

BOOK I. CHAPTER 1

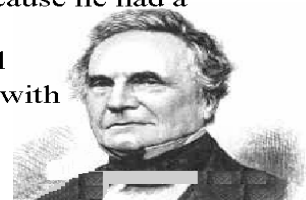
INTRODUCTION TO COMPUTERS

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Q1. Describe Charles Babbage work in the history of computer? /Who was Charles Babbage?

Charles Babbage was a mathematics professor in England. He designed an automatic mechanical calculating machine, called **Difference Engine**. It was steam powered and fully automatic, with the capability of printing the results. After working for 10 years, in 1833 he lost interest because he had a better idea of **Analytical Engine**.

Analytical Engine: A general purpose, fully program-controlled, automatic mechanical digital computer. This machine was supposed to operate automatically by steam power with a single person. The idea of this design showed a lot of foresight.

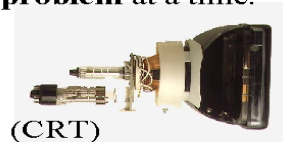


Q2. Describe the Advancements in the computers during the 1950's and 1960's

In 1950's **Magnetic Core Memories** and **Transistor Circuit Element** changed the computer filed. Computers of this duration were **expensive, complicated**. These were found in government agencies, research and development laboratories mostly to work on a **single problem** at a time.

Different Accessories of this duration are as under:

- i). Card reader
- ii). Printers
- iii) Cathode Ray tubes (CRT) (Monitors)



(CRT)

During 1950 & 60's, these computers were used in business for Accounting, Payroll, Inventory control.

Q3. Write a note on different Computer Generations briefly explaining their features.

First Generation: (Vacuum Tubes)

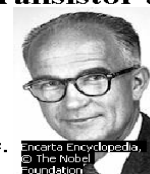
1. In this generation **Vacuum Technology** was used.
2. Vacuum tubes were **expensive, get hot and burn out**.
3. Computers were Bulky and **large** in size.
4. Computers required **special rooms** with **air conditioning**.
5. Some computers of this generation are **ENIAC** and **UNIVAC-1**.



Second Generation: (Transistors)

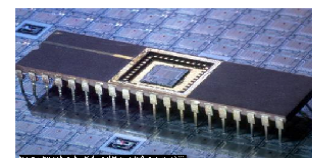
In 1947 William Shockley, William Brattain and John Bardeen **invented Transistor** at Bell Labs

1. Transistors were small in size. (200 transistors = 1 Vacuum Tube)
2. Much **less expensive** and **40 times faster** than a vacuum tube.
3. Do not **get hot and burn out**.
4. Smaller and **high processing speed**.
5. In 2nd Generation **magnetic core memory** was used as internal storage.
6. **COBOL, BASIC, PASCAL, ASSEMBLY** languages were used.
7. Some computers of 2nd Generation are **IBM 7094** and **IBM 1400** series and **CDC 164** etc.



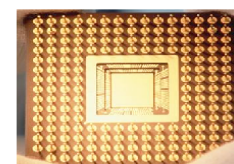
Third Generation: (Integrated Circuits)

1. In 1958 **Jack St. & Clair Kilby** developed the concept of Integrated Circuit.
2. First IC was invented and used in **1961**.
3. An IC was about **¼ inch** square and can contain thousands of transistors
4. Computers were **small, faster, more reliable** and lower in price.
5. **Magnetic Core** memory was used.
6. Most successful computers are **IBM 360 - 370, DEC PDP-8, UNIVAC 1108** and **UNIVAC 9000**.



Fourth Generations: (Microprocessor)

1. **Ted Hoff** produced 1st Microprocessor for Intel "**Intel 4004**"
2. Modern microprocessor was less than one-inch square.
3. Semiconductor memory was used.
4. **LSI** and **VLSI** were designed. (Large Scale Integrated circuit & Very LSI)
5. High processing speed, more internal storage and smaller in size.
6. Microprocessor is **used in wristwatches, microwave ovens and cars**.
7. Some 4th generation computers are **Apple Macintosh** and **IBM PC** etc.



Fifth Generations. – Present and Beyond. (Artificial Intelligence)

1. Devices will be based on **Artificial Intelligence**.
2. Parallel processing and superconductors is helping to make **artificial intelligence** a reality.
3. Quantum computation and molecular and **nano-technology** will change the face of computer
4. Will develop such devices that **respond to natural languages input** and are **capable of learning and self-organization**.



Analog computers	Digital computers
1) Data processed in continuous form. 2) Represents physical quantities like speed, weight, temperature 3) Fast in processing 4) Used for real-time simulation.	1) Data processed in discrete form. 2) Represent physical quantities with the help of digits 3) Easy to programs. 4) Used for general purposes.



