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Subject :Computer Sci.(Gen).

Generation of Computers : First to Fifth

Part-4

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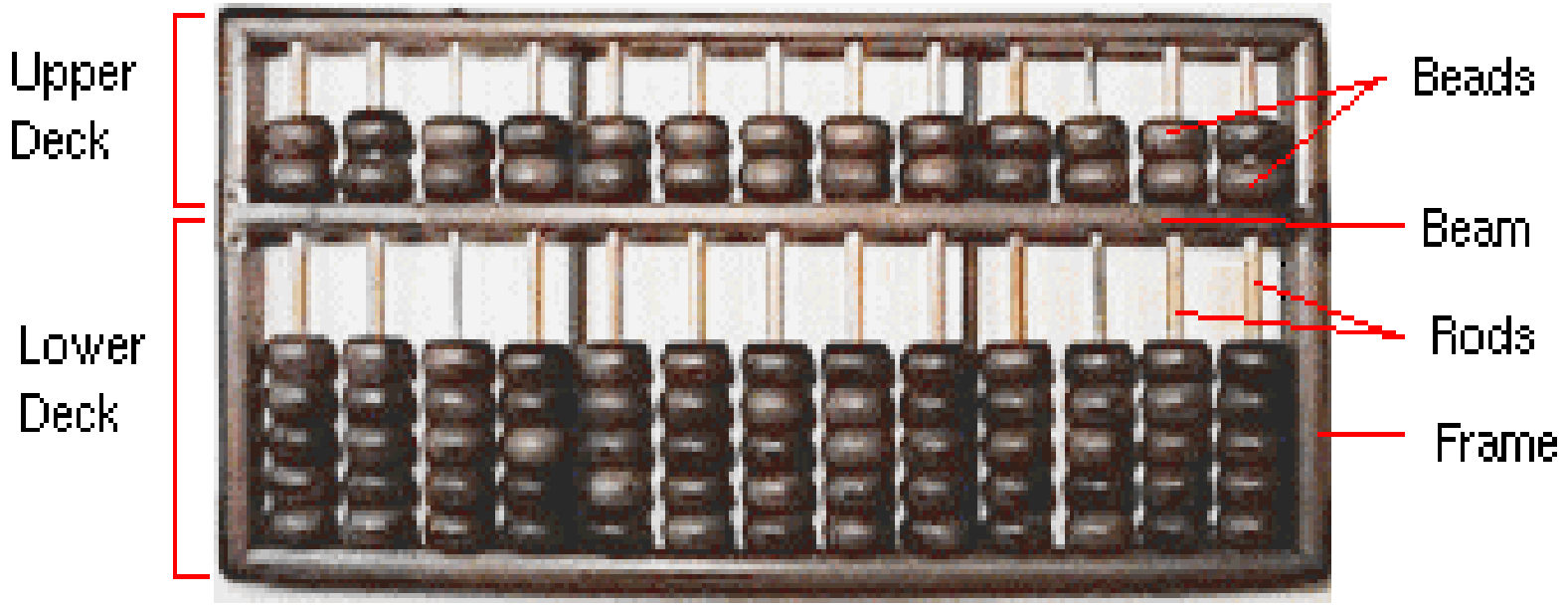
Objective

- **To aware the generations of computer.**

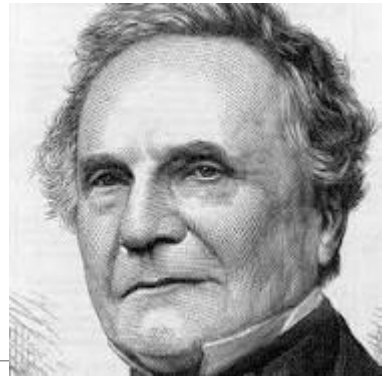
Generation of Computer

- History of Computers :
- Human when thought of counting ,he developed the concept of computing.
- His initial approach to maintain accounting and data computations for this use sticks, pebbles or lines on walls and fingers.
- The device like Abacus mechanical calculator ,developed for better and fast computations in 450B.C. by Egyptians.
- ABACUS was beads on wires counting frame ,which is still much in use in south east Asia, China and Japan.



