

# NME 1 : FUNDAMENTALS OF COMPUTERS

## (INFORMATION TECHNOLOGY)

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### UNIT-1

**Introduction and Data Representation in Digital Computer - Historical Background of computer - merits and limitation of computer - First to fifth Generation of Computers - Characteristics of Computers - Classification of Computers**

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#### Introduction and Data Representation in Digital Computers

Data and instructions cannot be entered and processed directly into computers using human language. Any type of data be it numbers, letters, special symbols, sound or pictures must first be converted into machine-readable form i.e. binary form. Due to this reason, it is important to understand how a computer together with its peripheral devices handles data in its electronic circuits, on magnetic media and in optical devices.

Electronic components, such as microprocessor, are made up of millions of electronic circuits. The availability of high voltage(on) in these circuits is interpreted as '1' while a low voltage (off) is interpreted as '0'. This concept can be compared to switching on and off an electric circuit. When the switch is closed the high voltage in the circuit causes the bulb to light ('1' state). on the other hand when the switch is open, the bulb goes off ('0' state). This forms a basis for describing data representation in digital computers using the binary number system.

#### **Number System Base Value Number and Alphabetic character used**

1	Binary	2	0, 1
2	Decimal	10	0,1,2,3,4,5,6,7,8,9
3	Octal	8	0,1,2,3,4,5,6,7
4	Hexa decimal	16	0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

#### **Number systems and their representation**

**A number system** is a set of symbols used to represent values derived from a common base or radix.

As far as computers are concerned, number systems can be classified into four major categories:

- ◆ decimal number system
- ◆ binary number system
- ◆ octal number system
- ◆ hexadecimal number system

## Decimal number system

- The term decimal is derived from a Latin prefix decimal, which means ten. Decimal number system has ten digits ranging from 0-9. Because this system has ten digits; it is also called a base ten number system or denary number system.
- A decimal number should always be written with a subscript 10 e.g.  $X_{10}$
- But since this is the most widely used number system in the world, the subscript is usually understood and ignored in written work. However, when many number systems are considered together, the subscript must always be put so as to differentiate the number systems.
- The magnitude of a number can be considered using these parameters.
  - Absolute value
  - Place value or positional value
  - Base value

**The absolute value** is the magnitude of a digit in a number. for example the digit 5 in 7458 has an absolute value of 5 according to its value in the number line.

**The place value** of a digit in a number refers to the position of the digit in that number i.e. whether; tens, hundreds, thousands etc.

**The total value** of a number is the sum of the place value of each digit making the number.

**The base value** of a number also known as the **radix**, depends on the type of the number systems that is being used .The value of any number depends on the radix. for example the number  $100_{10}$  is not equivalent to  $100_2$ .

## Binary number system

It uses two digits namely, 1 and 0 to represent numbers. unlike in decimal numbers where the place value goes up in factors of ten, in binary system, the place values increase by the factor of 2. binary numbers are written as  $X_2$ . consider a binary number such as  $1011_2$ . The right most digit has a place value of  $1 \times 2^0$  while the left most has a place value of  $1 \times 2^3$ .

## Octal number system

Consists of eight digits ranging from 0-7. the place value of octal numbers goes up in factors of eight from right to left

## Hexa decimal number system

This is a base 16 number system that consists of sixteen digits ranging from 0-9 and letters A-F where A is equivalent to 10, B to 11 up to F which is equivalent to 15 in base ten system. The place value of hexadecimal numbers goes up in factors of sixteen.

A hexadecimal number can be denoted using 16 as a subscript or capital letter H to the right of the number .For example, 94B can be written as  $94B_{16}$  or  $94BH$ .

### **Converting binary numbers to decimal numbers**

- To convert a binary number to a decimal number, we proceed as follows:
- First, write the place values starting from the right hand side.
- Write each digit under its place value.
- Multiply each digit by its corresponding place value.
- Add up the products. The answer will be the decimal number in base ten.

### **Converting binary numbers to hexadecimal numbers**

To convert binary numbers to their binary equivalents, simply group the digits of the binary number into groups of four from right to left e.g. 11010001. The next step is to write the hexadecimal equivalent of each group e.g.

