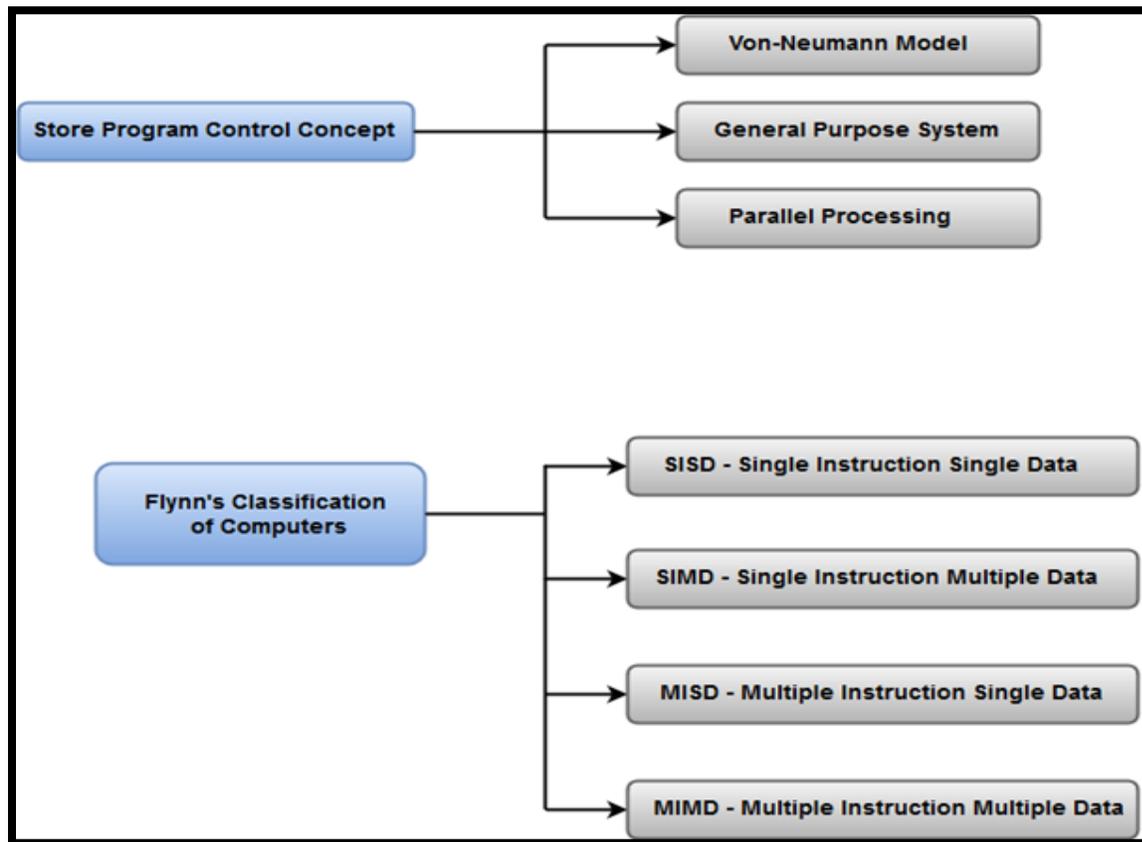


**Basic CO and Design**

**General System Architecture**

In Computer Architecture, the General System Architecture is divided into two major classification units.

