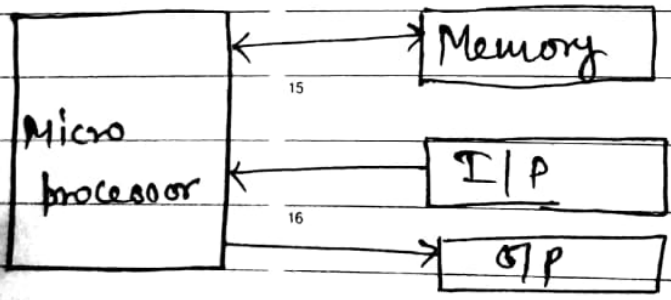
Priorities

Microprocessor :- Microprocessor is a programmable logic device that can be used to controll the device.

or

The microprocessor is a programmable Integrating device that has decision making capability.

→ A microprocessor is a multipurpose, programmable register based logic electronic device that reads binary instructions from Memory, accept binary data as I/P process the data according to those instruction & provide results as O/P.



programmable machine (Microprocessor system)

Microprocessor Application → Reprogrammable system

→ program Embedded system

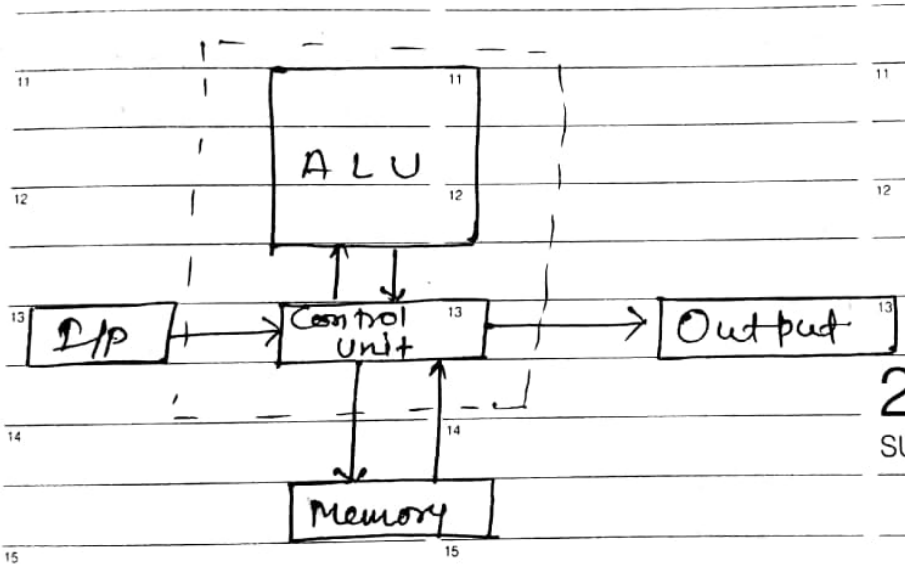
Mnemonics Mnenomics

30 December THURSDAY 364-1 | 31 December FRIDAY 365-0 | 1 January SATURDAY 001-364

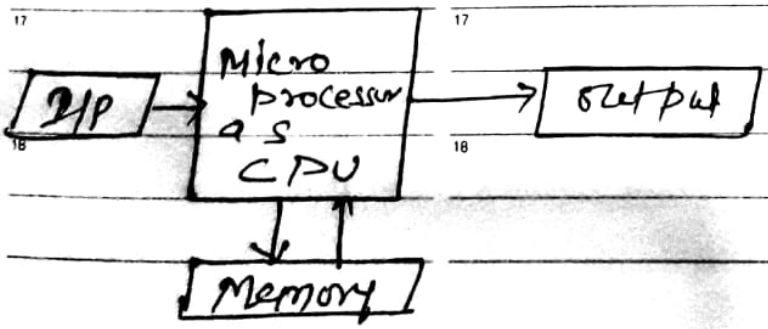
Priorities Reprogrammable system include. General purpose processor capable of handeling of large data, mass storage such as CD & peripherals like printers for example PC (Personal Computer).

Micro Controllers that include all these four Components on a single chip.