1101- D

0001- 1

The equivalent of 11010001 is D1H or D1<sub>16</sub>

### **Symbolic representation using coding schemes**

- In computing, a single character such as a letter, a number or a symbol is represented by a group of bits. The number of bits per character depends on the *coding* scheme used.
- The most common coding schemes are:
- Binary Coded Decimal (BCD),
- Extended Binary Coded Decimal Interchange Code (EBCDIC) and
- American Standard Code for Information Interchange (ASCII).

### **Binary Coded Decimal (BCD)**

- Binary Coded Decimal is a 4-bit code used to represent numeric data only. For example, a number like 9 can be represented using Binary Coded Decimal as 1001<sub>2</sub>.
- Binary Coded Decimal is mostly used in simple electronic devices like calculators and microwaves. This is because it makes it easier to process and display individual numbers on their Liquid Crystal Display (LCD) screens.
- **A standard Binary Coded Decimal**, an enhanced format of Binary Coded Decimal, is a 6-bit representation scheme which can represent non-numeric characters. This allows 64 characters to be represented. For letter A can be represented as 110001<sub>2</sub> using standard Binary Coded Decimal

### **Extended Binary Coded Decimal Interchange code (EBCDIC)**

- Extended Binary Coded Decimal Interchange code (EBCDIC) is an 8-bit character-coding scheme used primarily on IBM computers. A total of 256 (2<sup>8</sup>) characters can be coded using this scheme. For example, the symbolic representation of letter A using Extended Binary Coded Decimal Interchange code is 11000001<sub>2</sub>.

### **American standard code for information interchanges (ASCII)**

- American standard code for information interchange (ASCII) is a 7-bit code, which means that only 128 characters i.e. 2<sup>7</sup> can be represented. However, manufactures

have added an eight bit to this coding scheme, which can now provide for 256 characters.

- This 8-bit coding scheme is referred to as an 8-bit American standard code for information interchange. The symbolic representation of letter A using this scheme is  $1000001_2$ .

## HISTORICAL BACKGROUND OF COMPUTING

### **Earliest Computer**

- Originally calculations were computed by humans, whose job title was computers.
- These human computers were typically engaged in the calculation of a mathematical expression.
- The calculations of this period were specialized and expensive, requiring years of training in mathematics.
- The first use of the word "computer" was recorded in 1613, referring to a person who carried out calculations, or computations, and the word continued to be used in that sense until the middle of the 20<sup>th</sup> century.

### **Abacus**

- An **abacus** is a mechanical device used to aid an individual in performing mathematical calculations.
- The **abacus** was invented in Babylonia in 2400 B.C.
- The abacus in the form we are most familiar with was first used in China in around 500 B.C.
- It used to perform basic arithmetic operations.

### **Napier's Bones**

- Invented by **John Napier** in 1614.
- Allowed the operator to **multiply, divide and calculate square and cube roots** by moving the rods around and placing them in specially constructed boards.

### **Pascaline**

- Invented by **Blaise Pascal** in 1642.
- It was its limitation to addition and subtraction.
- It is too expensive.

### **Jacquard Loom**

- The **Jacquard loom** is a mechanical loom, invented by **Joseph-Marie Jacquard** in 1881.
- It is an automatic loom controlled by punched cards.

### **First Computer Programmer**

- In 1840, **Augusta Ada Byron** suggests to Babbage that he use the binary system.
- She writes programs for the **Analytical Engine**.

## **ENIAC**

- **ENIAC** stands for **Electronic Numerical Integrator and Computer**.
- It was the first electronic general-purpose computer.
- Completed in 1946.
- Developed by **John Presper Eckert** and **John W. Mauchly**.

## **UNIVAC 1**

- The **UNIVAC I** (**UNIV**ersal **A**utomatic Computer 1) was the first commercial computer.
- Designed by **J. Presper Eckert** and **John Mauchly**.

## **EDVAC**

- **EDVAC** stands for **Electronic Discrete Variable Automatic Computer**
- **The First Stored Program Computer**
- Designed by Von Neumann in 1952.
- It has a memory to hold both a stored program as well as data.

## **The First Portable Computer**

- **Osborne 1**—the first portable computer.
- Released in 1981 by the Osborne Computer Corporation.

## **The First Computer Company**

- The first computer company was the **Electronic Controls Company**.
- Founded in 1949 by **J. Presper Eckert** and **John Mauchly**.

