

Computer and Information Technology

LECTURE 1

A LONG WALK OF EVOLUTION

Finding a Definition for Computer

A computer is a machine or device that performs processes, calculations and operations based on instructions provided by a software or hardware program. It has the ability to accept data (input), process it, and then produce outputs.

Computers can also store data for later uses in appropriate storage devices, and retrieve whenever it is necessary.

(techopedia.com)

Finding a Definition for Computer

A computer is a programmable electronic device designed to accept data, perform prescribed mathematical and logical operations at high speed, and display the results of these operations

(dictionary.com)

Finding a Definition for Computer

A computer is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. Modern computers have the ability to follow generalized sets of operations, called programs. These programs enable computers to perform an extremely wide range of tasks.

(wikipedia.org)

Finding a Definition for Computer

A computer is an electronic device that accepts data and instructions as inputs, manipulates the inputs and then stores or displays the outputs.

It is a data processor as it stores, process and helps us to retrieve data from it whenever it is necessary.

Finding a Definition for Computer

A computer is.....

an electronic
device

programmed
or instructed

to perform automatically

to receive
inputs

Process them
as per
instruction to

generate
outputs

or to store
them to
retrieve later

Characteristics of Computer

1. Speed

Very Fast device capable of doing a regular human's entire year's mathematical calculations in a second or two.

2. Accuracy

Calculations produce results in unvarying and predetermined level of accuracy.

Characteristics of Computer

3. Automatic Operation

Once it has everything (data input, instructions about what to do with the data and how to present the output), it performs without requiring any intervention.

4. Diligence

Can perform monotonous works for hours without making an error and shows no reluctance.

Characteristics of Computer

5. Versatile

It is not just a calculator, it can be programmed to be anything ranging from scientist's data analyzer to a stock investor's market predictor. It can be the trajectory calculator for lunar landing craft or can be in a machine that washes cloths.

6. Massive Storage

It can store massive amount of data without loosing integrity.

Characteristics of Computer

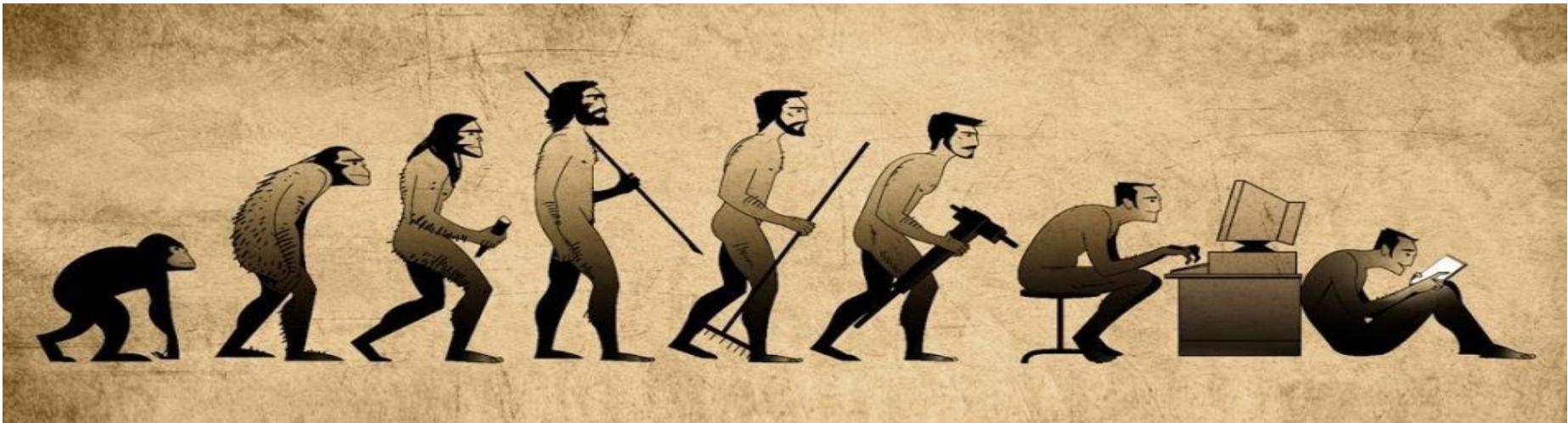
7. No Intelligence

It can be allowed to learn within a programmed limit which is in no state of comparison with human intelligence.

8. No Feelings

Computer has no feelings, tastes or personal traits. Now a days with AI, computers show pseudo personality, can be presented as judgmental but it is still nothing close to what a real human has.