- Store Program Control Concept
- Flynn's Classification of Computers



**Store Program Control Concept**

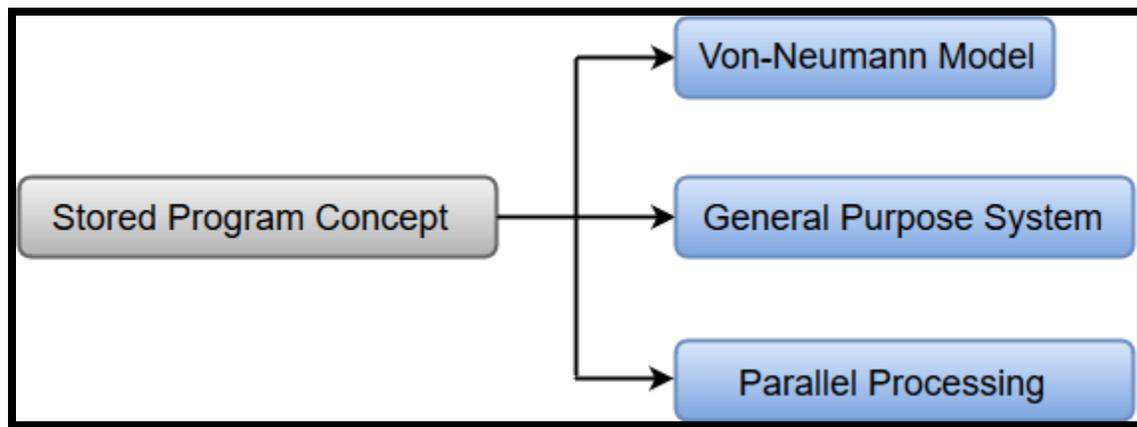
The term Stored Program Control Concept refers to the storage of instructions in computer memory to enable it to perform a variety of tasks in sequence or intermittently.

The idea was introduced in the late 1040s by John von Neumann who proposed that a program be electronically stored in the binary-number format in a memory device so that instructions could be modified by the computer as determined by intermediate computational results.

ENIAC (Electronic Numerical Integrator and Computer) was the first computing system designed in the early 1940s. It was based on Stored Program Concept in which machine use memory for processing data.

Stored Program Concept can be further classified in three basic ways:

- Von-Neumann Model
- General Purpose System
- Parallel Processing



## **Flynn's Classification of Computers**

M.J. Flynn proposed a classification for the organization of a computer system by the number of instructions and data items that are manipulated simultaneously.

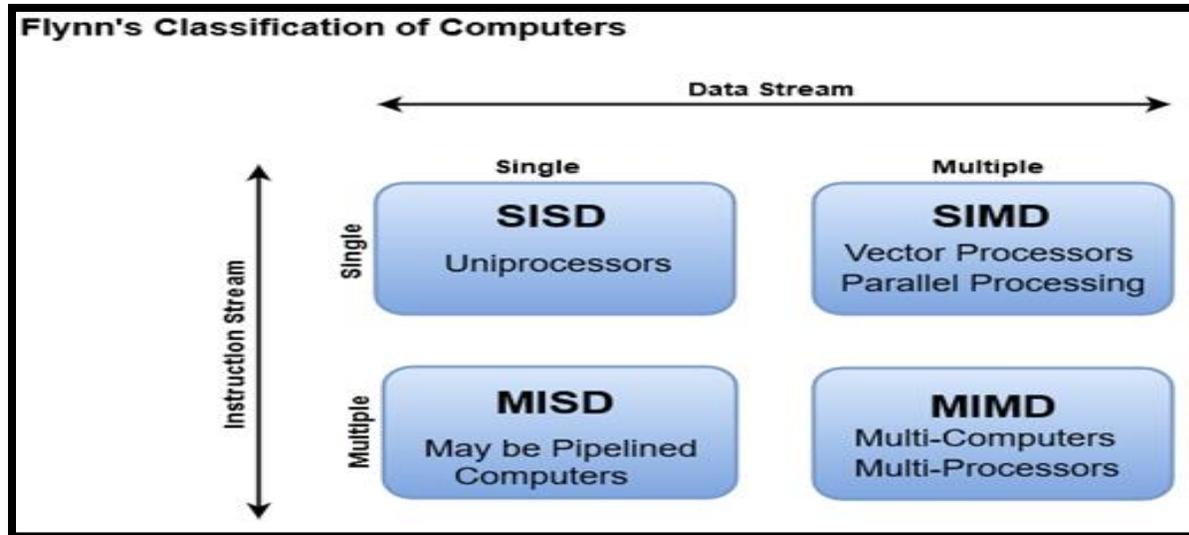
The sequence of instructions read from memory constitutes an instruction stream.

The operations performed on the data in the processor constitute a data stream.

Parallel processing may occur in the instruction stream, in the data stream, or both.

**Flynn's classification divides computers into four major groups that are:**

- Single instruction stream, single data stream (SISD)
- Single instruction stream, multiple data stream (SIMD)
- Multiple instruction stream, single data stream (MISD)
- Multiple instruction stream, multiple data stream (MIMD)



**Computer Registers**

Registers are a type of computer memory used to quickly accept, store, and transfer data and instructions that are being used immediately by the CPU. The registers used by the CPU are often termed as Processor registers.

