Assignment - 1

1) What do you mean by microprocessor? List out its application areas?

⇒ microprocessor is a multipurpose programmable, clock driven register based electronic device that reads binary instructions from a storage device called memory, accepts binary data as input processes data according to those instructions and provide results as output. The microprocessor operates in binary 0 and 1 known as bits that are represented in terms of electrical voltages in the machine that means 0 represents low voltage level and 1 represents high voltage level. Each microprocessor recognizes and processes a group of bits called the word and microprocessor are classified according to their word length such as 8 bit microprocessor with 8 bit word and 32 bit microprocessor with 32 bit word etc.
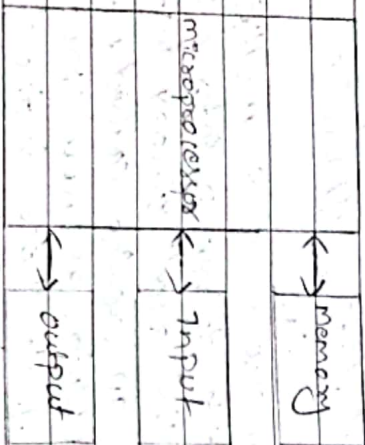
2) Explain Stored Program concept and Von Neumann Architecture?

=> Stored-Program Concept. Storage of instructions in Computers memory to enable it to perform a variety of tasks in sequence or intermittently. Program electronically stored in binary-number format of a memory device. So that instructions could be modified by the computer as determined by intermediate computational results. which enabled digital Computers to become much more flexible and powerful.

Storing the data and instructions in same memory is called Stored Program Concept which is first adopted by John Von Neumann and such architecture is named as Von-Neumann architecture. It is the ability to store instructions in the memory along with the data on which the instructions operate. The Von Neumann architecture consists of three distinct components a central processing unit, memory unit, and input/output "(I/o)" interfaces.

Fig. microprocessor

diagram: microprocessor → input, ← memory, → output

Applications of microprocessor

* Microprocessor is the CPU of the microcomputer.

* microprocessor is used data monitoring system, automatic weighing batching system.

* It is used in Security system like CCTV Surveillance, smart locks etc.

* It is also used in communication system

CPU consist of control unit and arithmetic and logic unit (ALU). ALU is responsible for carrying out an arithmetic and logical operation on data where as control unit determines the order of flow of instructions that need to be executed in programs by issuing control signals to the hardware.
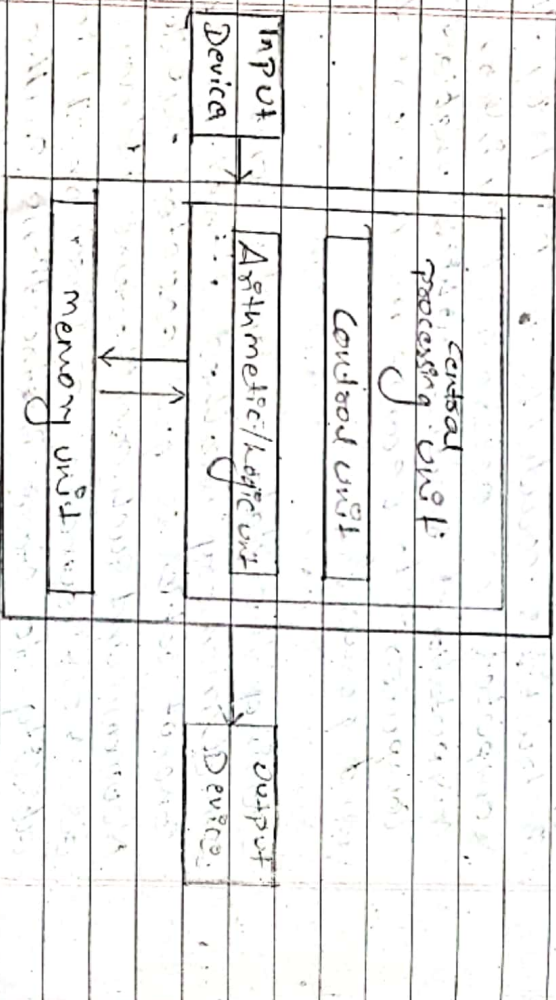
⇒

Fig. Block diagram of Von Neumann Architecture

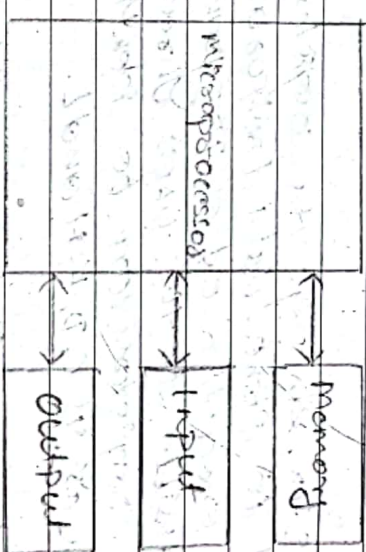3) Draw the block diagram of basic microprocessor and explain its operation.