Q5. Write a short note on the following: POCKET, LAPTOP and MICRO COMPUTER?

POCKET (PALMTOP) Computers: Pocket computers have been designed to keep lot of information close to hand. These computers are **small** and use special **operating system** but don't have full-sized keyboard. Pocket computer uses special **pens** and **touch-sensitive screens** to **enter** data.

LAPTOP Computers: Laptop computers have the same features as the desktop. Modern laptops can have **DVD writers**, full-sized keyboards, mouse/**touch-sensitive mouse pad** and a large Liquid Crystal Display (LCD).

(Micro Computer :) Desktop Computers: There are two types of desktop computers are available

a). **Macintosh (Apple):** These have stylish look and bright colors.

b). **Personal Computers (PCs):** PCs mean an IBM-compatible computer based on an Intel (or similar) microprocessor. Most common Operating systems are Microsoft Windows, although, UNIX, Linux are also available.

Q6. Impact of Computer and Internet on Society?

- Increased efficiency
- Information sharing
- Changed work structure



Education: From Primary to University level computers are being used for learning activities. A large number of learning programs (tutorials) are available on every subject. The trend of on-line examinations is getting popular day by day.

Distance Learning: Hundreds of institutes are offering distance-learning programs. Where Students are provided reading material and they can attend **virtual classrooms**. In a virtual classroom, teacher deliver lecture at his own workplace while the students, connected to a network may listen to him at sitting homes. Questions/Answers may send & receive via email.

Business: Computers are being used in business and industry for these purposes

- To keep record of huge transactions.
- Transactions can be made from anywhere in the world.
- To make customer's bills and sales reports.
- To reduce administrative paperwork and cost.
- To Calculate and record employs pays.
- To analyze sales of various products in different localities on monthly & yearly basis



ONLINE BANKING: Online bank offers 24 hour services. Online banks have been using powerful computers to perform millions of transactions. ATMs are installed to draw money at any time from any branch. These are computerized machines connected together. Customers are connected to the bank via Personal Computers to see their bank account status while sitting at home.

ATMs?: (automated teller machine) are electronic cash machines, usually situated outside a bank, that enables customers to withdraw money or carry out other banking procedures on insertion of an encoded plastic card.

Advantages of Online Banking:

- Convenience:** Online banking sites never close, they're available 24 hours a day, 7 days a week.
- Ubiquity:** You can make transaction even if you're anywhere in the world
- Transaction speed:** Online banks execute and confirm the transactions at a very high speed.
- Efficiency:** You can access and manage all of your bank accounts, from one site.

Q7. Define Computer and Classification of computers:

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It is an electronic device that accepts data, processes it and gives outputs at a high speed according to programmed instructions.

OR

A computer is an electronic device that processes data and perform tasks according to the given instruction.

Computer classification: is based on the processing power, functional capabilities and size of memory. Etc.

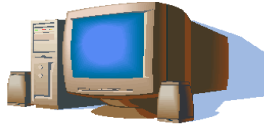
- i). Super Computer
- iii). Mini Computer

- ii). Mainframe Computer
- iv). Micro Computer



i). Super Computer: Super computers are the most powerful, expensive and fastest computers. These can perform more than 1 trillion calculations per second. **Cray T90** system has thousands of processors. These are used to handle large and highly complex problems. These computers are used in weather forecasting and for nuclear researches etc. **Super computers** are rare due to its cost.

ii). Mainframe Computers: In mainframe environment, each user works at a computer terminal. A **terminal** is a monitor and a keyboard connected to a mainframe. These computers are expensive, stores lot of data and can support thousands of terminals. IBM S/390 is an example of mainframe computer.



iii). Mini Computers

These computers have less processing power than mainframe computers but high processing power than micro computers. These computers are used in networked environment as server machines. The HP 3000 is an example of minicomputer.

(a). Microcomputer

Microcomputer developed for individual users. These are known as Personal Computers (PC). In 1981 IBM made first microcomputer IBM-PC. One big factor of the popularity of microcomputers is the low price. PCs are getting powerful day by day because of the improvement in technology. These are used in business, education and almost every field of life.

Basic units of a microcomputer are,

- 1). Input unit
- 2). Central processing unit
- 3). Output unit.



Q8. Modern Computers are based on Store–Program Concept? Who introduced this concept, Discuss his contribution in the history of computer? / Who was John Von Neumann? (Modern Stored Program)

In 1945 John Von Neumann gave the idea about **stored – program** techniques.

i). Computer should have simple, fixed physical structure and able to perform any kind of computation without physical change in the unit.

ii) Data and program can be stored in the same memory and machine itself can alter either its program or internal data.