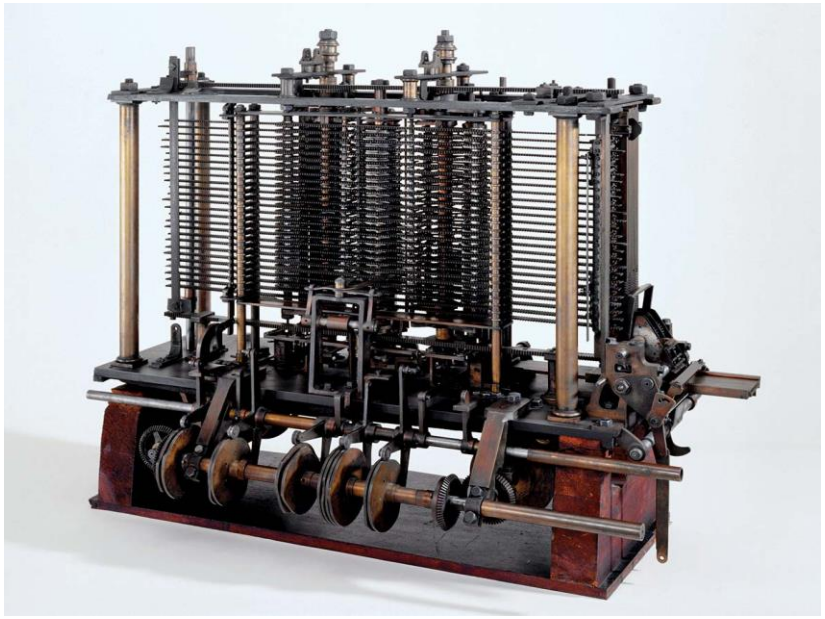
- History of Computers… :
- The first desktop calculator machine ,which is capable to perform various arithmetic operations developed by French Scientist Blaise Pascal in 1642.
- This calculator again improved by German mathematician Gotterfired Leibnitz which performs four basic arithmetic operations(+,-,* & /).
- He also suggested the use of Binary system instead of Decimal for the mechanical calculator.
- First stored program - metal cards which is used still today in computer manufacturing developed by Joseph Marie Jacquard in 1802.
- English Mathematician ,Charles Babbage(Father of Computer) developed huge calculator “Difference Engine“ machine in the 1882.
- He improved this machine with new idea of “Analytical Engine” in 1833 which perform the basic arithmetic functions automatic.
- This machine used punched cards as input/output devices for basic input and output.

- History of Computers… :
- This basic features of machines are still found in most of the modern computers.
- This being the reason for which he known as “Father of Computers” for this remarkable contribution in the field of computers.



Charles Babbage(Father of Computer)

Difference Engine



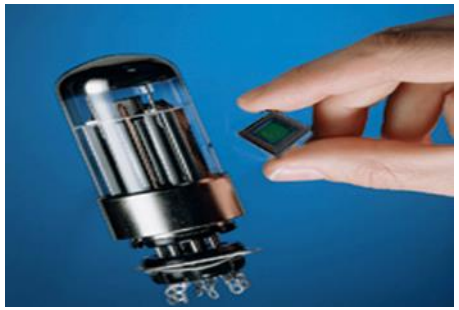
Analytical Engine

- **Computer Generations**
- The *generation* of *computer* means the gap between the development of the *computer* in terms of the technologies.
- **Computer generation** includes both hardware and software, which together make up an entire **computer** system
- Each generations has made technological evaluations based on Speed, Storage capacity, Cost, Reliability, power consumption, portability and flexibility.
- There are five computer generations known till date.