Microprocessor as CPU —

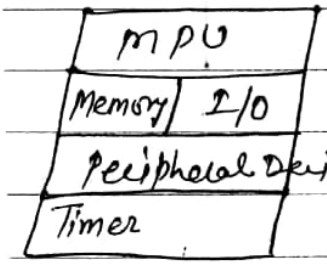


Traditional Computer



Microprocessor as CPU

2 January SUNDAY 002-363



Micro Controller

DECEMBER 2010

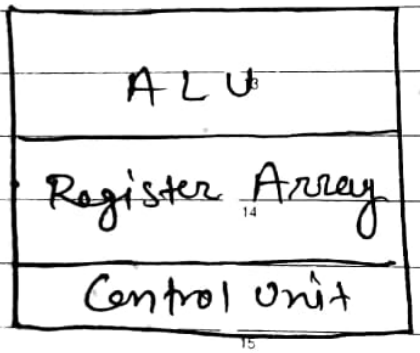
W	M	T	W	T	F	S	S
48			1	2	3	4	5
49	6	7	8	9	10	11	12
50	13	14	15	16	17	18	19
51	20	21	22	23	24	25	26
52	27	28	29	30	31		

3 January MONDAY | Week 1 | 4 January TUESDAY | 5 January WEDNESDAY

Priorities

Microprocessor :- Historical perspective

		Clock speed	Bus Ad.	Bus Data
MP				
4004	1971	108 KHZ.	10 bit	4 bit
8008	1972	200 KHZ.	14 bit	8 bit
8080	1974	2MHZ.	16 bit	8 bit
8085	1976	5 MHZ.	16-bit	8 bit
8086	1978	5 MHZ.	20 bit	16 bit
pentium	1993	60 MHZ.	32 bit	32/64 bit
pentium 4	2000	1-4 GHZ.	36 bit	64 bit



Microprocessor

EVENING

Priorities

programming Languages -!

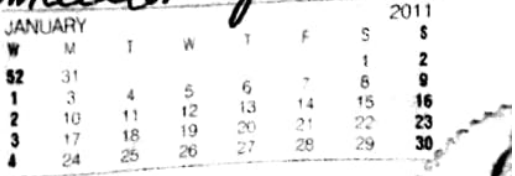
Machine Languages -! It is the language that m/c understand. It is in binary format that is either 0 or 1. but for humain being it is easy to understand this Languages. this Language is specific to microprocessor

Advantage → (i) m/c Language program execute faster than the program written in the High Level Langugs.
(ii) No Translator or Converter is Required.
Disadvantage -!

(i) Difficult to learn & understand.
(ii) programs are lengthy & Complex
(iii) programs are machine dependent

Assembly Language -! Since program written in the machine language can not understand to the humain being House manufacturer of a microprocessor had devised a symbolic code for each Instruction Called "mnemonic"

for example- INR A → Increments the Content of Accumulator by one



Priorities

A Translator Called the "Assembler" Convert the Assembly language to machine language (source program) (Object Code)