Evolution of Computers



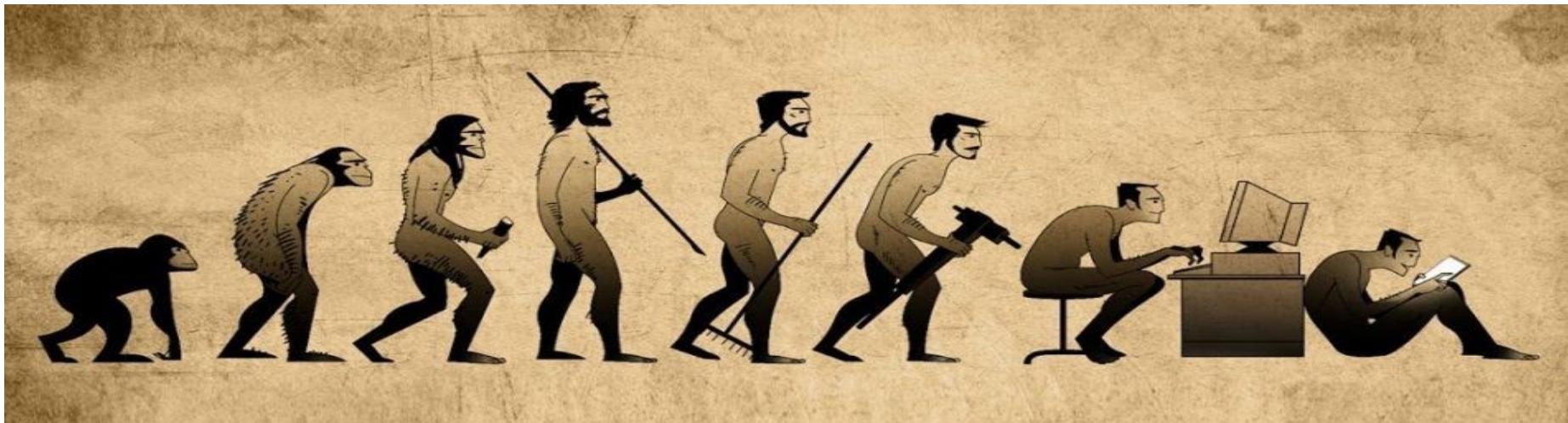
**Antikythera
Mechanism**

Displayed in National Archaeological Museum in Athens



Conceptual Recreation

Evolution of Computers



Evolution of Computers

We have been taking helps from calculating devices for a while. Archaeologists demand to find artifacts used for calculation as old as 2000 year.

To stick to the definition of computers, we mark these ancient devices as well as some early 20th century devices as calculators, not computers. And while discussing the timeline of computers, we will include only electronic computers that satisfy our definition.

Evolution of Computers

EARLY CALCULATING DEVICES



Evolution of Digital Computers

Computer Generations

In historical evolution of modern digital computers, a 'generation' is marked as a phase which starts with a ground breaking or game changing innovation.

These technological innovations include both hardware and software related developments and inventions.

Hence we describe this evolution through five generations.

Evolution of Digital Computers

First Generation >>> 1940 to 1956

Punch Card in
Punch Card Machine





Processor component

emory

er bulk input
ystem outputs

feed data and

ulation

ng operation

VAC 1

Evolution of Digital Computers

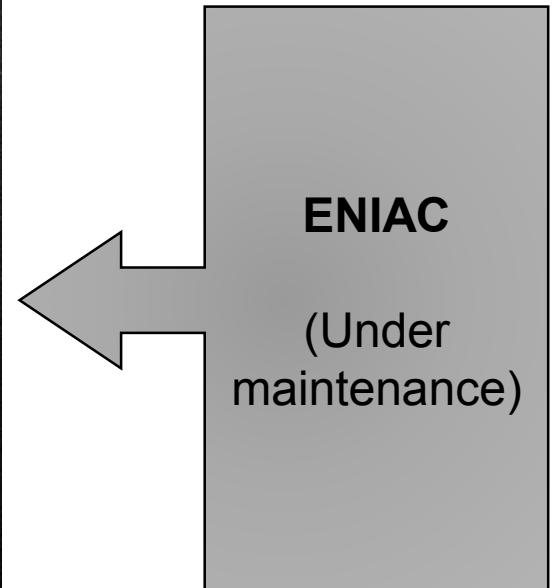
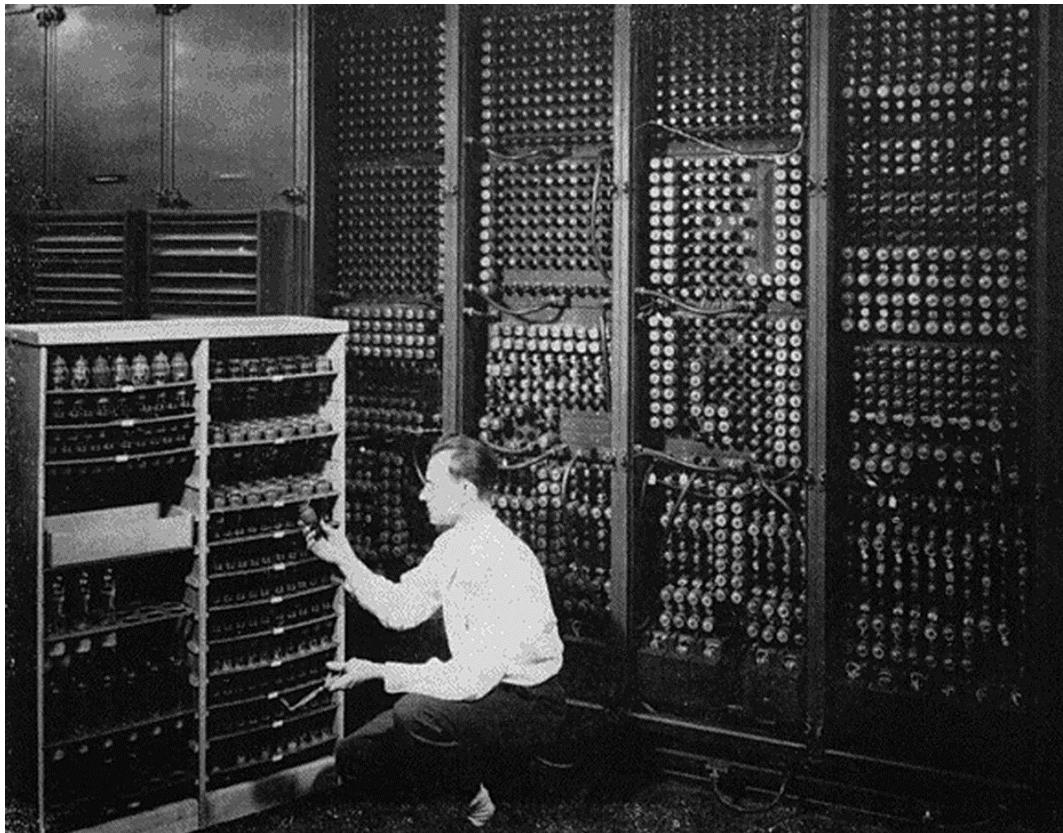
First Generation >>> 1940 to 1956



