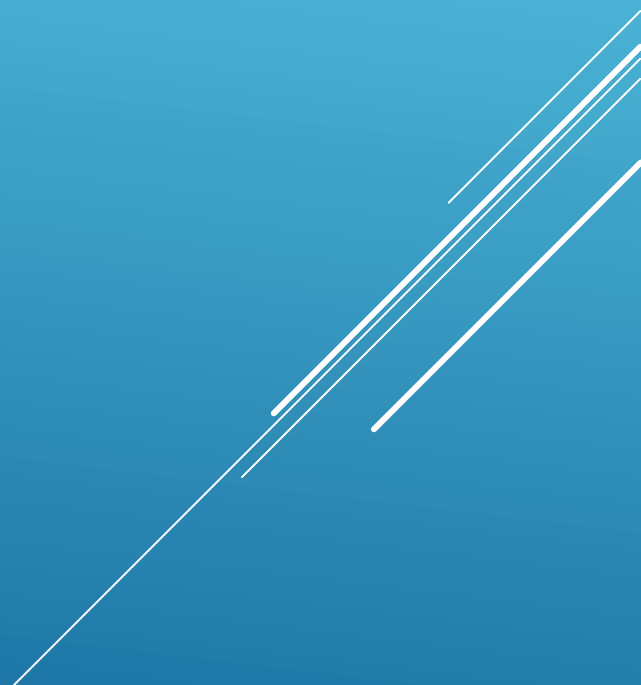# PRESENTATION ON VECTOR PROCESSING

PRESENTED BY VARSHA SINGH RANA
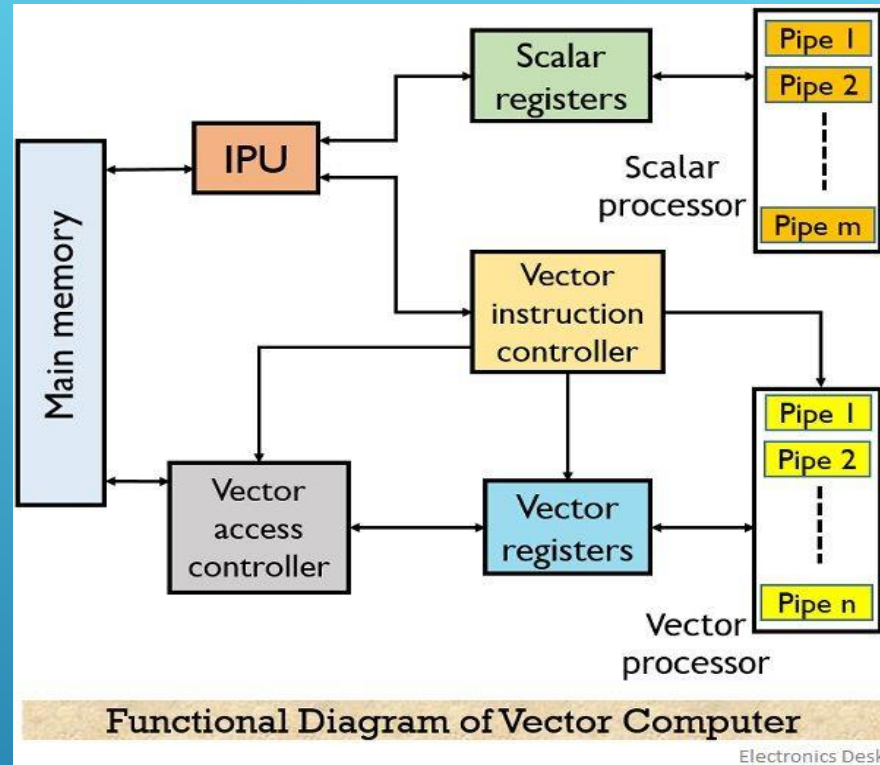
VECTOR PROCESSING

- **Definition**

- Vector processor is basically a central processing unit that has the ability to execute the complete vector input in a single instruction. More specifically we can say, it is a complete unit of hardware resources that executes a sequential set of similar data items in the memory using a single instruction.

- We know elements of the vector are ordered properly so as to have successive addressing format of the memory. This is the reason why we have mentioned that **it implements the data sequentially**.

- It holds a single control unit but has multiple execution units that perform the same operation on different data elements of the vector.

- Unlike scalar processors that operate on only a single pair of data, a vector processor operates on multiple pair of data. However, one can convert a scalar code into vector code. This conversion process is known as vectorizatio So, we can say vector processing allows operation on multiple data elements by the help of single instruction.