- **First Generations(**1946-1959)
- The First generations computer was developed by Eckert and Mauchly at the University of Pennsylvania in USA.
- This computer is Electronic Numerical Integrator and Calculator (ENIAC) used high speed Vacuum Tube switching devices and magnetic drums for memory.
- The concept of a stored program proposed by John Von Neumann in 1946.
- This concept used first in computer is EDSAC (Electronic Delay storage Automatic Calculator) developed by Professor Maurice Wilkes at Cambridge University , UK.
- The UNIVAC is the first every commercial computer which was purchased in 1951 built by Uniac division of Remington Rand.

- **First Generation….**
- This generations computers used about 10000 vacuum tubes which have limited life .
- The power dissipation was very high and taking up entire room.
- It generates a lot of heat, which caused ongoing breakdowns.
- It consumes huge electricity.
- It was costly , unreliable, Non-portable and very slow input and output.
- The first generation of computers used machine language or 0s and 1s.
- The concept of operating system had not emerged.

- **First Generation computers**



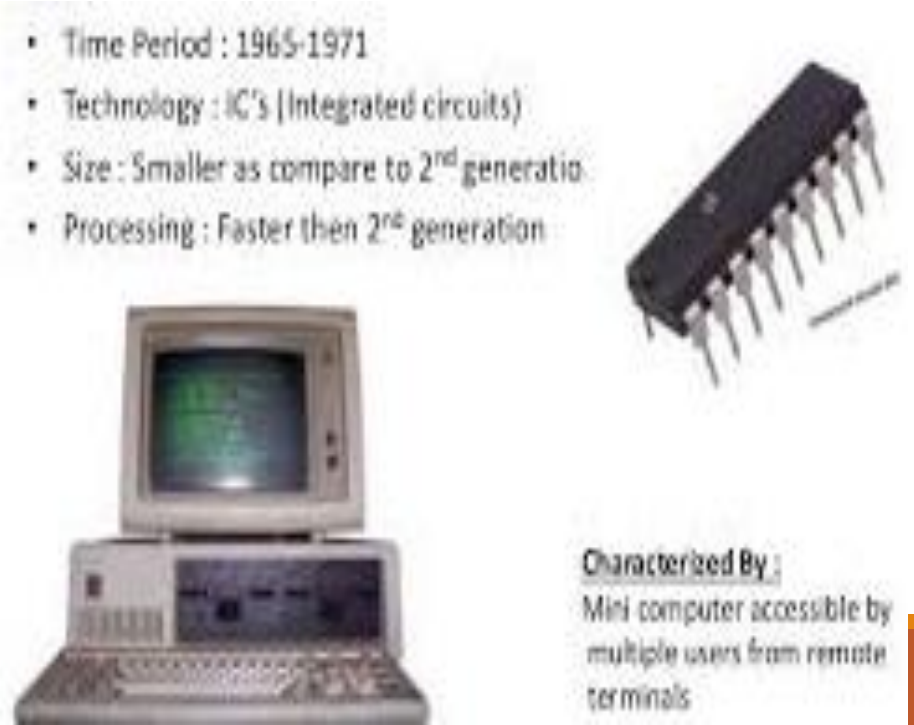
- **Second Generations(**1959-1965)
- A big revolution in electronics took place with the invention of transistors by Bardeen, Brattain and Schokley in 1947.
- In this generation, transistors were used that were cheaper, consumed less power, more compact in size, more reliable and faster than the first-generation machines made of vacuum tubes.
- In this generation, magnetic cores were used as the primary memory and magnetic tape and magnetic disks as secondary storage devices.
- In this generation, assembly language and high-level programming languages like FORTRAN, COBOL were used.
- The computers used batch processing and multiprogramming operating system.

- **Second Generations….**
- IBM 7000 series computers emerged during the second generation.
- Commercial applications rapidly developed during this period on business and indsustry .
- Payroll system, Inventory control, marketing , production planning and general ledger systems developed .
- Engineering applications in process control increased very rapidly.
- New profession in computing such as systems analysts and programmers emerged during the second generation .
- Academic programs in computer science were also initiated.