## **MERITS AND LIMITATION OF COMPUTERS**

### **Merits**

#### ♦ **Speed:**

The speed of a computer is measured in terms of the number of instructions that it can perform or execute in a second. The speeds of computers are measured in milliseconds (10<sup>-3</sup> sec), micro-seconds (10<sup>-6</sup> sec), and nano-seconds (10<sup>-9</sup>sec). Computers are superfast machines and can process millions of instructions per second. Smaller computers can execute thousands of instructions per second, while the more complex machines can execute millions of instructions per second.

#### ♦ **Accuracy:**

Computers are very accurate. They are capable of executing hundreds of instructions without any errors. They do not make mistakes in their computations. They perform each and every calculation with the same accuracy.

◆ **Efficiency**

The efficiency of computers does not decrease with age. The computers can perform repeated tasks with the same efficiency any number of times without exhausting themselves. Even if they are instructed to execute millions of instructions, they are capable of executing them all with the same speed and efficiency without exhaustion.

◆ **Storage Capability**

Computers are capable of storing large amounts of data in their storage devices. These devices occupy very less space and can store millions of characters in condensed forms. These storage devices typically include floppy disks, tapes, hard disks, CDs etc, the data stored on these devices can be retrieved and reused whenever it is required in future.

◆ **Versatility**

Computers are very versatile. They are capable not only of performing complex mathematical tasks of science and engineering, but also other non-numerical operations fielding air-line reservation, electricity bills, data base management etc.

◆ **Internet:**

You can connect your computer to [Internet](#) and browse through huge data. People use internet for various purposes. Students can use internet to download study materials. A research analyst can do market research over internet. A marketing person can gather relevant data across various geographical boundaries. A prospective customer can find a service provider over internet.

◆ **Multimedia:**

Computer can also be used as an entertainment device. We can play various multimedia applications such as music, video, etc.

◆ **Reduced cost:**

The introduction of computer has resulted into a reduction of cost to perform various complicated tasks.

◆ **Stores data in digital format:**

Computers can store millions of pages of information in digital format.

◆ **Calculations:**

Businesses are increasingly using spreadsheets and other software as a tool for performing mathematical calculations.

## Limitations of Computers

### ◆ **Dependency**

- It functions as per a user's instruction, so it is fully dependent on human being.
- A computer is a machine that has no intelligence to perform any task.
- Each instruction has to be given to computer.
- A computer cannot take any decision on its own.

### ◆ **No Feeling**

- Computers have no feelings or emotions.
- It cannot make judgement based on feeling, taste, experience, and knowledge unlike a human being.

### ◆ **Ever changing technology:**

The technology that is new today, may soon become obsolete. We need to regularly upgrade the hardware and software in a computerized environment. This involves additional time and cost.

### ◆ **Increased manpower cost:**

The computer needs to be operated by skilled person. This has led to an increase in manpower cost for organizations. Due to the inherent risks, huge expenditure are made ensure data security.

### ◆ **Computer stops responding:**

At times the operating system of the computer may stop responding or functioning. Though this problem is generally solved by restarting the computer, but sometimes you may have to take the support of the technician.

### ◆ **Viruses:**

The threat of virus and malware attack always remains in the computerized environment. To cope up with these risks, various anti-virus software are available in the market. If you are using a good antivirus, you are almost sure that your private information and other sensitive data are secured.

### ◆ **Reduction in employment opportunity:**

The introduction of computers has negatively impacted the employability of computer illiterate people.

## FIRST TO FIFTH GENERATION OF COMPUTERS

**First Generation** The period of first generation: 1942-1954. Vacuum tube based.

(ENIAC - Electronic Numerical Integrator and Calculator EDSAC – Electronic Delay Storage Automatic Calculator , EDVAC – Electronic Discrete Variable Automatic Computer UNIVAC – Universal Automatic Computer, IBM 701)

- ◆ Vacuum tubes were used – basic arithmetic operations took few milliseconds
- ◆ Consume more power with limited performance
- ◆ High cost
- ◆ Uses assembly language – to prepare programs. These were translated into machine level language for execution.
- ◆ Mercury delay line memories and Electrostatic memories were used
- ◆ Fixed point arithmetic was used
- ◆ Punched cards and paper tape were invented to feed programs and data and to get results.
- ◆ Magnetic tape / magnetic drum were used as secondary memory
- ◆ Mainly used for scientific computations.

