

# INTRODUCTION TO MICROPROCESSOR

- With the advancement in semiconductor technology, in 1970's it became possible to integrate a complete CPU on a single chip. The CPU on a single chip was named as a microprocessor.
- The first microprocessor 4004 was fabricated by intel corporation in 1971.
- During 1971-1973, NMOS(N-type MOS) technology, Intel 8085 & Motorola 6800 microprocessors were developed. These were 8-bit microprocessor.
- Around the year 1978, HMOS(high density MOS) technology was used to develop 16-bit microprocessor such as Intel 8086/80186/80286.
- After 1985, Intel 80386, a 32-bit microprocessor was developed.
- In 1994, Intel 80486 microprocessor was developed and was used for building microcomputer.

# INTRODUCTION TO MICROPROCESSOR

- Clock Speed: The number of pulses generated by the clock per unit of time is called as the clock speed of the CPU. It is measured in millions of cycles per second i.e MHz(Megahertz).
- Processing Power: It depends upon word size.
- Word Size: is defined as the size of the data that a CPU can process at a time.

- Buses of Microprocessor:

**Data Bus:** Bidirectional group of lines on which data can flow both ways.

**Address Bus:** is a unidirectional group of Lines on which address of a device or Memory is sent by the microprocessor to read/ write the data.

**Control Bus:** is a group of lines on which control signals flow from microprocessor to its connected devices & vice versa.

Chip	Word Legth/Size(bit)
Intel 8085	8 bit
8088	16 bit
80386	32 bit
80486	32 bit
Pentium	64 bit

# Generations of Microprocessor

## First Generation of Microprocessor:

- After 8085 , Intel developed 8086 processor in 1978.
- The clock speed of 8086 was 4.77 MHz.
- It had 16-bit data bus with 20 bit address bus.
- It was capable of addressing 1MB of memory.

## Second Generation of Microprocessor:

- Intel produced 80286 chip as its 2<sup>nd</sup> generation microprocessor.
- It had 16-bit wide data bus & was capable of addressing 16 MB of memory.
- The clock speed varied from 6 MHz to 20 MHz.
- It was widely used to develop multi-tasking applications.

# Generations of Microprocessor

## Third Generation of Microprocessor:

- The 80386 chip was the 3<sup>rd</sup> generation microprocessor produced by Intel.
- It had 32 bit wide data bus.
- The address bus was also of 32 bits & chip was capable of addressing 4 GB of memory.
- The clock speed varied from 16 to 33 MHz.

## Fourth Generation of Microprocessor:

- The 80486 chip was the 4<sup>th</sup> generation of microprocessor produced by Intel.
- A small cache of size 8k was also built into the chip.
- An internal clock multiplier was also built within the chip by Intel, that was used to increase the internal operating speed of the CPU by 2x & 4x.
- To prevent overheating, a heat sink & a fan was also attached.

# Generations of Microprocessor

## Fifth Generation of Microprocessor(The Pentium):

- Pentium had a data bus of size 64 bit & address bus of size 32 bit.
- The initial version had clock speed of 33 MHz, 60 MHz, 66 MHz. With the help of internal 1.5 multipliers, the speed was increased to 90 & 100 MHz.
- In 1997, Intel added 72 new instructions to enhance multimedia computing & the chips were named as MMX(Multimedia Extensions) chip.
- The internal cache was of size 32 k.

## Sixth Generation of Microprocessor:

- Intel introduced Pentium Pro as its 6<sup>th</sup> generation microprocessor.
- A secondary cache of size 256 k was also taken into the chip.
- The speed of Pentium Pro was 166 MHz & 200 MHz.
- Later on, Intel developed Pentium II & III
- Pentium II:- clock speed range was 266 & 300 MHz.
- Pentium III:- clock speed varying from 650 MHz to 1.4 GHz.

# Generations of Microprocessor

## Seventh Generation of Microprocessor:

- AMDK7(Athelon), Intel Pentium IV & Alpha 21264 chips are the 7<sup>th</sup> generation microprocessors.
- Hyper threading Technology was used, which allows the CPU to execute 2 threads in parallel. Thus multi-tasking can run more effectively.
- It has secondary cache of size 512 k with clock speeds ranging from 2.4 GHz to 3.2 GHz.
- It uses 128 bit integer MMX chip.





# ASSIGNMENT

Draw a table that explains main features and technology used in each generation of microprocessor.