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ID * 6966

Subject * Microprocessor

Programme * B.Tech Electrical.

Submitted to * Eng. Aamir Aman.

Subroutine:

also referred to as a function, procedure, and subprogram, is code that may be called and executed any-where in a program.

e.g.

A routine may be used to save a file or display the time.

Half the main program.

The subroutine developed by one programmer can be used by other programmers in their own program.

Provide returning to same point.

The subroutine can be called main program a lot of time without any word the subroutine code again and again to so less memory have reserved.

Execute the sub-routine.

Revert to the main route.

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Hintal.

- (*) The block of inst- which carries out a specific and well defined task is called Subroutine, call the main program.
 - (*) Provide returning to same point.
 - (*) Execute the sub-routine,
 - (*) Return to the main route.
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Q.2
Ans

Part (B)

Types of Segment.Stack Segment

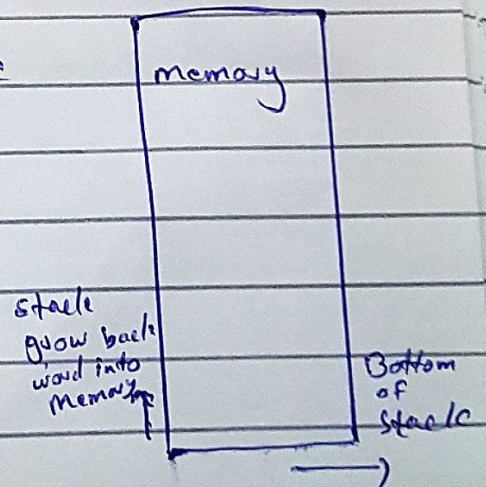
The stack is an area of memory identified by the programmer for temporary storage of information.

* The stack is a LIFO structure. (Last in First out principle)

* The stack normally grows backword into a memory.

→ → The stack storage starts from the highest address & continues towards the lowest addresses.

⇒ The program defines the bottom of stack and the stack grows up into reducing address range.



* In 8086 the main stack register stack pointer (SP).

(SS) usually to store info the memory segment.

* The C.P.U then copies the value of Ax to the memory word physical address is $0x2F82E$.

Stack Pointer.

* In the 8085, the stack is defined by setting the (SP) stack pointer

$LX1 SP, FFFFH$

* Stack pointer to location $FFFFH$ (end of memory for the 8085)

* The register stores the address of the top of stack (Top) the top most valid field location of SP .

* The stack grows from the higher address to lower, ~~and~~ so when the data is pushed on stack (SP).

* Need of stack address segment.

As there are very few registers inside MP . it may be possible the main program & sub-routine both required them.

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* Main programs are stored on Stack with the help of PUSH instruction and POPPED.

* 2 Operation of Stack.

These are two operation of Stack

① PUSH. ② POP.

① Push is instruction which is always incrementation the Stack pointer.

② Pop is deletion is always decrements Stack pointer.

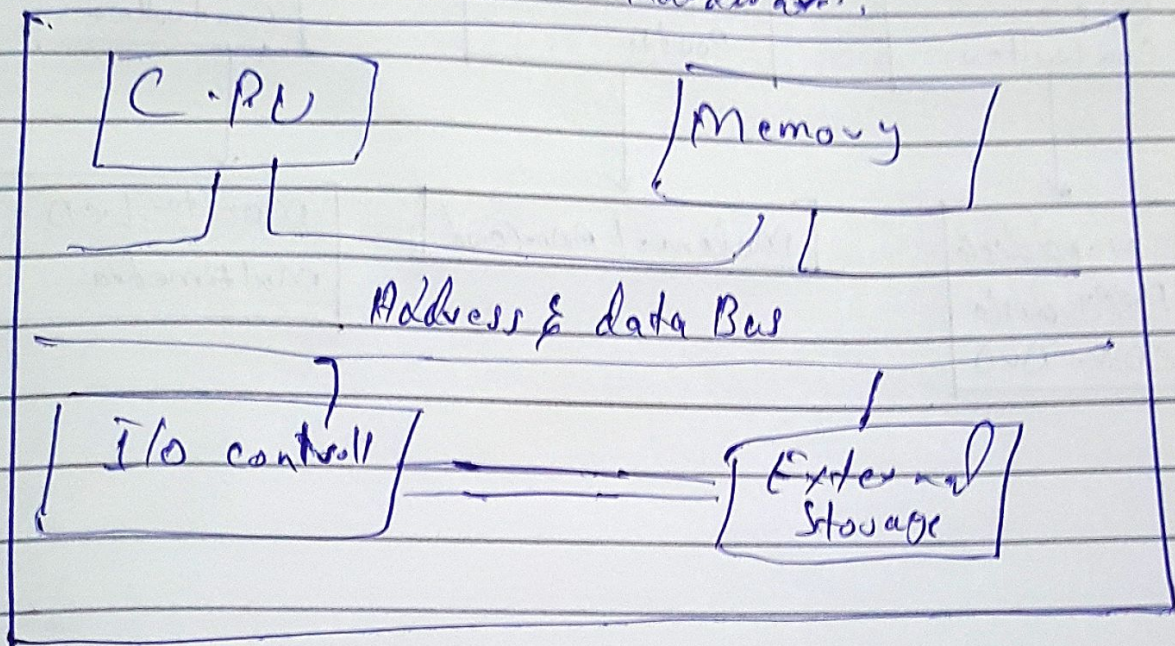
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Part. (A)