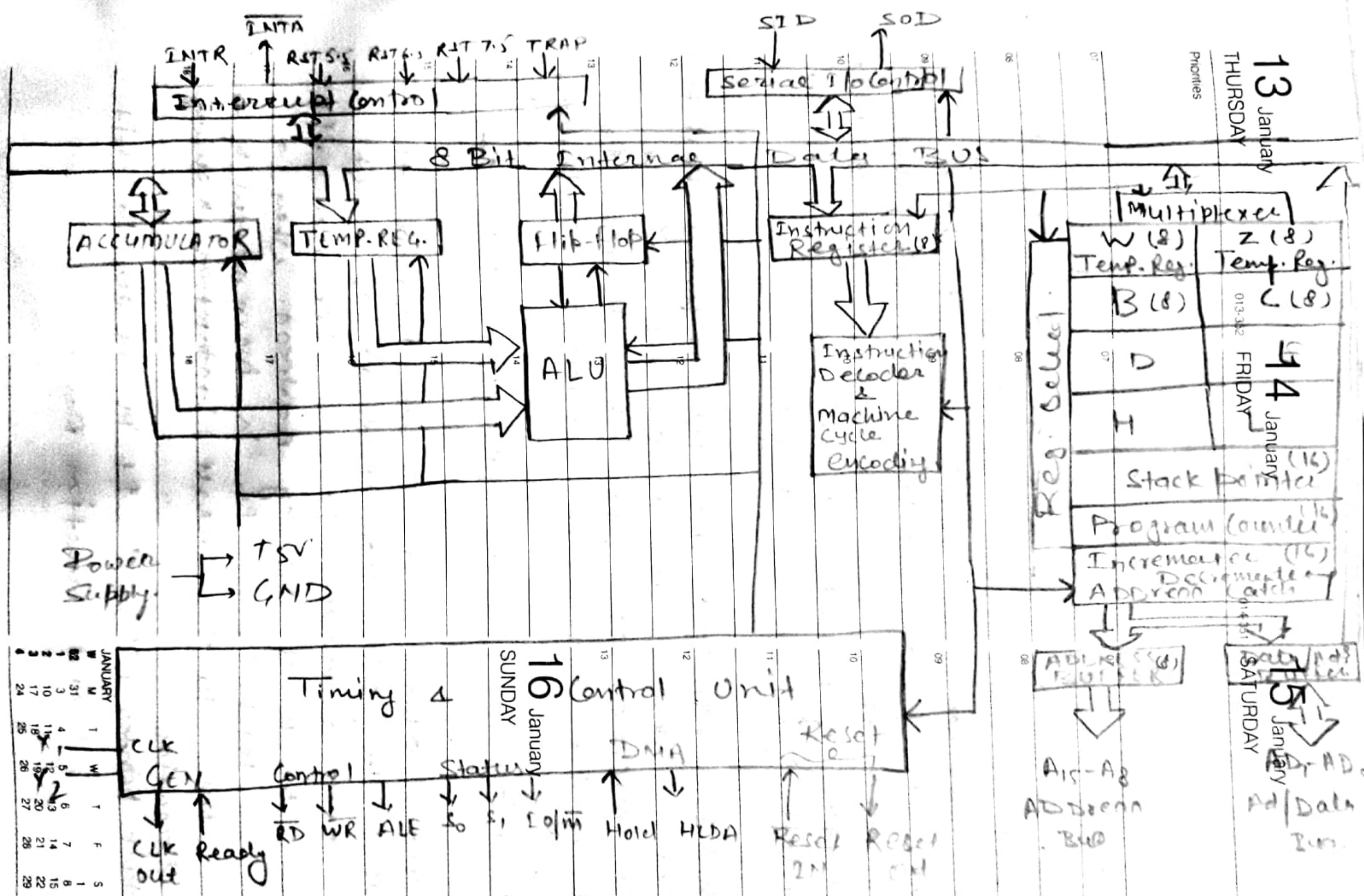
→ High Level Language :- These Languages are M/C Independent.
Ex. BASIC, fortran, COBOL, C, C++, Jav

8085 Microprocessor Architecture :-

8085 Microprocessor is a 8 bit General purpo Microprocessor

It include the following blocks. →

(1) Register Block
(2) ALU Block.
(3) Control Unit block
(4) Interrupt block
(5) Serial I/O Control block



8085 - Functional Block Diagram.

17 January MONDAY

Week 3

18 January TUESDAY

19 January WEDNESDAY

Priorities

(i) Register block :- 8085 microprocessor has six General-purpose registers to store data. These are B, C, D, E, H & L. They can be combined as BC, DE, HL to perform 16-bit operations. These General purpose Registers are used to store intermediate data & results. these registers are also called "Scratchpad Registers".

→ 'W' & 'Z' registers are the temporary Registers which are not accessible by the user the microprocessor use these Registers for storing the data or address temporary.

Program Counter (PC) & Stack pointer (SP) :-

→ Program Counter is a 16 bit Register that is used to point the address of next instruction to be executed. It keeps track of memory Address. when a byte is fetched, the PC is incremented by one to point to the next instruction, memory location.

→ Stack pointer (SP) → It is also 16-bit special function Register

EVENING

Register used as memory pointer. Which "SP" always points to the top of stack. (stack is apart of memory). Stack operates on the principal of LIFO.

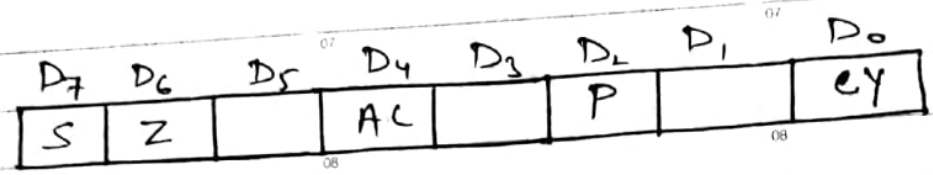
(ii) ALU Block :-

Arithmatic logical unit Contains the following unit :-

(a) Accumulator → It is a 8-bit Regist which is used to perform arithmatic & logic operation.

(b) Temporary Register → It is 8-bit Regist used to store temporary data in arith - matic & logical instructions. It is no accessible to user.