**Second Generation :** The period of second generation : 1952-1964. Transistor based  
(Manufacturers – IBM 7030, Digital Data Corporation’s PDP 1/5/8 Honeywell 400)

- ◆ Transistors were used in place of vacuum tubes. (invented at AT&T Bell lab in 1947)
- ◆ Small in size , Lower cost
- ◆ Lesser power consumption and better performance
- ◆ Magnetic ferrite core memories were used as main memory which is a random-access non-volatile memory
- ◆ Magnetic tapes and magnetic disks were used as secondary memory
- ◆ Hardware for floating point arithmetic operations was developed.
- ◆ Index registers were introduced which increased flexibility of programming.
- ◆ High level languages such as FORTRAN, COBOL etc were used - Compilers were developed to translate the high-level program into corresponding assembly language program which was then translated into machine language.
- ◆ Separate input-output processors were developed that could operate in parallel with CPU.
- ◆ Punched cards continued during this period also.
- ◆ 1000 times increase in speed.
- ◆ Increasingly used in business, industry and commercial organizations for preparation of payroll, inventory control, marketing, production planning, research, scientific & engineering analysis and design etc.



**Third Generation:** The period of third generation : 1964-1972. Integrated Circuit based.  
(System 360 Mainframe from IBM, PDP-8 Mini Computer from Digital Equipment Corporation)

- ◆ ICs were used
- ◆ Small Scale Integration and Medium Scale Integration technology were implemented in CPU, I/O processors etc.
- ◆ Smaller & better performance
- ◆ Comparatively lesser cost
- ◆ Faster processors
- ◆ In the beginning magnetic core memories were used. Later they were replaced by semiconductor memories (RAM & ROM)
- ◆ Introduced microprogramming
- ◆ Microprogramming, parallel processing (pipelining, multiprocessor system etc), multiprogramming, multi-user system (time shared system) etc were introduced.
- ◆ Operating system software were introduced (efficient sharing of a computer system by several user programs)
- ◆ High level languages were standardized by ANSI eg. ANSI FORTRAN, ANSI COBOL etc
- ◆ Database management, multi-user application, online systems like closed loop process control, airline reservation, interactive query systems, automatic industrial control etc emerged during this period.

**Fourth Generation :** The period of fourth generation : 1972-1990. VLSI microprocessor based  
(Intel's 8088,80286,80386,80486., Motorola's 68000, 68030, 68040, Apple II, CRAY etc)

- ◆ Microprocessors were introduced as CPU– Complete processors and large section of main memory could be implemented in a single chip
- ◆ Tens of thousands of transistors can be placed in a single chip (VLSI design implemented)
- ◆ CRT screen, laser & ink jet printers, scanners etc were developed.
- ◆ Semiconductor memory chips were used as the main memory.
- ◆ Secondary memory was composed of hard disks – Floppy disks & magnetic tapes were used for backup memory
- ◆ Parallelism, pipelining cache memory and virtual memory were applied in a better way
- ◆ LAN and WANS were developed (where desktop work stations interconnected)
- ◆ Introduced C language and Unix OS
- ◆ Introduced Graphical User Interface
- ◆ Less power consumption
- ◆ High performance, lower cost and very compact
- ◆ Much increase in the speed of operation

**Fifth Generation:** The period of fifth generation : 1990 and onwards. ULSI microprocessor based

(IBM notebooks, Pentium PCs-Pentium 1/2/3/4/Dual core/Quad core.. SUN work stations, Origin 2000, PARAM 10000, IBM SP/2)