IBM 701
(Control unit section, from this part an operator uses this computer)

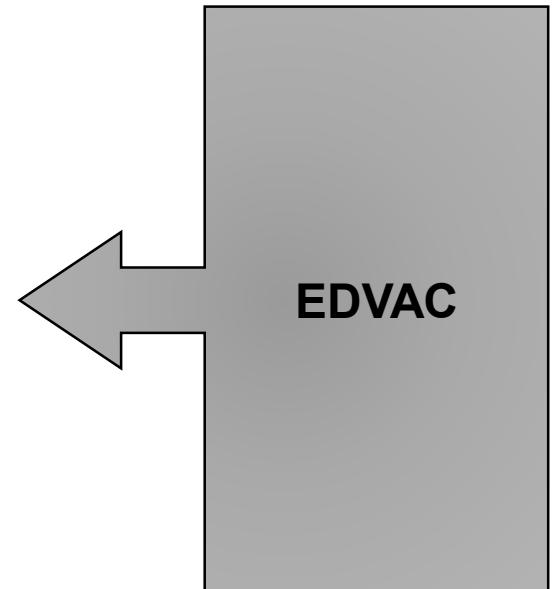
Evolution of Digital Computers

First Generation >>> 1940 to 1956



Evolution of Digital Computers

First Generation >>> 1940 to 1956



Evolution of Digital Computers

First Generation >>> 1940 to 1956

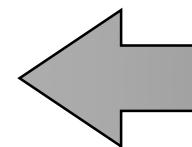
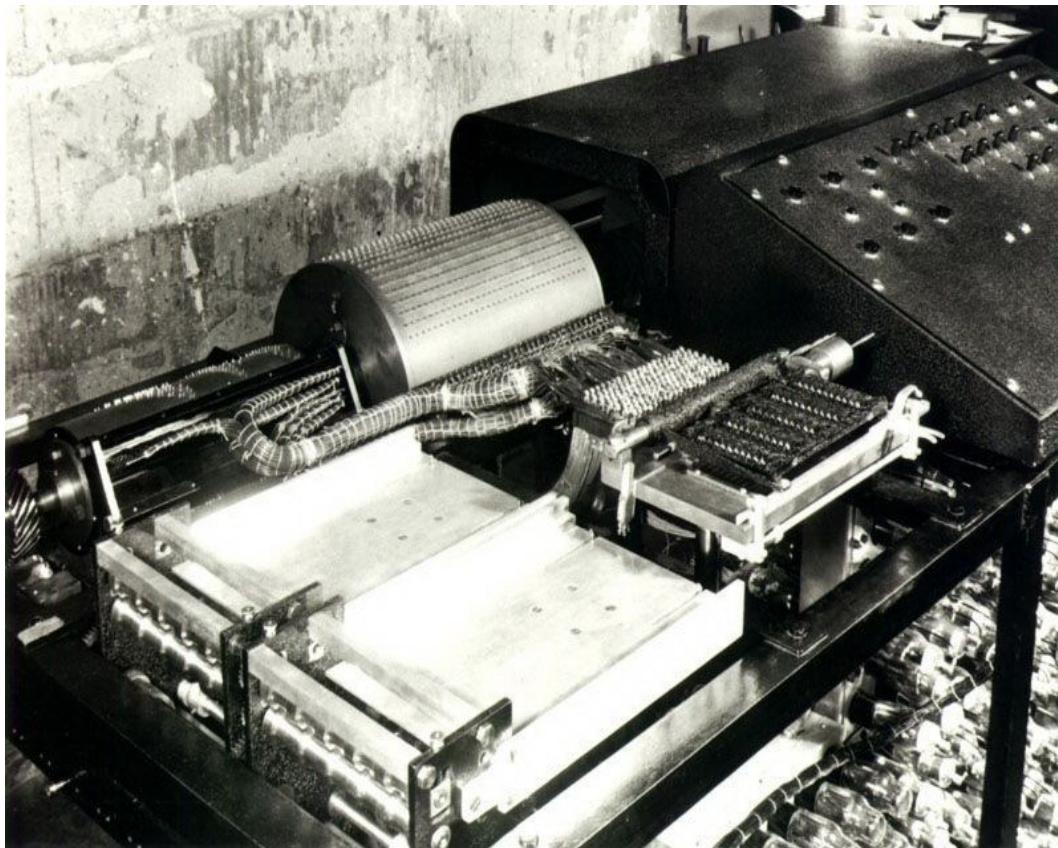