(c) Flag Register → ALU Contains 5-flip flops, which are set or reset after an operation according to data Condition of result in Accumulator & other Register.



there are five flags -

(i) Carry flag (CY) :- If an arithmetic operation results in a carry then cy flag is set (CY=1) otherwise it is Reset(0)

(ii) parity flag (P) - if in the result there are even No. of 1's then P=1 otherwise P=0

(iii) Auxillary Carry Flag (AC) :- If in arithmetic operation when a carry is generated by D_3 & passed to D_4 then AC flag is set to 1 (AC=1)

(iv) Sign flag (S) :- If D_7 bit of the result is 1 then S set to 1 otherwise S=0.

(v) zero flag (Z) :- if the result of an arithmetic operation is zero then Z=1 otherwise Z=0.

EVENING

Ex: Let Content of Accumulator is 37 H & B = 46 H. then ADD B operation is perform, then Content of Accumulator & flag respectively are -

Sol:

```
  0 0 1 1  0 1 1 1
  0 1 0 0  0 1 1 0
-------------------
  0 1 1 1  1 1 0 1
```

Content of Accumulator = 0111 1101

Carry flag (Cy) = 0
parity flag (P) = 1
Auxillary carry flag (AC) = 0
zero flag (Z) = 0
Sign flag (S) = 0

Ex: Let Content of Accumulator is 89 H & B = 77 H if ADD B Operation is performed, then Content of Accumulator & flags respectively are -

```
  1 0 0 0  1 0 0 1
  0 1 1 1  0 1 1 1
-------------------
1 0 0 0 0  0 0 0 0
```

Cy = 1
AC = 1
S = 0
Z = 1
P = 1

(iii) Control Unit Block :- This block Controll & Synchronize all data Transfers & Transformation in the microprocessor system this Consist of

(i) Instruction Register (IR)
(ii) Instruction Decoder & machine cycle encoder
(iii) Timing & Controll Unit.

3 February THURSDAY 034-331 | 4 February FRIDAY 035-330 | 5 February SATURDAY 036-329

Priorities

(iv) Interrupt Block :- There are five Interrupt in 8085 a microprocessor

(a) INTR (b) RST 5.5 (c) RST 6.5 (d) RST 7.5 (e) TRAP.

Except TRAP Interrupt all interrupts are a Maskable Interrupt TRAP is a Non-maskable interrupt. i.e. if microprocessor Receive TRAP request from external devices. Microprocessor has to respond it.

(v) Serial I/p & O/p Control block :- In 8085, there are separate pins for serial I/p & O/p operations.