First commercially available computers using above ideas are EDVAC and UNIVAC.

Q9. Write the name and describe some of the application of computer.

Application in retailing applications: In modern stores computer are used for billing, to accept credit cards, so that customers can purchase goods without cash.

Bar Codes (Universal Production Code): The items at store are marked with “Bar Code”. This is a sequence of lines, which is read by a “Bar Code Reader”. The price of the item is stored in this code and these are automatically added to the bill. The computer generates the receipt and the customer pays the bills.

- i. Due to bar codes system computer automatically updates the inventory list.
- ii. It shows the stock available.



Application in entertainment:

Computers can be used to watch television shows being broadcaster on Internet, watch movies, listen to music and play games. We can create animations and special effects for television shows, commercials, movies and cartoons. Computer is also used to create high quality music and sounds in a short time.

Application in Computer Simulation:

Computer simulations are widely used in computer institute to make clear the understanding of working of various systems. Simulation can include simple graphical or numerical representation of how mechanical or physical experiments are carried out.

High Level Language	Low Level Language
1. High level language is close to English	1. Low level language is close to machine language
2. Easy to learn and understand	2. Difficult to learn and understand
3. More suitable for human use	3. Less suitable for human use
4. Use English like words	4. Use binary digits 0s and 1s
5. Take less time to program	5. Takes more time to write program
6. Can be executed on any computer	6. Machine Dependent
7. Need to be translated	7. Directly executable

Q11. Discuss some negative aspects of the use of Internet in our society.

Although Internet is very useful but it has some negative aspects as well.

- i). If you are searching some web sites, it takes too long to have your exact required web site.
- ii). Less/No security of your data/information.
- iii). Virus attacks through the net and it destroy important data.
- iv). Unwanted pages displayed automatically.
- v). Child wants to spend more time on net chatting rather studying.

**Q12. What is Assembler, Compiler and Interpreter?**

Assembler: An assembler is a program that translates an assembly language program into machine code.

Compiler: is a program that translates a source program (program in high-level language) into machine program. A compiler first reads the whole program before translating it. It produce an error list and an object code.

Interpreters: It looks at each line of the program, decides what that line means, checks any possible errors and then executes the line. It neither produce any error list nor an object code.

Q13. Write a note on the following.**Visual Basic, LISP, C/C++**

Visual Basic: Was the first visual development tool from Microsoft designed to compete the C, C++, PASCAL and other well known programming languages. At the beginning visual basic wasn't very successful but VB release 2.0 and 3.0 had become the fastest growing language on the market. Now, VB is one of the best professional programming languages.

It is used today to create quick and simple interfaces without lot of coding efforts.

LISP (List Processing Language): It was designed for Artificial Intelligence (AI) research. Its syntax (programming rules) was very different from ordinary languages. Major difference between other languages and LISP is its data type, which is *list*. It has unique ability to modify itself, and hence grow on its own. It is being used even today because it is highly specialized.

C and C++

In 1972, C language was developed by Dennis Ritchie at Bell Labs. It was used to write operating systems such as UNIX, Windows, and Macintosh OS etc. It is also very useful for compiler writing.

C++: It is an extension to C using OOP (Object Oriented Programming) concept. C++ is most often used in simulations, such as games.

General Questions

What is computer?

A computer is an electronic device that processes data and perform tasks according to the given instruction.

What is Abacus?

Computer history starts with the birth of abacus, about 5000 years ago. Abacus was a wooden rack holding horizontal wires with beads on them. By moving these beads we can solve arithmetic problems.

What is Napier's Bones? / Who was John Napier?

John Napier was a Scottish mathematician. He created **logarithm table**. He also created **Napier's Bones** to perform arithmetic calculations. This device was widely used by accountants and bookkeepers.

What is Slide Rule?

People have used the concept of logarithms to develop the Slide Rule. With a modern slide rule you can perform all arithmetic operations. It can also calculate Squares, Square Roots, LOG, SIN, COS and TAN. It had been used till the middle of 70's.

What is Pascaline? / Who was Blasé Pascal? (Mechanical Calculator)

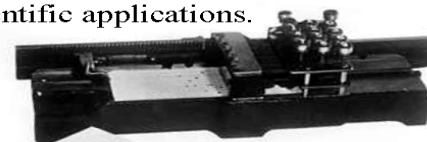
Pascal invented a mechanical calculator which had a system of gears. A one-tooth gear engages its single tooth with a ten-tooth gear. It makes ten revolutions to move ten-tooth gear once. Number could be entered and cumulative sums obtained by cranking a handle.

Who was Von Leibniz? (Mechanical Calculator)

Von Leibniz was a German mathematician. He produced a calculator that was similar to Pascal's but more reliable and accurate.