UNIVAC 1

(Ahead of its time, this model of UNIVAC had tape drive)

Evolution of Digital Computers

First Generation >>> 1940 to 1956



ABC

(Atanasoff-Berry Computer utilizing a magnetic drum memory)

Evolution of Digital Computers

Second Generation >>> 1956 to 1963

Hardware Features	<ul style="list-style-type: none">• Transistors replaced vacuum tube as main processor component• Magnetic core as main memory• Punch cards were still in use• Magnetic tapes as well as magnetic disks saw use as secondary memory
Software Features	<ul style="list-style-type: none">• Assembly language came into use• Saw the introduction of high level language• Batch processing OS came into light
Other Features	<ul style="list-style-type: none">• Smaller compared to previous generation• Transistors are not power hungry like vacuum tubes• 1000 times faster, more reliable• Saw some commercial use
Examples	IBM 7030, Honeywell 400, UNIVAC LARC

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



John Bardeen,
William Shockley &
Walter Brattain
at Bell Laboratories

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



A transistor & a vacuum tube
(side by side size comparison)

Evolution of Digital Computers

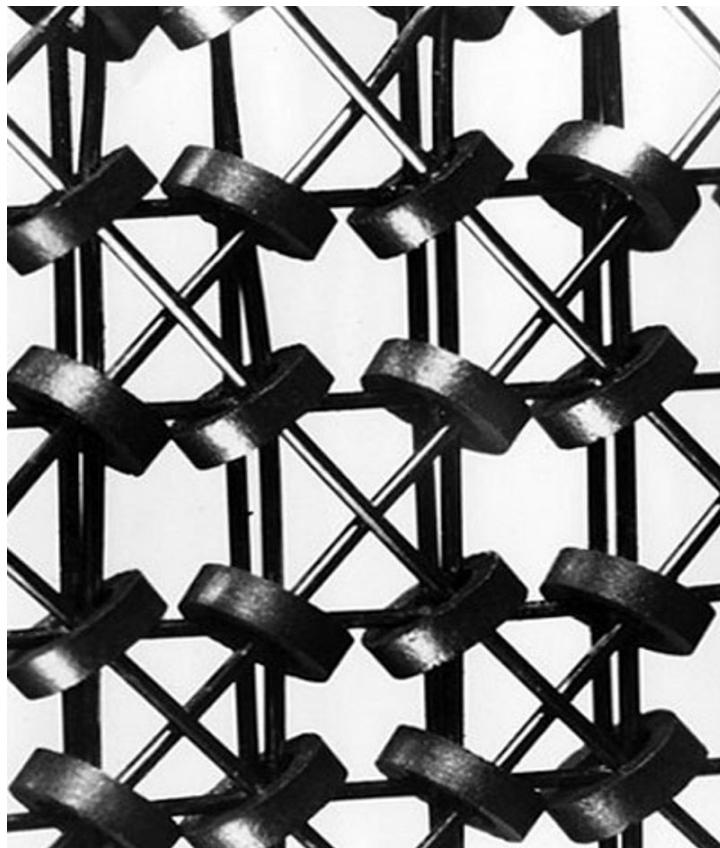
Second Generation >>> 1956 to 1963



Magnetic core memory
allowed Random Access
Operation

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



← **Magnetic Core Memory**
(enlarged view)

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



IBM 7030 (Operator's Unit)