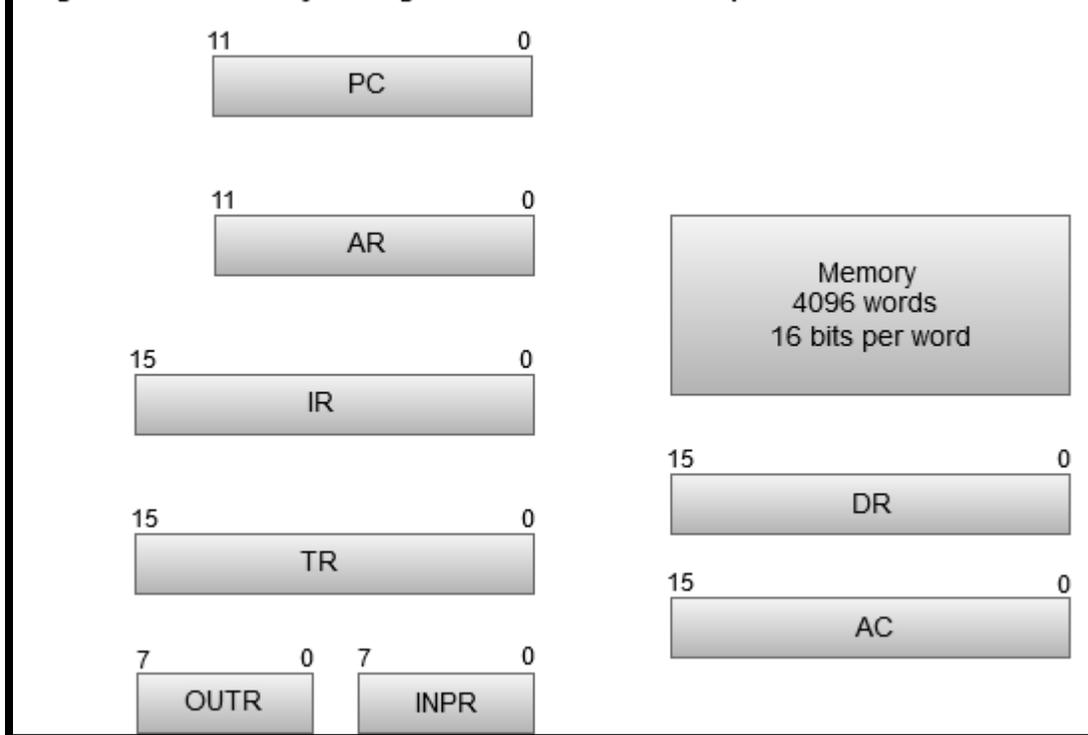
A processor register may hold an instruction, a storage address, or any data (such as bit sequence or individual characters).

The computer needs processor registers for manipulating data and a register for holding a memory address. The register holding the memory location is used to calculate the address of the next instruction after the execution of the current instruction is completed.

Following is the list of some of the most common registers used in a basic computer:

Register	Symbol	Number of bits	Function
Data register	DR	16	Holds memory operand
Address register	AR	12	Holds address for the memory
Accumulator	AC	16	Processor register
Instruction register	IR	16	Holds instruction code

Program counter	PC	12	Holds address of the instruction
Temporary register	TR	16	Holds temporary data
Input register	INPR	8	Carries input character
Output register	OUTR	8	Carries output character

**Register and Memory Configuration of a basic computer:**

- The Memory unit has a capacity of 4096 words, and each word contains 16 bits.
- The Data Register (DR) contains 16 bits which hold the operand read from the memory location.
- The Memory Address Register (MAR) contains 12 bits which hold the address for the memory location.
- The Program Counter (PC) also contains 12 bits which hold the address of the next instruction to be read from memory after the current instruction is executed.
- The Accumulator (AC) register is a general purpose processing register.
- The instruction read from memory is placed in the Instruction register (IR).
- The Temporary Register (TR) is used for holding the temporary data during the processing.
- The Input Registers (IR) holds the input characters given by the user.
- The Output Registers (OR) holds the output after processing the input data.