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Microprocess and Bus Architecture.

Microprocessor is C.P.U. a
mp base system. are Electrical system
software are Hardware.



The computer built from μ AP (MP) is called 'microcomputer'.

* Memory (P and S.)

In Two types of memory
Primary memory
and Secondary memory.

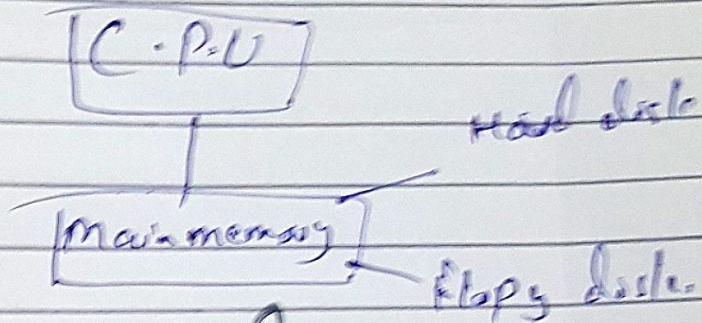
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* Primary Storage memory is RAM, and ROM.

* Secondary Storage memory is Hard disk, floppy disk, USB, CD - discs etc.



* Input output peripherals.

* All input device and output is called peripheral.

* Input output device, as printer, scanner, keyboard, joystick, mouse, etc.

* The I/O device connected to the system bus through peripheral interface IC called I/O. As you can see these ICs on mother board.