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



UNIVAC LARC

Evolution of Digital Computers

Second Generation >>> 1956 to 1963



Honeywell 400

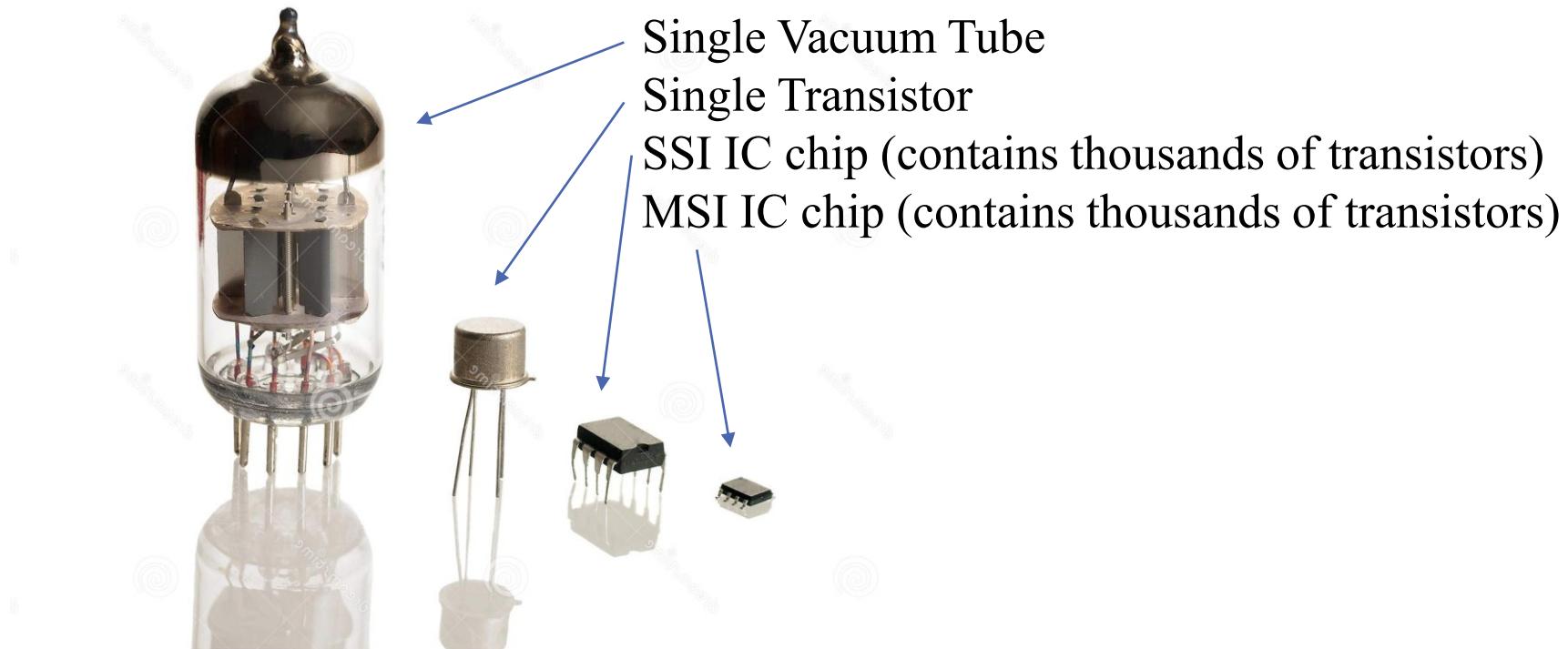
Evolution of Digital Computers

Third Generation >>> 1964 to 1971

Hardware Features	<ul style="list-style-type: none">• Small Scale Integration (SSI) and Medium Scale Integration (MSI) technology were used to make IC or Integrated Circuit which served as CPU component• First saw the use of semiconductor main memory• Keyboard and Monitors were widely used• Magnetic tapes and disks were still widely used
Software Features	<ul style="list-style-type: none">• Time sharing OS• High level languages saw uniform development
Other Features	<ul style="list-style-type: none">• Faster (1000 times) and smaller• More reliable and upgradable• Cheaper production cost due to SSI & MSI• Wide spread commercial use and online use
Examples	IBM 360, IBM 370, PDP-8, PDP-11