Fig. Block diagram of basic microprocessor

Microprocessor

⇒ It is clock driven semiconductor device consisting of electronic logic circuits manufactured by using either a large scale integration (LSI) or very large scale integration (VLSI) technique. It is capable of performing various computing functions and making decisions to change the sequence of program execution.

It can be divided into three segments.

A. **Arithmetic/Logic Unit:** It performs arithmetic operation as addition and subtraction and logic operations are AND, OR & XOR.

B. **Register Array:** The registers are primarily used to store data temporarily during the execution of a program and core accessible to the users through instruction. The registers on be identified by letters such as B, C, D, E, H and L.

C. **Control unit:** It provides the necessary timing and control signals to all the operations in the microcomputer. If controls the flow of data between the microprocessor and memory & peripherals.

Memory

Memory stores binary information such as instructions and data and provides that information to the up whenever necessary. Memory has two section.

A. **Read only memory (ROM):** used to store programs that do not need alteration, ng and can only read.

B. **Read/write memory (RAM):** Also known as user memory which is used to store user programs and data. The information stored in this memory can be easily read and altered.

Input/output

* It communicates with the outside world using two devices input and output which are also known as Peripherals.

* The input device such as keyboard, switches, and analog to digital converter transfer binary information from outside world to the microprocessor.

* The output device transfers data from the microprocessor to the outside world. They include the devices such as LED, CRT, digital to analog converter, printer etc.

4) What is System Bus? Explain it types?

A system bus is a single computer bus that connects the major components of a computer system. Combining the functions of a data bus to carry information, an address bus to determine where it should be sent, and a control bus to determine its operation. The technique was developed to reduce costs and improve modularity, and although popular in the 1970s and 1980s, more modern computers use a variety of separate buses adapted to more specific needs. It is varies from system to system.

types of system bus:

Address Bus
It is a group conducting wires which carries address only. Address bus is unidirectional because data flow in one direction. From microprocessor to memory or from microprocessor to I/O devices (i.e. out of microprocessor)

Length of Address Bus of 8085 microprocessor is 16 bit (i.e four Hexadecimal Digits) and determine the amount of memory a system can address.

Data Bus
It is a group of conducting wires which carries data only. Data bus is bidirectional because data flows in both directions, from microprocessor to memory or I/O devices and from memory or I/O devices to microprocessor. Length of Data Bus of 8085 microprocessor is 8 bit, ranging 00H to FFH (i.e too Hexadecimal l(Digits)) where H denotes Hexadecimal. The width of the data bus is directly related to the largest number that bus can carry, such as an 8 bit bus can represent 2^8 unique values i.e 0 to 255.

Control Bus
It is a group of conducting wires, which is used to generate timing and

control Signal to control all the associated peripherals. Microprocessor uses control bus to process data. that is to do with selected memory location.

Some Signals are:

* Memory read
* Memory write
* I/O read
* I/O write
* Opcode fetch

5) Differentiate between Von Neuman and Harvard Architecture.

=> Von Neuman Architecture   Harvard Architecture

i) It is a theoretical design.   It is a modern architec-
based on stored program   ture based on the Harv.
computer concept   and most computer
                                 model

ii) It uses same physical
memory address for instru.   ii) It uses separate mem-
ction and data.   ory address for instruction
                                 and data.

iii) Processor needs two clock   iii) Processor need one cycle
cycles to execute an   to complete an instruction
instruction

iv) Similar control on design   iv) Control unit design
buses is more complica-   and development of one
ted which adds to the   is cheaper and faster
development cost.   development cost.

v) Data transfer and instruc-   v) Data transfer and instruc-
tion fetches cannot be   tion at the same time.
performed simultaneously.

vi) Used in Personal computers and   vi) Used in microcontrollers
laptops, and workstations   and signal Processing.