- ◆ Generation number beyond IV, have been used occasionally to describe some current computer system that have a dominant organizational or application driven feature.
- ◆ Computers based on artificial intelligence are available
- ◆ Computers use extensive parallel processing, multiple pipelines, multiple processors etc
- ◆ Massive parallel machines and extensively distributed system connected by communication networks fall in this category.
- ◆ Introduced ULSI (Ultra Large Scale Integration) technology – Intel’s Pentium 4 microprocessor contains 55 million transistors millions of components on a single IC chip.
- ◆ Superscalar processors, Vector processors, SIMD processors, 32 bit micro controllers and embedded processors, Digital Signal Processors (DSP) etc have been developed.
- ◆ Memory chips up to 1 GB, hard disk drives up to 180 GB and optical disks up to 27 GB are available (still the capacity is increasing)
- ◆ Object oriented language like JAVA suitable for internet programming has been developed.
- ◆ Portable note book computers introduced
- ◆ Storage technology advanced – large main memory and disk storage available
- ◆ Introduced World Wide Web. (and other existing applications like e-mail, e Commerce, Virtual libraries/Classrooms, multimedia applications etc.)
- ◆ New operating systems developed – Windows 95/98/XP/..., LINUX, etc.
- ◆ Got hot pluggable features – which enable a failed component to be replaced with a new one without the need to shutdown the system, allowing the uptime of the system to be very high.
- ◆ The recent development in the application of internet is the Grid technology which is still in its upcoming stage.
- ◆ Quantum mechanism and nanotechnology will radically change the phase of computers.

### **CHARACTERISTICS OF COMPUTERS**

#### ◆ **Speed**

A computer is very fast device. It can perform large amount of work in a few seconds. Where human being worked a particular work for whole day, computer does the same in very short time. Today, computers can perform 100 million computations in one second. The speed of computers are measured in terms of microseconds, Nano seconds and even in Pico seconds.

Where, 1 second= $10^{-6}$  micro second  
= $10^{-9}$  nano second  
= $10^{-12}$  Pico second

#### ◆ **Accuracy**

The computer is 100% accurate and capable to perform arithmetical calculation and logic operations with the same accuracy. It can never make mistakes. All mistakes are done by users. The cause of errors may be due to inaccurate feeding data or due to wrong setting of the programmer. The accuracy of a computer is Illustrated well by the term GIGO; i.e. Garbage In Garbage Out, which means if faulty instruction are provided for processing the data, obviously wrong answer will be given.

#### ◆ **Diligence**

A computer can operate twenty four hours continuously without taking any rest. It has no feelings or no emotions, if you work continuously for 3 hours, you feel lack of concentrate but a computer is free from these and you will get the result you Want with the same speed and same accuracy.

#### ◆ **Versatility**

Versatility is one of the most wonderful features about the computer. One moment, it is preparing the results of a particular examination, the next moment it is busy in preparing electricity bills, and in between it may be helping an office secretary to trace an important letter in seconds. It can do multiple works at a same time. It also used in data processing jobs, weather fore casting, ticket reservation purpose ,multimedia designing, animations, accountancy etc.

#### ◆ **High Memory**

Computer has made more memory or storage capacity than human beings. It can store millions of data and instructions, which can be retrieved and recalled even after a number of years. This is not possible in case of human brain.

Computers have internal or primary memory (storage space) as well as external or secondary memory. While the internal memory of computers is very expensive and limited in size, the secondary storage is cheaper and of bigger capacity.

The computer stores a large amount of data and programs in the secondary storage space. The stored data and programs can be retrieved and used whenever required. Secondary memory is the key for data storage. Some examples of secondary devices include floppy disks, optical disks.

When data and programs have to be used, they are copied from the secondary memory into the internal memory, often known as random access memory (RAM).

#### ◆ **Economical :**

Today, computers are considered as short-term investments for achieving long-term gains. Using computers also reduces manpower requirements and leads to an elegant and

efficient way of performing various tasks. Hence, computers save time, energy, and money. When compared to other systems, computers can do more work in lesser time.

- ◆ **Decision Making**

The computer has capability to perform task and managing processing schedules when there are many jobs available and Waiting own turns. The Operating system has capability to manage files, executing utilities software and many others.

The game, weather forecasting, weaponry systems, aviation's, space shuttles etc are controlled by computer and the controlling actions are performed by its decision making capacity based on stored related database.

- ◆ **Artificial Intelligence:**

The fifth generation computer which recognizes voice is based on artificial intelligence. The AI is applied in gaming software, and robotics from many years, but operating system based on AI is also in process which can recognize not only voice, but read mood of users also. It gives suggestion and decision on complex problems.

- ◆ **Efficiency**

The *computer* processed data in nano second which is beyond of human capacity.

- ◆ **Communicate**

Computers have the ability to communicate, but of course there needs some sort of connection (either Wired or Wireless connection). Two computers can be connected to send & receive data. Special softwares are used for text and video chat. Friends & family can connect over the internet and share files, photos & videos online.