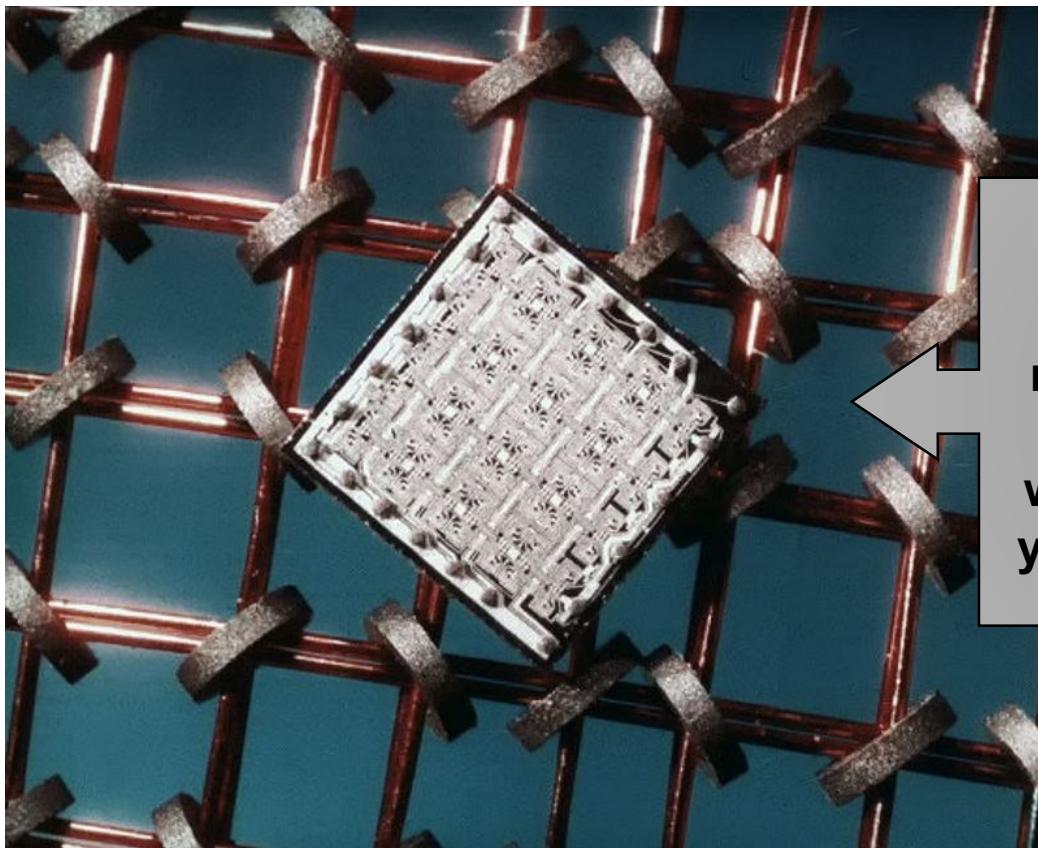
Evolution of Digital Computers

Third Generation >>> 1964 to 1971



Evolution of Digital Computers

Third Generation >>> 1964 to 1971



A semiconductor IC main memory chip on top of a magnetic core memory for size comparison. IC RAM was hundred times smaller yet had double the capacity

