

Introduction to Information and Communication Technology

IT in Supply Chain
Supply Chain Management, MSc

Few Details

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Etymology

- **INFORMATION:** Information represents a new knowledge which is obtained from an acquisition process (e.g. reading, learning, research) and helps people to fulfill everyday tasks.
- **COMMUNICATION:** Advertise the information to publicity
- **TECHNOLOGY:** Technology is a tool which enables the design of devices that ease people's everyday life. The knowledge behind the technology is based on science, research and experience.

Historical eras of ICT

Phylogeny of Information Technology:

- Pre-mechanical era (B.C.E. 3000 – C.E.1450)
- Mechanical era(1450 - 1840)
- Electro mechanical era (1840 - 1940)
- Electronic era (1940 – till now)



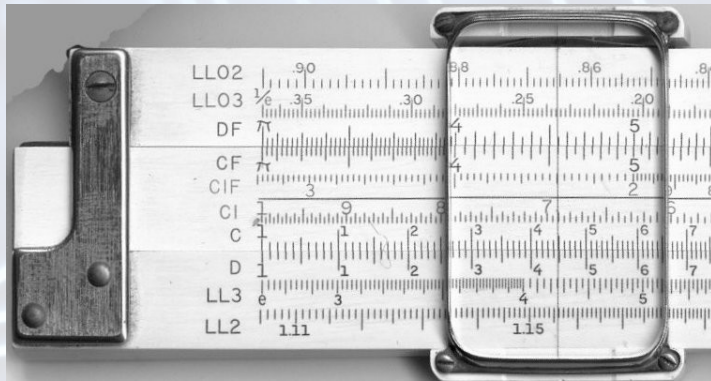
Pre-mechanical era (B.C.E. 3000 – C.E.1450)

- Rock carvings
- Writing and alphabets
- Paper and pens
- Books and libraries
- The first numbering system
- The first calculator (Abacus)



Mechanical era (1450 - 1840)

Slide rule



Pascaline



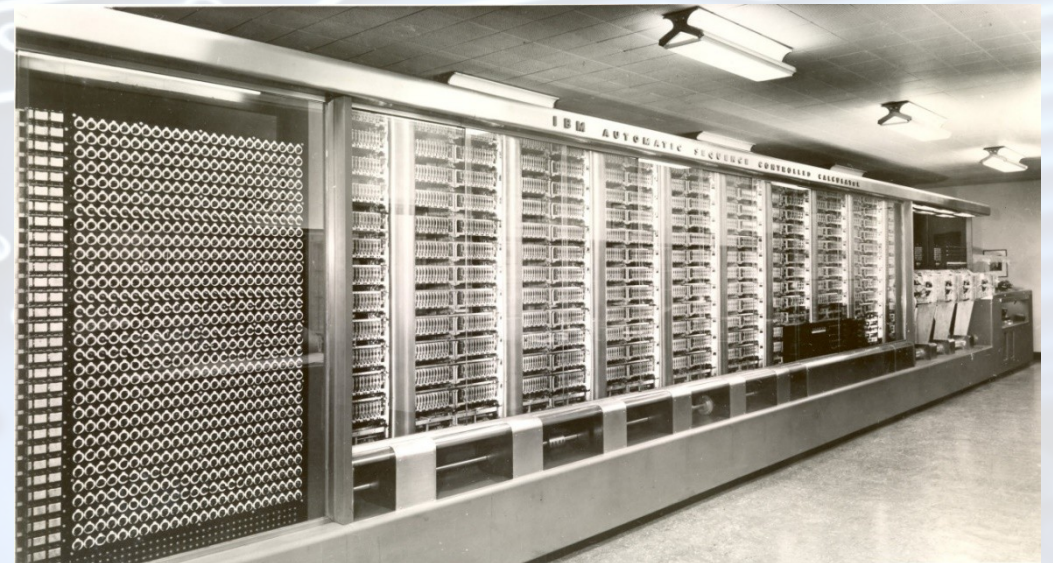
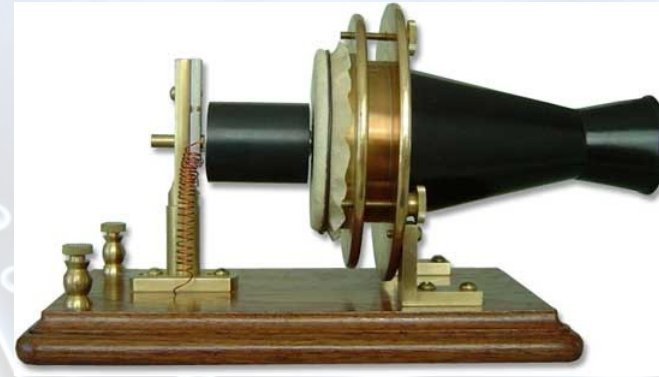
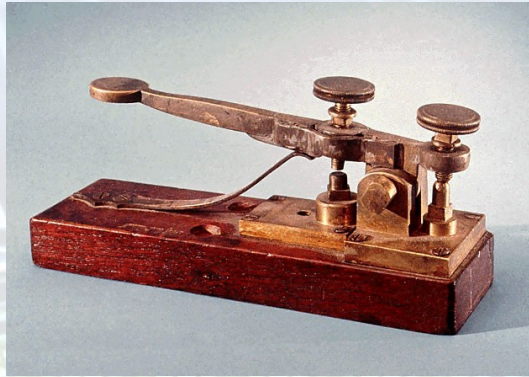
Difference engine