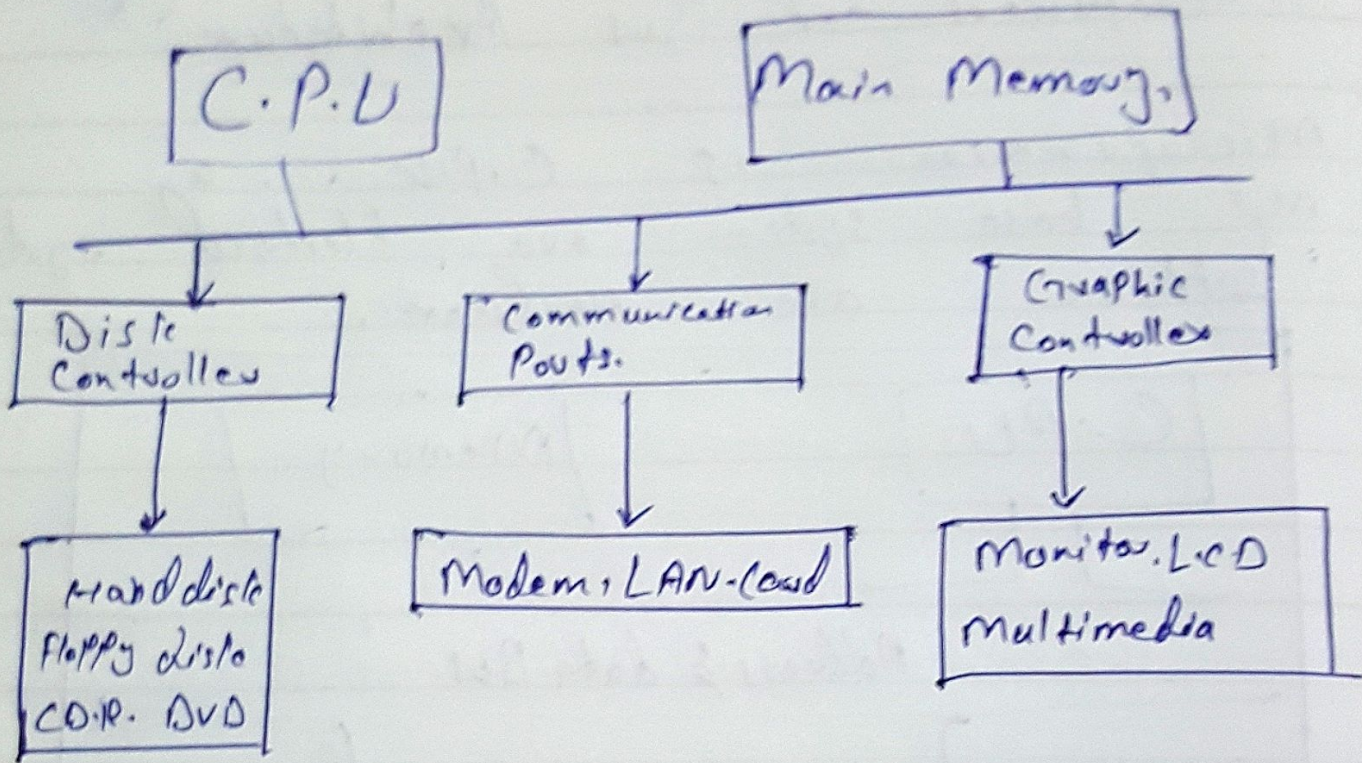
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Peripherals

Controller.



Part B

Q.2

Part (B)

BusFunction of (BIU) & (EU) - 8086

The 8086 CPU is organized as two separate processors called the Bus Interface Unit (BIU) and Execution Unit (EU). The BIU provides the following functions including generation of the memory and I/O addresses for the transfer of data b/w the outside world - outside the CPU that is and EU.

* Function of BIU -

BIU connects 8086/8088 to the world.

* send out address or memory location.

* fetch instruction from the memory.

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Final

- ④ Sends out addresses to I/O ports.
- ⑤ Reads write data I/O ports.

* Function of EU.

The function of EU is:

- ① Tells BIU the address from where to fetch data & instructions.
- ② Decodes & execute the instructions.
- * In function to control operation on data using the instruction decoder of ALU.

Main Parts of E.U.

- ① Arithmetic Logic Unit (ALU)
- ② Status and control flags.
- ③ General purpose registers and temporary operand registers.

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A-L.U

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BIU

The A.L.U performs
arithmetic operators, logic & shift
operations by instructions.

Flags.

8086 has 16 bit flag register
contains 9 active flags.
There are two types of flags.
Conditional flags.

There are 6 flag
set or reset by EU on the
basis of result of some arithmetic
operation.

Control flag.

3 flags used to
control certain of the processor.

Main Component of BIU.

- 1) Instruction queue.
- 2) Segment registers.
- 3) Instruction pointer.
- 4) Address generation and bus control.