These are SID & SOD

SID → Serial I/p data

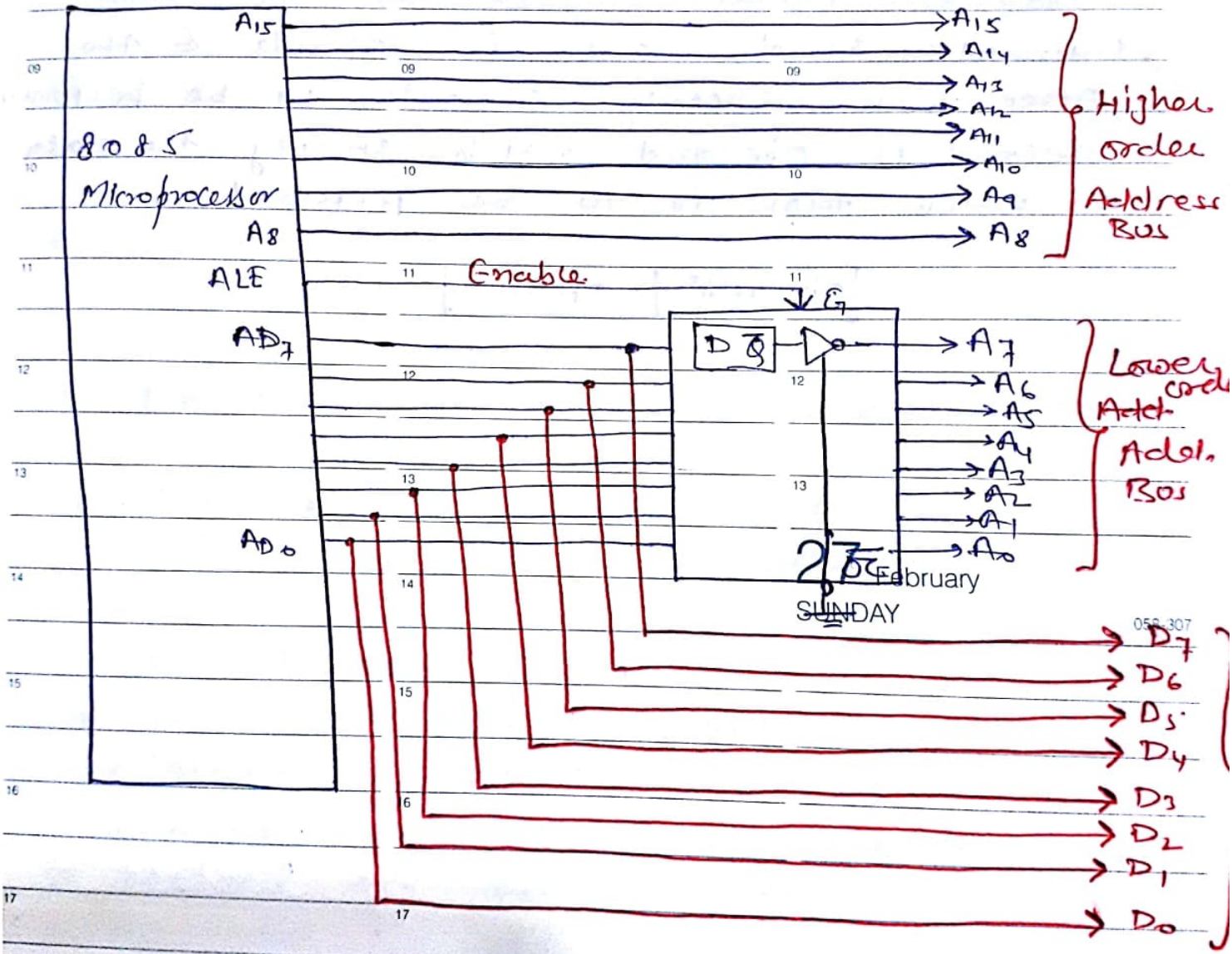
SOD → Serial O/p data

6 February SUNDAY 037-328

FEBRUARY 2011

W	M	T	W	T	F	S	S
5		1	2	3	4	5	6
6	7	8	9	10	11	12	13
			16	17	18	19	20

Demultiplexing of Address / Data Bus :-



28 February MONDAY | Week 9 059-306 | 1 March TUESDAY | 060-305 WEDNESDAY

Priorities

8085 Instruction. →

Instruction format → It has two specifi
Information field one is opcode ← the
other which specify operation to be perf
second is operand which specify the da
on which task is to be performed.

Opcode	Operand

EVENING

→

Microprocessor Initiated operations & 8085 BUS organisation.

Mainly microprocessor performs for operations

(i) Memory read → Reading data (Instruction) from memory

(ii) Memory write → write data (or Inst.) in to memory

(iii) I/O Read → Accepts data from I/P Devices.

(iv) I/O write → Sends data to O/P Devices.

All these Operations are part of Communication process b/w the microprocessor & peripheral devices. (Including memory). To Communicate with peripheral the MPU needs to perform the following steps.

(i) Identify the peripheral or the memory location.

(ii) Transfer binary information. (data or Inst.)

(iii) provide Timing & synchronization signals.

The 8085 perform these function using three sets of communication lines called Buses. these are

(i) Address Bus
(ii) The data Bus
(iii) The Controll Bus.

(i) Address Bus → The Address bus is a group of 16 lines. $A_{15}-A_0$. The Address Bus is uni directional. Bits flow in one direction from MPU to peripheral devices. The micro processor uses the Address Bus to perform the first function identifying a peripheral or a memory location.

Each peripheral or memory location is identified by a binary No. Called an address. & The address BUS BUS is used to carry 16-bit Address.

EVENING

Data BUS → The data BUS is a group of eight lines used for data flow. These lines are bidirectional. Data flow ~~Any microprocessor~~ in both the directions bet^n the micro processor & peripheral devices.

The micro processor use the data BUS to perform the second function - Transferring binary information.

The eight data lines enable the microprocessor to 13 March manipulate 8 bit data ranging from SUNDAY 00 to FF. ($2^8 = 256$ No.) . The largest No. that can appear on the data BUS is 1111 1111 $(255)_{10}$

Control BUS → The Control BUS is comprised of various signals lines that carry synchronising signals. The micro processor uses such signals lines

Introduction to 8085 Assembly language →

Instruction format

Opcode	Operand

opcode specified operation to be performed
Operand specify about the data on which operation is to be performed.