- **Second Generations computers**

- **Third Generations(**1965-1971)
- The third generation computers used silicon transistors (Integrated Circuit) in place of germanium transistors. The IC was invented by Jack Kilby.
- A Single IC consisting of transistors, resistors and capacitors .
- It reduced by factor of 10 power consumptions and increased speed by a factor of 10 .
- This development made computers smaller in size, reliable, and efficient.
- The size of main memories reached about 4MB and 100MB/drive Magnetic disk secondary memory.
- In this generation remote processing, time-sharing, multi-programming operating system were used.

- **Third Generations..**
- The online airline reservation systems, interactive query systems, database management system emerged.
- High-level languages (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68 etc.) were used during this generation.
- More reliable ,smaller in size, faster and less maintenance as comparison to previous two generations.
- Third generations computers :
- IBM-360 series,Honeywell-6000 series etc.



- **Fourth Generations :First Decade(1976-85)**
- The fourth generation computers used microprocessor chip .
- It is Very Large Scale Integrated (VLSI) circuits packing about 5000 transistors in a chip.
- In 1971, Intel released the 4004(Ted Hoff) microprocessor .
- Magnetic memory replaced by semiconductor memory with size of 16 MB.
- Hard disks provided a low cost ,high capacity secondary memory.
- Computers cost came down so it is used in offices as well as in home also.
- IBM personal computer open and use Intel 8008 processor with MS-DOS(Microsoft Disk Operating system).
- The open architecture of IBM PC allowed to many small companies to make PCs with Intel Microprocessor called IBM clones.

- **Fourth Generations …**
- A large number of applications such as word processor, spread sheets and database management systems for PCs emerged.
- Networks of computers and distributed computer systems were developed.
- Disk memories becomes very large(1000MB/Drive).
- The program distributed and real time systems developed in ADA programming language.
- Another important development was interactive graphic devices and language interface to graphic systems.
- Computer-Aided used in engineering for design.
- The UNIX OS and time shared interactive systems and more user friendly systems comes in this period .

- **Fourth Generations(Second Phase 1986-2000):**
- The second phase of fourth generation computers used high speed microprocessors and increased in size of main memory.
- Powerful microprocessor such as Intel Pentium ,Motorola ‘s Power PC 600 etc. are used in Personal PC, portable laptop and palm held computers.
- Intel designed a powerful chip in 90s called Pentium (1993) which sold in large numbers.
- The Intel developed Pentium with MMX(Multimedia Extension) and Pentium-II and Celeron Processor .
- In 2000 Intel introduced a 64 Bit processor called IA 94 or Itanium.
- Desktop workstations and powerful servers for numeric computing as well as file services use RISC microprocessors such as Alpha, SUNPARC.

- **Fourth Generations(Second Phase 1986-2000)….:**
- The secondary storage devices size of 1 GB used commonly in 1994.
- For larger disks RAID(Redundant Array of Inexpensive Disk) gives storage of 100GB.
- Optical Disk emerged with size 650 MB,DVDROM (17GB) and rewritable disks comes for the multimedia applications.
- The powerful computer network used Fiber optic cable which transmit data 100MBPS to 1GBPS.
- During this phase ,number of computers connected to the internet and World Wide Web (WWW) service emerged which provides easy access of Internet
- Example of the Fourth Generation computers are Mini Computers and Micro Computers such as Pentium, Power PC, IBM 4300, ICE 2900, etc.

- **Fourth Generations(Second Phase 1986-200)….:**
- Computers of the fourth generation are very reliable and accurate and use friendly high level languages.
- The C++ and Java object oriented programming languages emerged .
- Application of computers has increased in various areas like visualization, parallel computing, multimedia, etc.