Q13/ Part A

(3/11).
Answer

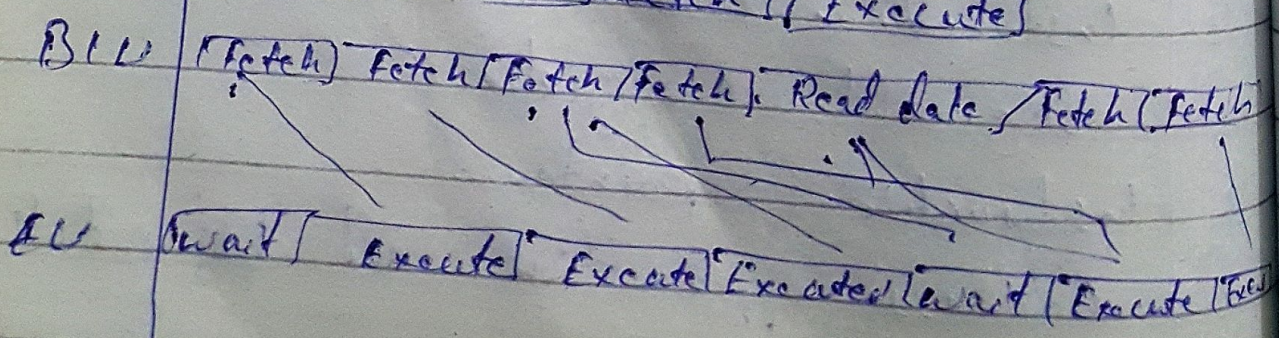
Pipelining

In a computing a pipeline also known as a data pipeline is set of data processing elements connected in series where the output of one element is the input of the next one. The elements of a pipeline are often executed in parallel or in time-staggered fashion.

* Fetching of the next instruction while the current instruction is called pipelining.

Fetch and Execute Cycle:

[Fetch] [Execute] [Fetch] [Execute]



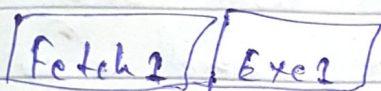
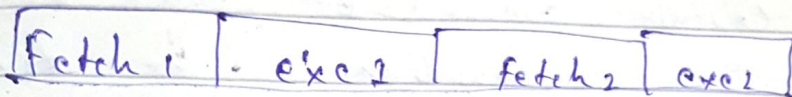
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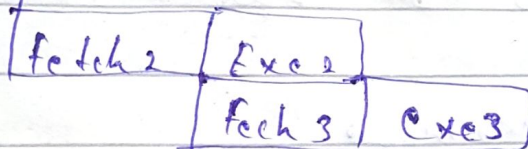
Pipelining in 8086.

Non Pipelining



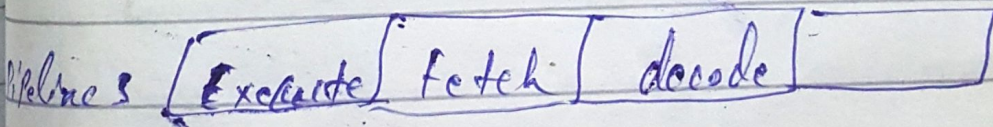
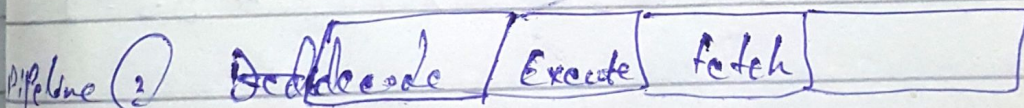
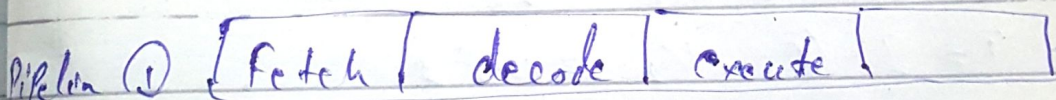
Pipelined

8086



Pipelined in 8086 microprocessor

Parallel Processing Pipeline.



Each pipeline in a separate part of CPU.

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* INSTRUCTION cycle.

The instruction cycle mean duration. The μp takes certain amount of time to execute the instruction. The time required varies from one processor to other and also depends on system clock frequency f .

* For example

The instruction ADD A, SH takes 4T states.

* If clock frequency -

$$F = 2 \text{ Hz } \mu\text{c}$$

$$- T = \frac{1}{f} = \frac{1}{2} = 0.5 \text{ s}$$

$$- \text{So ADD A, SH} \rightarrow 4T = 4 \times 0.5 = 2 \text{ s}$$



Q.3 Part (B)

Address Mapping.

Address mapping also known as pin mapping or geocoding is the process of assigning map coordinate location to addresses in database.

* The output of address mapping is a point layer attributed with all the data from input database.

(Or.)

* On maps of houses, we give particular location of a room, washroom & kitchen.

* Like wise allocating a unique address to any register or device on the address space is called address mapping.