In 8085 microprocesor there are ~~274~~ 256 instruction to perform 74 different ~~instruction~~ operations.

The instruction is classified on the basis of three criteria —

(i) Operation performed by the instruction.
(ii) Length of instruction.
(iii) Addressing mode of instruction.

(i) operation performed by the instructi

there are different types of instructi on the basis of their operation —

Priorities

(a) Data Transfer Instruction.
(b) Arithmetic op instruction.
(c) Logical Instruction.
(d) branch instruction
(e) machine or processor cycle inst.

(i) Data Transfer (move | copy) Instruction.
In this instruction the data move from source register to destination Register. with out chaging the content of the Source Register.
In this the Source can be data, Content of register, content of memory location or Contents from the I/P devices. where as Destination can be Register, memory or o/p devices.

This operation do not effect the flag register of the microprocessor

Ex: → Inst.	Operation	Comments
MOV R,M	[R] ← [[H-L]]	The Content of memory location whose address in in (H-L) pair is moved to register R.
MOV M,R →	[[H-L]] ← R	Move the Content of register R to memory location address

EVENING

31 March THURSDAY 090-275 | 1 April FRIDAY 091-274 | 2 April SATURDAY 092-273

Priorities

MVI R, data — [R] ← data — move immediate data to register. Data is moved to memory location whose address in in [H-L] pair.

MVI M, data — [[H-L]] ← data

Arithmatic operation. →

Any 8 bit No, Content of any register, Contents of memory location can be added to the Accumulator & the result is stored in the Accumulator. The Content of the two register except Accumulator can be not be added directly. one of two operand should be Accumulator

3 April SUNDAY 093-272

Ex' →

ADD R — [A] ← [A] + [R] — Add the Contents of register to the Content of Accumu Later. & the Result is placed in the Accumulator

ADD M — [A] ← [A] + [H-L] — The Content of Memo location which address is in H-L pair is added to the Accumu.l

MARCH 2011

4 April MONDAY | Week 14 | 5 April TUESDAY | 6 April WEDNESDAY

Priorities

Inst'	Operation	Comments
ADD Data	[A] ← [A] + data	The immediate data data is added to the Accumulator
SUB R,	[A] ← [A] − [R]	The Content of register R is subtracted from the Content of Accumulator & the result of is stored in accumulator

Logical Concept → The instruction of this Concept perform AND, OR, EX-OR, Compare, rotate etc.

Ex.

Inst.	operation	Comment
ANA R	[A] ← [A] ∧ [R]	The Content of Reg. R is Anded with the Accumulator & result in placed in Accumulator
ANI data	[A] ← [A] ∧ &data	Given data is Anded with the Content of Accumulator & the result is placed in the Accumulator

EVENING

7 April THURSDAY 097-268

Priorities

8 April FRIDAY 098-267

9 April SATURDAY 099-266

ORL data

[A] ← [A] V data

Contents of Accumulator is ORed with the given data & result is placed in Accumulator

Branch Group :→ The instruction of this group change the sequence of the program.

There are two types of branch instruction. Conditional & Unconditional

The Conditional branch instruction transfer the program to the specified label when certain condition is satisfied

10 April SUNDAY 100-265

The Unconditional branch instruction Transfer the program to the specified label Unconditionally.

GO:

JMP (address) label

[PC] ← label

Jump to the instruction specified by the label. The program Jumps to the instruction Unconditionally

APRIL 2011

11 April MONDAY | Week 15 | 12 April TUESDAY | 13 April WEDNESDAY

Priorities

JC 5010H — IF CY=1, PC ← 5010H, else PC ← PC+1 — Change the sequence of the program to the location 5010H if carry flag is set to 1 else follow the same sequence

→ Machine or processor cycle instruction → this Group include the instruction for Input/output port, stack & machine control. Ex. IN, OUT, PUSH HLT etc

Ex.

IN port address → (Input to accumulator from I/O port)

OUT port address → (Output from accumulator to I/O port

HLT → Execution of instruction HLT stops the microprocessor.

2) Length of instruction → The 8085 microprocessor process the 8 bit or 1 byte data at a time, Hence the word size of 8085 microprocessor is 1 byte.

EVENING