- ◆ **Automation**

Computers are automatic in operation. It means once the data and instructions are fed to a computer, human interventions are not required. The computers manipulate the data according to the instructions and continue doing so till the last instruction is executed.

- ◆ **Solve Complete Problems**

Computer solved those problems which are not solved by human being computer solved the computer solved the problems in seconds.

## CLASSIFICATION OF COMPUTERS

Computers may be classified based on the following: -

- i. Operating principles (based on their construction and working)
- ii. Applications
- iii. Size and capability (or classification into micro, mini, mainframe and supercomputers)
- iv). Based on Model

### **i) Classification based on Operating Principles**

Based on the operating principles, computers can be classified into one of the following types: -

1. Digital Computers
2. Analog Computers
3. Hybrid Computers

#### **A. Digital Computers**

Operate essentially by counting. All quantities are expressed as discrete or numbers. Digital computers are useful for evaluating arithmetic expressions and manipulations of data (such as preparation of bills, ledgers, solution of simultaneous equations etc)

#### **B. Analog Computers**

An **analog computer** is a form of computer that uses the continuously changeable aspects of physical phenomena such as electrical, mechanical, orhydraulic quantities to model the problem being solved. In contrast, digital computers represent varying quantities symbolically, as their numerical values change.

#### **C. Hybrid Computers**

Hybrid Computers are computers that exhibit features of analog computers and digital computers. The digital component normally serves as the controller and provides logical operations, while the analog component normally serves as a solver of differential equations.

### **ii. Classification based on area of applications**

Modern computers depending upon their applications are classified as: -

1. Special Purpose Computers
2. General Purpose Computers

#### **a.) Special Purpose Computers**

A special purpose computer is designed only to meet the requirements of a particular task or application. The instructions needed to perform a particular task are permanently stored

into the internal memory, so that it can perform the given task on a single command. It therefore doesn't possess unnecessary options and is less expensive.

#### **b.) General Purpose Computers**

General Purpose computers are designed to meet the needs of many different applications. In these computers, the instructions needed to perform a particular task are wired permanently into the internal memory. When one job is over, instructions for another job can be loaded into the internal memory for processing. This, a general purpose machine can be used to prepare pay-bills, manage inventories, print sales report and so on.

#### **iii) Classification digital Computer based on size and Capability**

Based on size and capability, computers are broadly classified into

##### **◆ Microcomputers(Personal Computer)**

A microcomputer is the smallest general purpose processing system. The older pc started 8 bit processor with speed of 3.7MB and current pc 64 bit processor with speed of 4.66 GB. Examples: - **IBM PCs, APPLE** computer.

The difference is portables can be used while travelling whereas desktops computers cannot be carried around.

#### **iv)Classification of Computers based on Model**

We can still classify computers based on another aspect – model. There are three different models of computers already available – XT computers, AT computers and PS/2 computers.

##### **Extended Technology or XT**

The extended technology computers used 8006, 8008, 8086, 8088 processors (These are the names of Microprocessors). The period of these computers was from 1975 to 1982. These processors had 4.77 MHz clock speed (these days there are Gigahertz computers). The processors were all of 8-bit. These computers are outdated now by two reasons: first, they do not support the latest software and the second that they had low processing power as well as low storage capacity.

##### **Advanced Technology or AT**

With the advent of 80286 microprocessors in 1982, Advanced Technology computers were introduced. The processors were of 8-bit and 16-bit. The computers using processors like 80286, 80386, and 80486 are the examples. Advanced Technology computers' period is from 1982 to 1995. With the features of higher speed and larger memory than the XT computers, they support latest versions of available software.

AT computers may have 80286 SX or 80387 DX, 80486 SX, 80486 DX or even Pentium (80586) processors. The AT computers support Co-processor that enhances the processing speed and capability of the main processor to perform large and computations within a short period.

### **Personal System or PS/2**

With the advancement of Processors having high clock speed as well as high storage capacity, IBM developed the second generation of personal computers in early 1990s, which used new refined architecture making the computers faster and more powerful than AT computers. The PS/2 processors used VLSI (Very Large Scale Integration) for chip fabrication and their clock speed range from 85 MHz to 1GHz. Generally, PS/2 Computers use 3.5 inch floppy disks and OS/2 operating System. PS/2 computers are widely used in general purpose computation such as word processing, Database Arrangement, Controlling accounts etc.