Eckert-Machly Computer Corporation: UNIVAC (Universal Automatic Computer). 1st Commercial Com

In 1947, Eckert and Machly manufacture their first successful machine UNIVAC, which was delivered to the US bureau of census in 1951. It was first commercial computer used in scientific applications.



Who was Herman Hellerith? (Punched Cards)

In 1890, Herman Hollerith developed the first electro-mechanical punched card machine. It could read information that had been punched into cards. Solutions of problems could be stored on different stacks of cards and accessed when needed.

Invention of punched cards opened a gate to modern data processing. IBM started production of punched cards using computers. These computers could add, multiply and sort numbers. Data was input and results were produced on punched cards.

Use of punched cards: These computers were slow, usually processing 50-220 cards per minute, each card holding about 80 decimal numbers (characters). Punched card system provided a means of input/output and memory.

First Electronic Digital Computers: (ENIAC) In 1946 John W. Mauchly and John P. Eckert at the University of Pennsylvania build first general purpose, high-speed, digital computer known as ENIAC (Electrical Numerical Integrator and calculator). It was very heavy, large and consumed 175 Kilowatts. It can perform 5000 additions per second. All arithmetic operations were performed in decimal system.

Drawback of ENIAC: It had to be programmed manually by setting switches and plugging and unplugging cables.



Q. Discuss different types of computers?

There are three types of computer:

i). Analog Computers.

i). Analog Computer:-

An analog computer is the one that measures or processes data in a continuous form. It represents physical quantities like speed, weight, temperature and voltage etc. Analog computers provided the base for modern digital computers. General-purpose analog computers were built in 1930s. These are very fast in processing and used for real-time simulation. A wall clock and speedometer are examples of Analog Computer.

ii). Digital Computers:-

Digital computers process data with the help of digits. These are easy to program and are used for general purpose. Results can be obtained in printed form, on magnetic tape and on the screens. In 1940s Aiken built first General-Purpose digital computer Mark-1. Digital computers are being used in every field of life for various purposes.

iii). Hybrid Computers

Hybrid computers are the combination of qualities of Analog and Digital computers. It uses analog-to-digital and digital-to-analog conversion. These computers can produce highly accurate and precise results. These types of computers are used in robotics, medical labs etc.

There are two types of computer languages. **i). Low Level (ii). High Level**

i). Low Level Languages: It provides the programmer a high degree of control, but it requires detailed knowledge of hardware to be used.

Types of low level languages:

a). Machine Language b). Assembly language.

a). Machine Language: The processor can understand Machine language directly. Program written in binary format (Machine Language) would be complex, time-consuming and difficult to debug. For this reason, programs are generally written in easier languages, which humans can understand, then can be translated into machine code for the processor to understand.

b). Assembly Language: It is close to the machine language. Assembly Language commands are called Mnemonics (Ne-Monics) codes. Different processors use different Assembly languages. It is complex but provides best control than high level languages. Assembler translates Assembly program into machine code for the processor.

ii). High Level Languages: are close to human languages. These are machine independent and known as “Third Generation” languages. These languages consist of simple English words and symbols like PRINT, ADD, GOTO +, -, *, /, @, & \$ etc. Each high level language has its own **compiler**.

Q. Write note on High Level Languages.

FORTRAN: (FORmula TRANslation): FORTRAN was the first high level language was developed in 1957. The language was designed at IBM for scientific computing. It was mainly used for scientific purposes.

BASIC (Beginners All-purpose Symbolic Instruction Code):

Basic was designed to allow students to write programs using time-sharing computer terminals. It is one of the most widely used and easy to learn high level languages. Some advantages of Basic language are as under.

- Easy for beginners
- General-purpose and interactive.
- Provide clear error messages
- Computer hardware knowledge is not required.

COBOL (COmmon Business Oriented Language):-

COBOL was designed for businessmen. Its data types were numbers and strings. It has English-like grammar, which make it quite easy to learn. Because of its simplicity it had been very popular among business community.

PASCAL (Named after a Scientist Pascal)

It combined the best features of COBOL, FORTRAN and ALGOL. It was a highly structured programming language, which is extremely popular in computer sciences. The features like input/output and solid mathematical features made it a highly successful language.

JAVA: Sun Microsystems develop a language to control microprocessors used in cable receivers, VCR's, toasters, and personal data assistants (PDA). JAVA offers powerful capabilities of network programming, Internet applications and GUI.

Q. What do you know about Language translators? (Assembler, Compiler, Interpreter)

Language translators are the programs that translate a high or low-level language program into machine code. Program written in any language is analyzed by special software, which checks errors in the program and generates machine language.