Electro mechanical era (1840 - 1940)



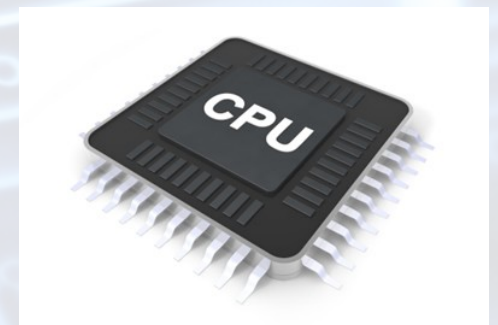
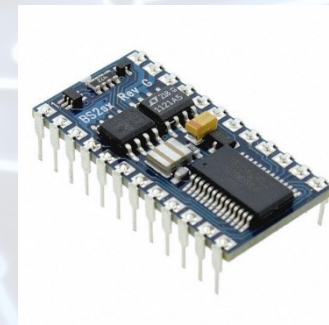
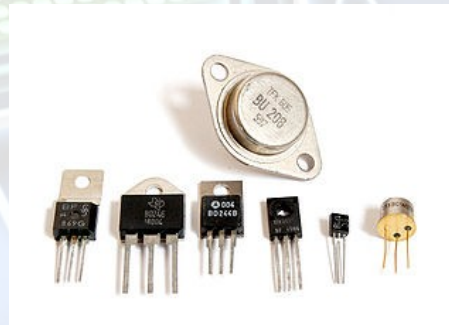
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- Telegraph
- Morse code
- Telephone
- Radio
- Harvard Mark 1 (weighted 5 tons)



Electronic era - beginning (1940 - present)

- vacuum tubes and rotating magnetic drums (ENIAC & Mark 1)
- transistors, magnetic tape and magnetic cores (FORTRAN & COBOL)
- integrated circuits and semiconductors (BASIC)
- CPU, memory, logic and control circuits (Apple II)



Electronic era - present (1940 - present)



- ICT
- e-Marketing
- e-Commerce
- e-Learning
- e-Health Care
- e-Governance
- Smart devices
- Smart homes
- Smart cities
- Internet of Things
- Global and indoor positioning
- Autonomous systems

Data vs. information

Data

- Unorganized facts that need to be processed
- Useless until they will be organized