Evolution of Digital Computers

Third Generation >>> 1964 to 1971



IBM 360, a third generation computer to use IC as CPU component

Evolution of Digital Computers

Third Generation >>> 1964 to 1971



IBM 370, first
computer to use
semiconductor
main memory

Evolution of Digital Computers

Third Generation >>> 1964 to 1971



**PDP-8
Advertisement**
("Can be carried in your car" was the theme of the ad)

Evolution of Digital Computers

Third Generation >>> 1964 to 1971



PDP-11

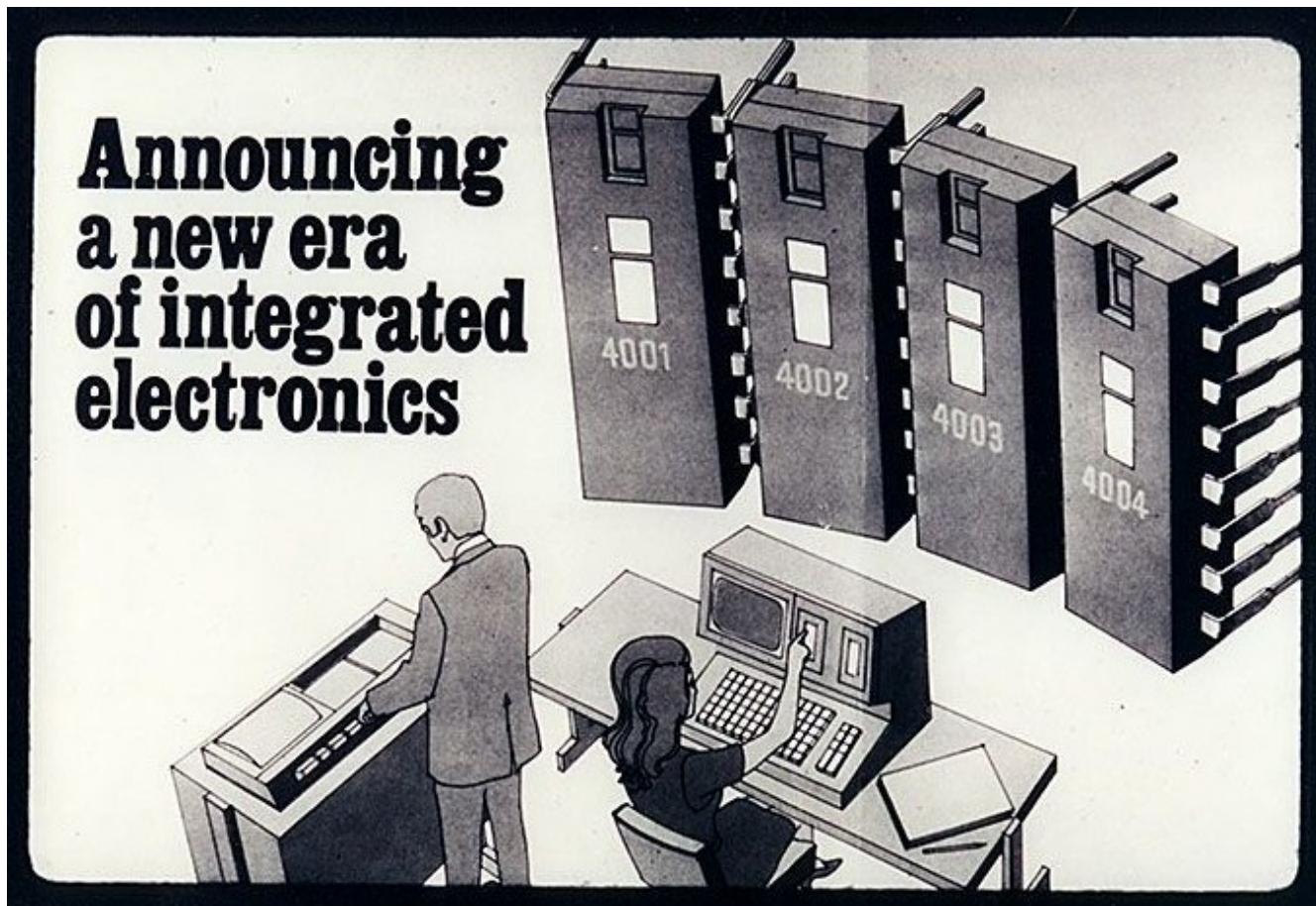
Evolution of Digital Computers

Fourth Generation >>> 1972 to 1990

Hardware Features	<ul style="list-style-type: none">• Very Large Scale Integration (VLSI) allowed IC to contain all the necessary components of CPU to be integrated in a single chip called Microprocessor• Magnetic core became obsolete• High speed computer network spread throughout the world
Software Features	<ul style="list-style-type: none">• GUI based OS developed by Microsoft, Apple, Bell and others• Network based applications were developed
Other Features	<ul style="list-style-type: none">• Smaller, reliable and came as ready to use• Can sit on a table yet more powerful• Various applications made them completely general purpose
Examples	IBM PC and its clones, Apple II, Apple Lisa, CRAY-1,2