- **Fifth Generations(2000 to till date)….:**
- Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today.
- The use of parallel processing and superconductors is helping to make artificial intelligence a reality.
- Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come.
- The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

- **Moore’s Law :**

- **Moore's Law** states that the number of transistors on a microchip doubles about every two years, though the cost of computers is halved.
- In 1965, Gordon E. **Moore**, the co-founder of Intel, made this observation that became **Moore's Law**.

https://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html

Computer Generations – A comparison

Generation	Years	Switching Devices	Storage Devices	Software	Applications
First	1949-55	Vacuum Tubes	Magnetic Drum (1KB)	Machine and assembly Languages	Mostly Scientific & simple business
Second	1956-65	Transistors	Magnetic core main memory, tapes and disk memory .(100 KB main memory)	High level Languages FORTRAN,COBOL, Batch OS	Business, Engineering and Scientific research
Third	1966-75	Integrated Circuit	High speed Magnetic cores. Large disk (100MB) 1 MB main memory	FORTRAN IV, COBOL 68, Time shared OS	Database system Online System
Fourth First Phase	1976-84	Large Scale Integrated circuits. Microprocessor (LSI)	Seminar conductor Memory. 10MB Winchester Disk.1000MB	FORTRAN 77 ,COBOL-74, Concurrent Pascal	Personal Computers , Distributed System, Real time control and Graphics oriented systems.
Fourth Second Phase	1985-2000	Very large scale integrated circuits.	Seminar conductor Memory. 1GB Winchester Disk.100GB	C,C++,Java, PROLOG	Simulation, Visualization , Parallel computing, Virtual Reality, Multimedia

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Unit No.	Topic Name	Ref.	No. of Lecturers
1	**Fundamentals of Computer System :** Introduction, Characteristics & features of Computers, Components of Computers ,Organization of Computer.	1/1	3
2	**Algorithm and Flowcharts :** Algorithm: Definition , Characteristics, Advantages and disadvantages , Examples Flowchart : Definition ,Define symbols of flowchart ,Advantages and disadvantages ,Examples	2/1 3/3 3/4	3 3
3	**Computer Generation & Classification** Generation of Computers : First to Fifth , Classification of Computers ,Distributed & Parallel computers	2/12	3
4	**Computer Languages** Types of Programming Languages :Machine Languages ,Assembly Languages ,High Level Languages • Assembler, Linker, Loader, Interpreter & Compiler	2/9 2/9	3

Unit No.	Topic Name	Ref.	No. of Lecturers
5	**Computer Memory :** • Memory Cell & Organization • Types of Memory (Primary And Secondary) : RAM ,ROM ,PROM ,EPROM, Secondary Storage Devices (FD, CD, HD, Pen drive, DVD, Tape Drive, DAT)	2/4 2/4	3
6	**I/O Devices:** Input Devices : Touch screen , OMR, OBR , OCR, Light pen , Scanners , Digitizers Output Devices :Plotters, LCD , Plasma Display, Printers	1/4 1/4	3
7	**Processor :** Structure of Instruction, Description of Processor , Processor Features ,RISC & CISC	2/5	6
8	**Operating system Concepts :** Why Operating System , Functions of Operating System, Types of Operating ,System , Batch O.S. , Multiprogramming O.S. , Time Sharing O.S ,Personal Computers O.S. ,Network O.S.	2/9 2/9	3
Core Ref.	1. Fundamentals of Information Technology By Chetan Srivastava, Kalyani Publishers 2. Fundamentals of Computers By V. Rajaraman, PHI Publication, IVth Edition. 3. 3. Fundamentals of Programming By Raj K. Jain, S. Chand Publication		

Fundamentals of Computer System

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2. Fundamentals of Computers By V. Rajaraman, PHI Publication, IVth Edition.
3. Fundamentals of Programming By Raj K. Jain, S. Chand Publication

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2. Computer Fundamental By B. Ram, BPB Publication.

Thank you !