Information

- Processed and organized data
- Have a meaningful value for the receiver

Basic types of data

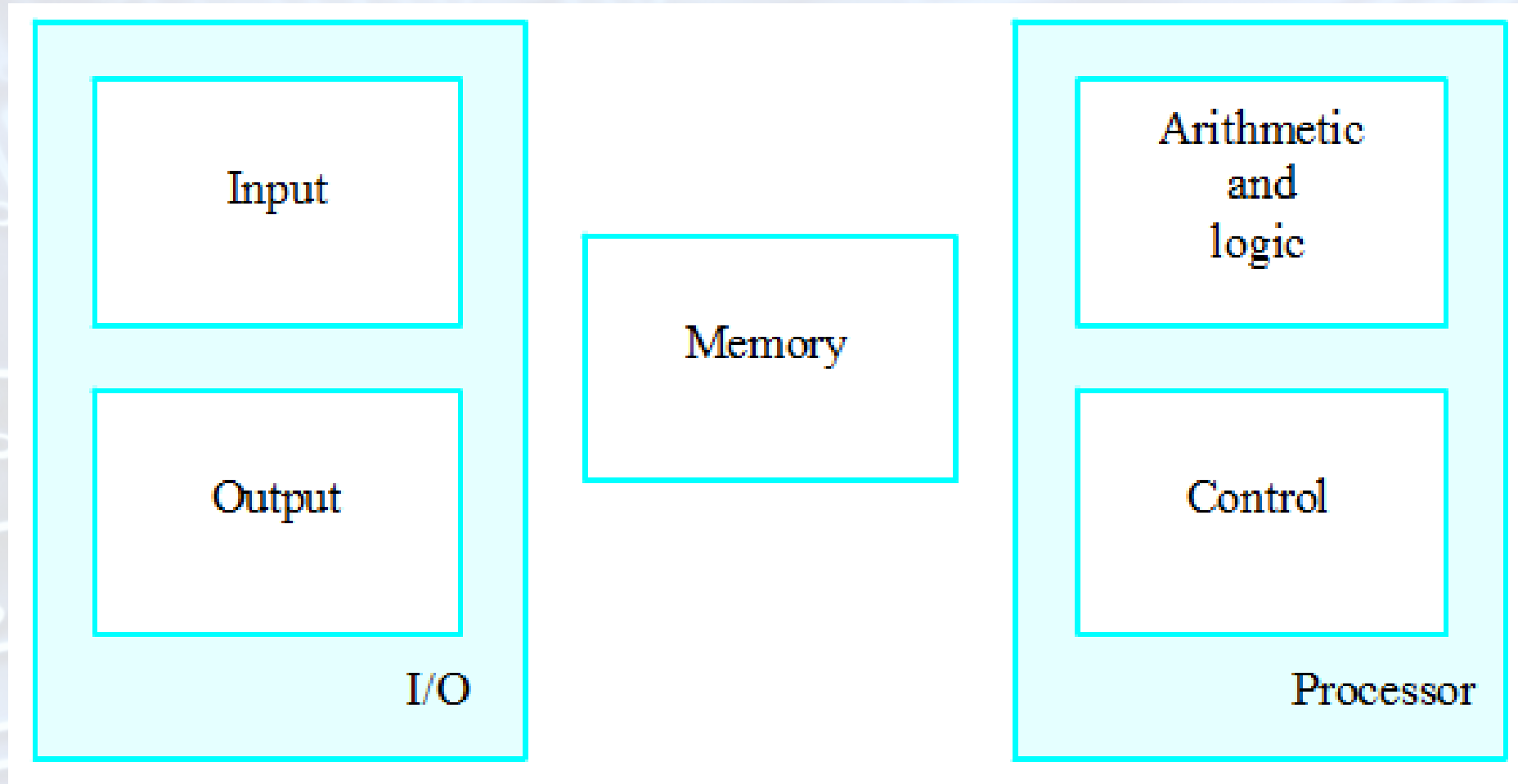
- Numeric
- Text
- Image
- Voice
- Video



Functional Units of PC



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PC inputs

- Keyboard
- Mouse
- Touch pad
- Scanner
- Touchscreen
- Microphone
- Joy-stick
- Code readers
- Drawing table
etc.





PC outputs

- Monitor or projector
- Plotter
- Printer





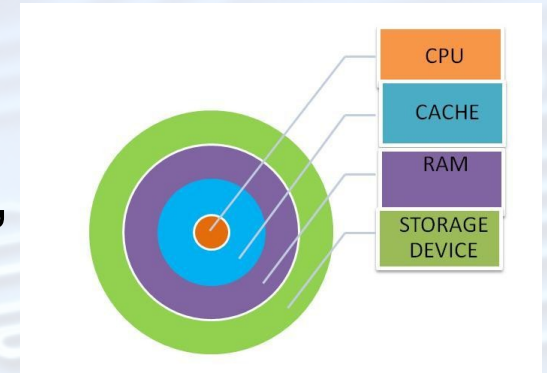
Data Processing Workflow

- ✓ Acquisition
- ✓ Preparation
- ✓ Input
- ✓ Processing
- ✓ Output and utilization
- ✓ Storage



Data Storage

- Primary storage (CPU registers, cache)
- Secondary storage (HDD, SSD, flash memory, CD,
- Nearline (Near-Online) storage (cassette library)





Neumann Architecture

Neumann's 6 concepts:

1. Fully electronic device.
2. Sequential commands – one command at once
3. Binary scale
4. Memory utilization
5. Stored-program concept
6. Universal utilization



Evolution of Computers

1st GENERATION:

- Vacuum tubes, processor-centric
- Speed: ~100 operations/sec
- Enormous size, very high power consumption, expensive
- Few prototypes

Evolution of Computers

2nd GENERATION:

- Semiconductors, transistors, storage-centric
- Speed: measured in micro seconds
- Decreased size, decreased power consumption, lower price
- From binary to Assembly
- First high-level programming languages
- First operating systems
- Batch processing



Evolution of Computers

3rd GENERATION:

- Integrated Circuits, Operative Memory (RAM)
- Speed: measured in nano seconds
- Modular structure, smaller size
- Multi-programming, time-divisional operation
- Highly reliable



Evolution of Computers

4th GENERATION:

- Microprocessors, Multiprocessors
- LSI (Large Scale Integration) and VLSI (Very LSI)
- Speed: measured in picoseconds
- Increased role of software
- Computer Networks (Internet)

Evolution of Computers

5th GENERATION (present and beyond):

- Cognitive structure for special tasks
- Parallelism
- Logical Programming Language
- Human Machine Interface (HMI) for recognition (voice, image, handwriting)
- Separate problem-solving module
- Artificial Intelligence (AI)

Computer Software

Operation Systems:

- DOS
- Windows
- Unix
- Linux
- MAC OS
- RTOS

Programming Languages:

- Ada
- Basic
- C, C++, C#
- Cobol
- Fortran
- Java
- Pascal
- Python
- PHP, etc.

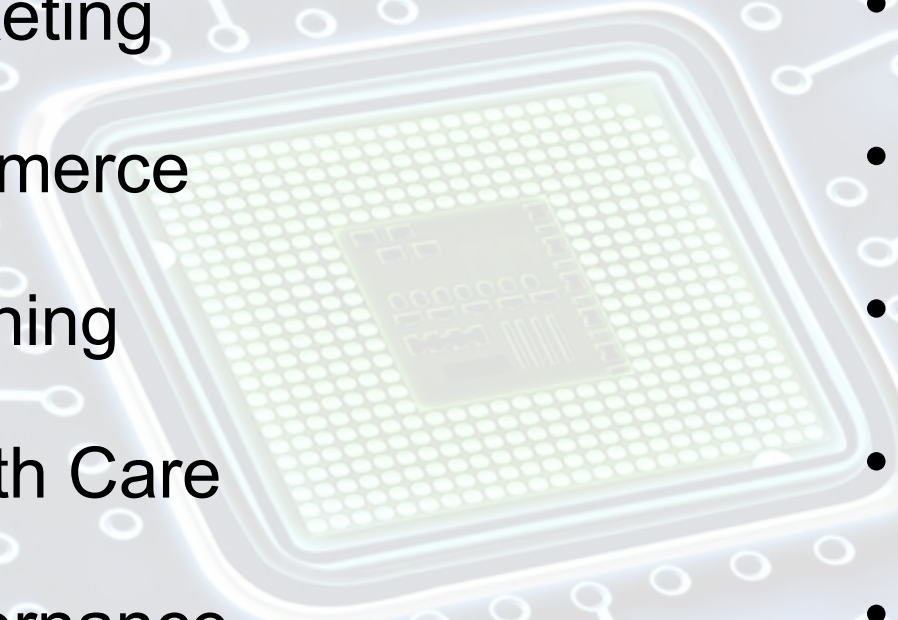
ICT

Information and Communication Technology covers any technology that assists in developing, manipulating, storing and forwarding information.

ICT: the fastest growing field



Present and future

- 
- ICT
 - e-Marketing
 - e-Commerce
 - e-Learning
 - e-Health Care
 - e-Governance
 - Smart Devices
 - Smart Homes
 - Smart Cities
 - Smart Security
 - Global and Indoor Navigation
 - Autonomous systems, etc.



Future ICT Research Fields

- E-Commerce, Intelligent Commerce
- Intelligent Business Control
- Intelligent Supply Chain Management
- Intelligent Human Resource Management
- IT Outsource Management
- Data Mining, Data Modeling
- E-Governance
- Recommender Systems
- Virtual Reality, Extended Reality and 3D internet
- Navigation and autonomous systems
- Intelligent Networking (Mesh)

**Thank you for your
attention!**