- These instructions are said to be **single instruction multiple data** or **vector instructions**. The CPU used in recent time makes use of vector processing as it is advantageous than scalar processing.

Functional Diagram of Vector Computer

Electronics Desk

ARCHITECTURE AND WORKING

- The functional units of a vector computer are as follows:
- IPU or instruction processing unit
- Vector register
- Scalar register
- Scalar processor
- Vector instruction controller
- Vector access controller
- Vector processor

- As it has several functional pipes thus it can execute the instructions over the operands. We know that both data and instructions are present in the memory at the desired memory location. So, the instruction processing unit i.e., IPU fetches the instruction from the memory.

- Once the instruction is fetched then IPU determines either the fetched instruction is scalar or vector in nature. If it is scalar in nature, then the instruction is transferred to the scalar register and then further scalar processing is performed.

- While, when the **instruction is a vector** in nature then it is fed to the vector instruction controller. This vector instruction controller first decodes the vector instruction then accordingly determines the address of the vector operand present in the memory.

- Then it gives a signal to the **vector access controller** about the demand of the respective operand. This vector access controller then fetches the desired operand from the memory. Once the operand is fetched then it is provided to the instruction register so that it can be processed at the vector processor.

- Classification of Vector Processor

- The classification of vector processor relies on the ability of vector formation as well as the presence of vector instruction for processing. So, depending on these criteria, vector processing is classified as follows:
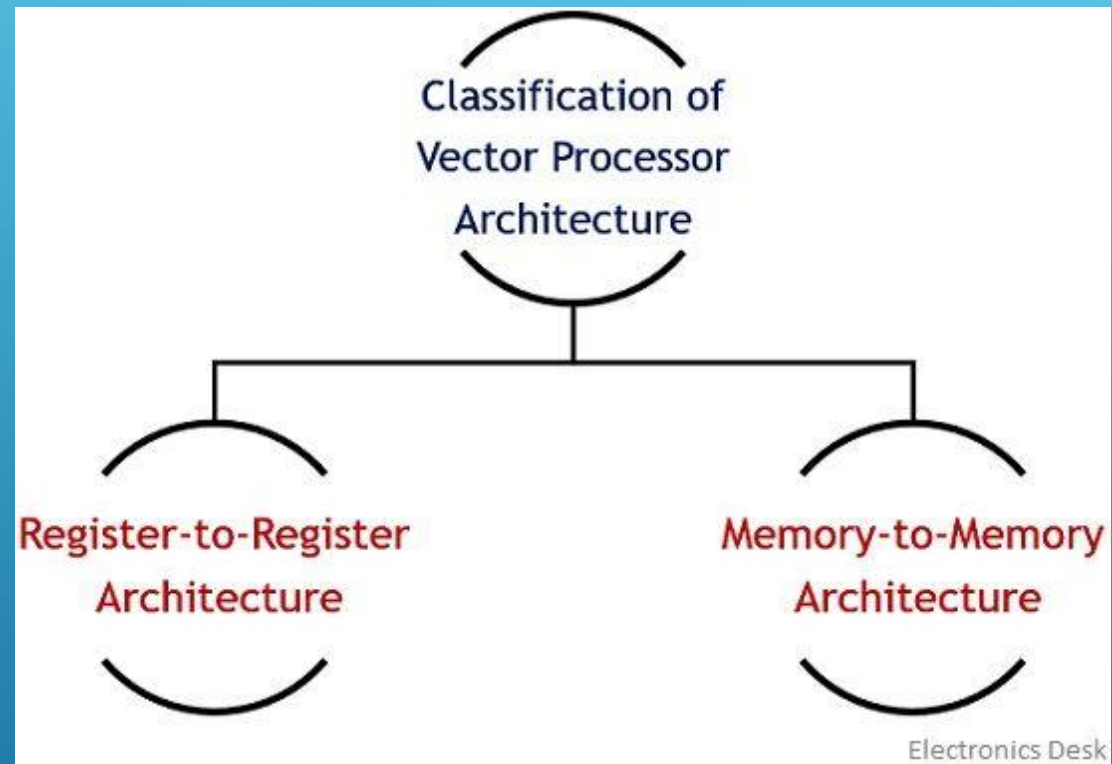
▸ Advantages of Vector Processor

▸ Vector processor uses vector instructions by which code density of the instructions can be improved.

▸ The sequential arrangement of data helps to handle the data by the hardware in a better way.

▸ It offers a reduction in instruction bandwidth.