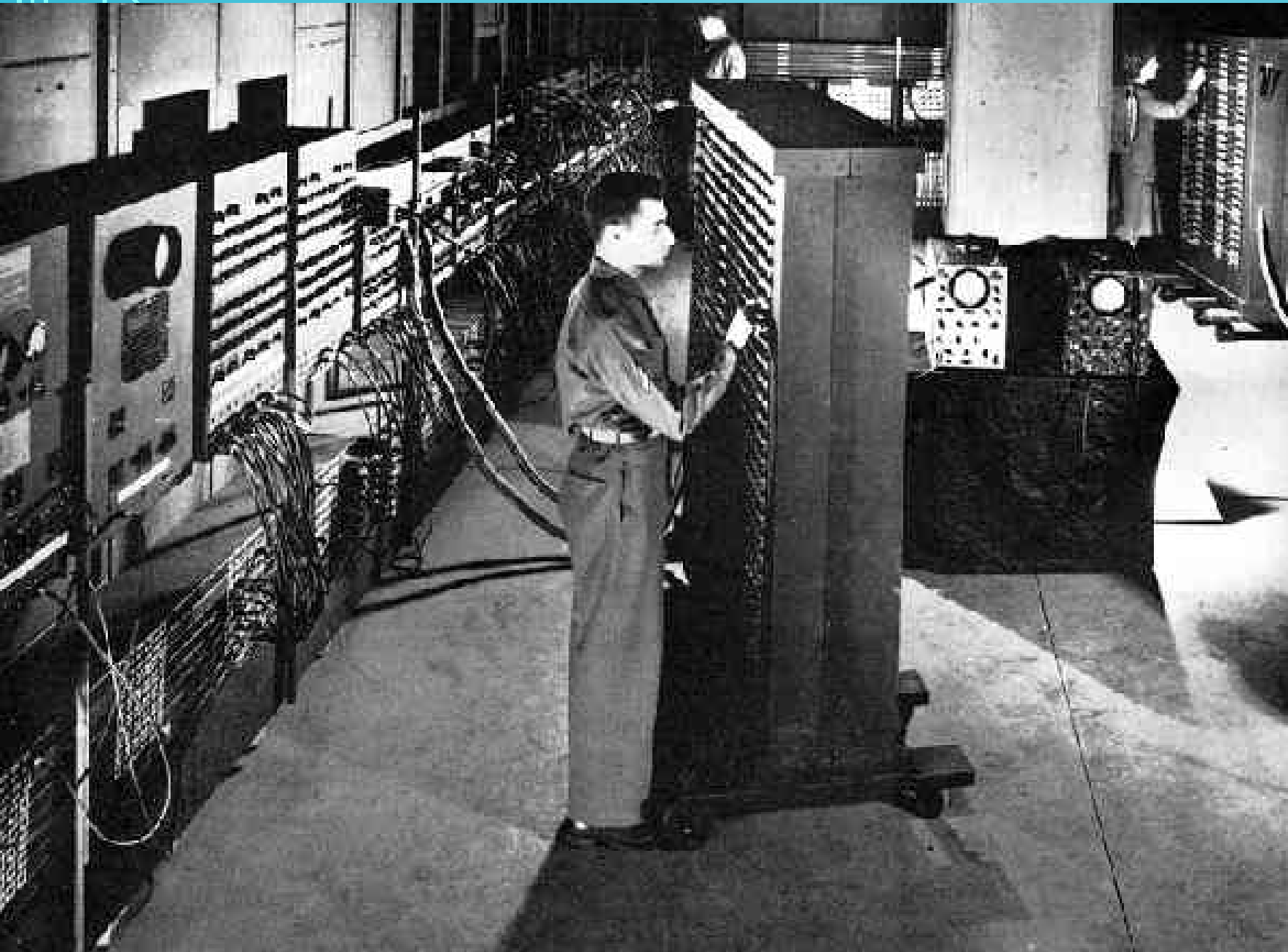
THE SECOND GENERATION: 1959-1964

- Used Transistors.

- transistor was faster, more reliable, smaller, and much cheaper to build than a vacuum tube. One transistor replaced the equivalent of 40 vacuum tubes.

- Generated Less heat

- Smaller than First Generation computer

- Moved from binary machine language to symbolic, or assembly languages, which allowed programmers to specify instructions in words.

SECOND GENERATION CONTD…

- High – level Programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN

- First computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

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; Example of IBM PC assembly language
; Accepts a number in register AX;
; subtracts 32 if it is in the range 97-122;
; otherwise leaves it unchanged.

SUB32   PROC            ; procedure begins here
        CMP   AX,97      ; compare AX to 97
        JL    DONE       ; if less, jump to DONE
        CMP   AX,122     ; compare AX to 122
        JG    DONE       ; if greater, jump to DONE
        SUB   AX,32      ; subtract 32 from AX
DONE:   RET             ; return to main program
SUB32   ENDP            ; procedure ends here
```

Fig.1
The original transmission of 1679 pulses in binary code.

THE THIRD GENERATION:

- Used Integrated Circuits (Large Scale Integrated Circuits - LSI)

- The integrated circuit, packs a huge number of transistors onto a single wafer of silicon.

- Placing such large numbers of transistors on a single chip vastly increased the power of a single computer and lowered its cost considerably.

- could carry out instructions in billionths of a second

- size of these machines dropped to the size of small file cabinets.

THIRD GENERATION…

- Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory.

- First commercially available computers

THE FOURTH GENERATION: 1971-TODAY

- Used Microprocessors (Very Large Scale Integrated Circuits- VLSI)

- A single chip that could do all the processing of a full-scale computer.

- By putting millions of transistors onto one single chip more calculation and faster speeds could be reached by computers. This is due to the fact that electricity travels about a foot in a billionth of a second, the smaller the distance the greater the speed of computers.

- 1970's - people began buying computers for personal use.

- Fourth generation computers also saw the development of Graphical User Interfaces, the mouse and hand-held devices

FIFTH GENERATION

- 1980-date ; ULSI – Ultra large scale integration from VLSI

- Based on parallel processing and Artificial Intelligence (AI)

- Computers will have cognitive abilities i.e. the ability to learn and adapt to changing situations

- Includes Natural Language processing –What could be AI inputs?

- AI includes Neural Networks, Machine Learning, Robotics

- What of Cloud computing, big data, Is Quantum Computing 7th Generation?

A COMPUTER : DEFINITION

- An electronic device that accepts input of data, processes it according to specific instructions, outputs the resulting information and may store it for future use.

- **Data**:- The quantities, characters, or symbols on which operations are performed by a computer

- **Information: -** Data that has been processed.

PARTS OF A COMPUTER

- **Software** – Set of instructions that give/specify/determine the computer functionalities or operation

- **Hardware** – Physical and tangible components that make up the computer system

- **Humanware** – Human users of the computer system who interact with the software and hardware to achieve desired objectives on the computer

COMPUTER HARDWARE

- Input Devices

- Output Devices

- Storage Devices

INPUT DEVICES

Any machine that feeds data into a computer.

- Keyboard

- Mouse

- Touch Screen

- Scanner

- Camera

- Microphone

- Light pen

OUTPUT DEVICES

- Monitors.
- Projectors.
- Printers.
- Speakers.
- Headphones.
- Plotters.
- DVD writers.
- Fax machine.

STORAGE DEVICES

- Hard disk
- DVDs
- CDs
- Magnetic tape
- Flash memory (USB memory sticks)
- Cassette tapes