Evolution of Digital Computers

Fourth Generation >>> 1972 to 1990



Evolution of Digital Computers

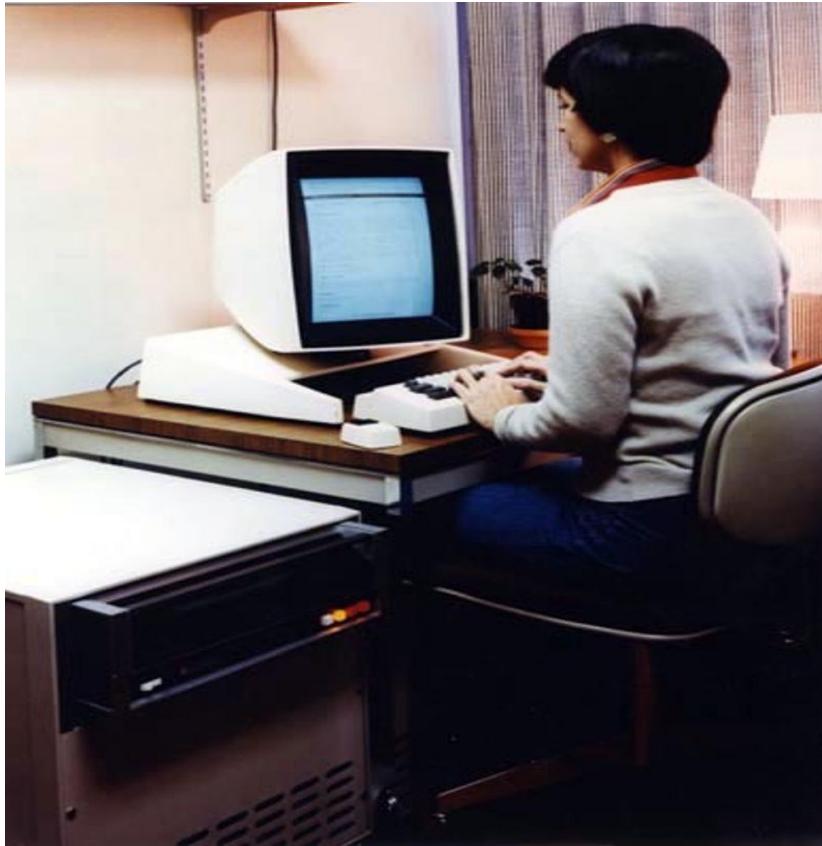
Fourth Generation >>> 1972 to 1990



← **Texas Instrument TI 99/4**

Evolution of Digital Computers

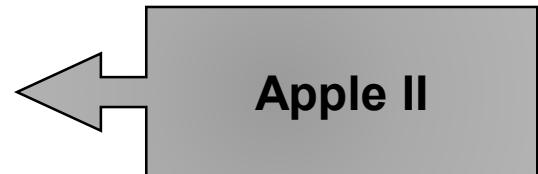
Fourth Generation >>> 1972 to 1990



Xeros Alto

Evolution of Digital Computers

Fourth Generation >>> 1972 to 1990



Evolution of Digital Computers

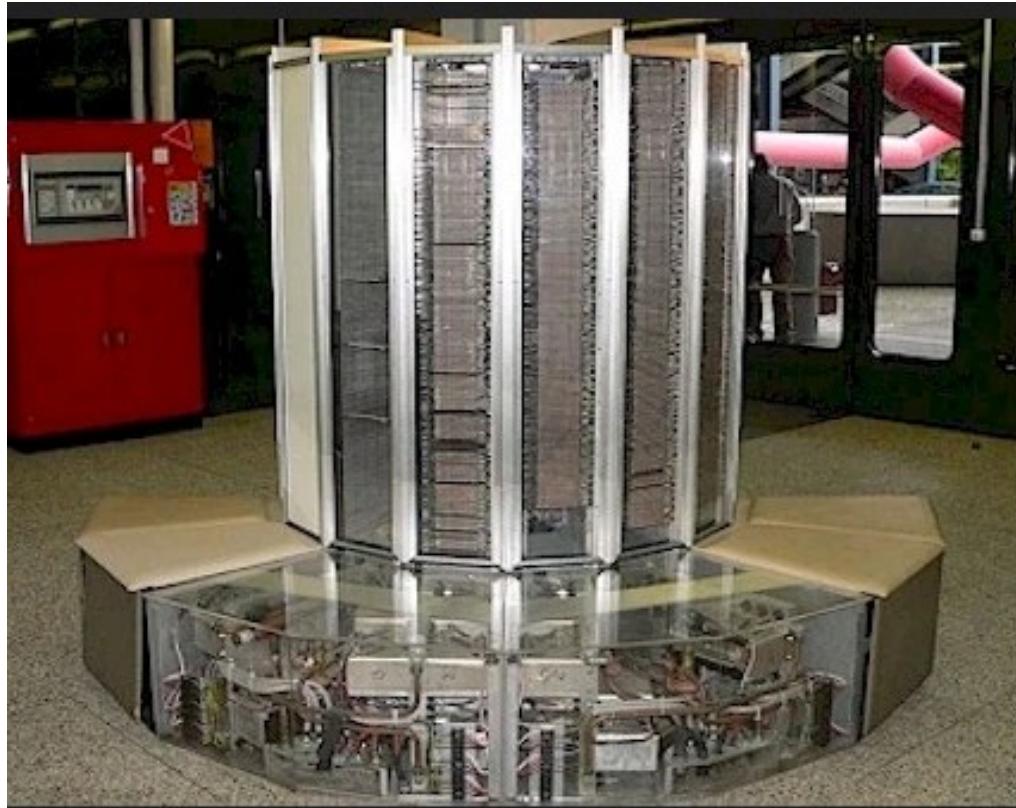
Fourth Generation >>> 1972 to 1990



←
Apple Lisa

Evolution of Digital Computers

Fourth Generation >>> 1972 to 1990



CRAY 1 Super
Computer

Evolution of Digital Computers

Fourth Generation >>> 1972 to 1990



CRAY 2 Super Computer

Evolution of Digital Computers

Fifth Generation >>> 1990 to Present and Beyond

Hardware Features	<ul style="list-style-type: none">• Microprocessor IC chips are now built in Ultra Large Scale Integration (ULSI) technology• High density magnetic disk• Optical Disk• Solid state secondary memory• Optical fiber and Satellite network• Computer driven machine and vehicles
Software Features	<ul style="list-style-type: none">• Multimedia applications• Internet based applications• Cloud
Other Features	<ul style="list-style-type: none">• Portable• GUI so easy anyone can now use a computer• Machine learning• Artificial Intelligence

Books to Collect

1. Pradeep K. Sinha & Priti Sinha, (2011). **Computer Fundamentals**, 6th Edition, BPB Publications, India.
2. Peter Norton, **Introduction to Computer**, 5th Edition, Glencoe/McGraw-Hill.
3. Jabber Mustafa (2018), **Computer and Information Technology**, 4th Edition, Dhaka.
4. Jannatul Ferdous Ara, Sabiha Sultana & Shamima Sultana, **Computer and Information Technology**, 2nd Edition, Gyan Bitan Publication, Dhaka.

Thank You for Your Patience

Stay Home, Stay Safe

Wear a Mask If You Have to
go outside