Ved Prakash Tiwari → 2nd BTech CSE

Computer Organisation

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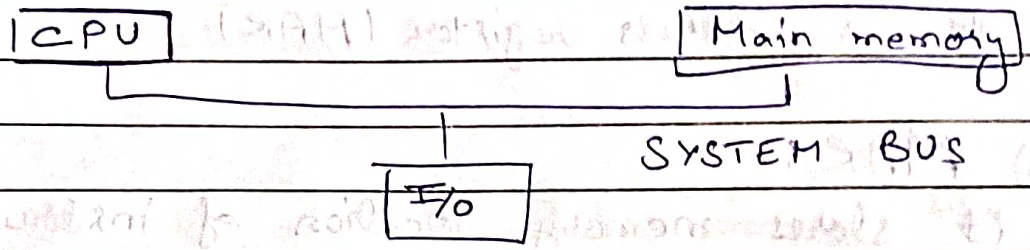
ALU → arithmetic & logic
CU → generates control & timing signals.
registers :—



Basic Terminology :

CU → a control unit handles all instruction or processor control system and generates control and timing signals.
It directs all i/p or o/p flow, fetches the data for instuction & controlling how data moves around the system.

ALU :
part of CPU that handles all the calculation.

REGISTORS :

i) ACCUMULATOR :
it stores results of calculations made by ALU.

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ii) PROGRAM COUNTER (PC)

→ it keep track of the memory location of next instruction to be dealt with.

→ PC then passes next address to Memor address register (MAR)

iii) MAR:

it stores memory location of instructions that need to be fetched from memory or stored memory.

iii) MVR:

it stores the instruction fetched from memory or any data that is to be transferred to and stored in memory.

iv) IR or CIR

(Instruction or Current instruction register)

it stores the most recently fetched instruction while it is waiting to be coded and executed.

BUSES:

Data is transmitted from one part of the computer to another ~~connectivity~~ connecting all the major internal components to the CPU & memory by means of buses.

i) Address bus

→ it carries the address of data b/w memory & processor.
→ Unidirectional bus.

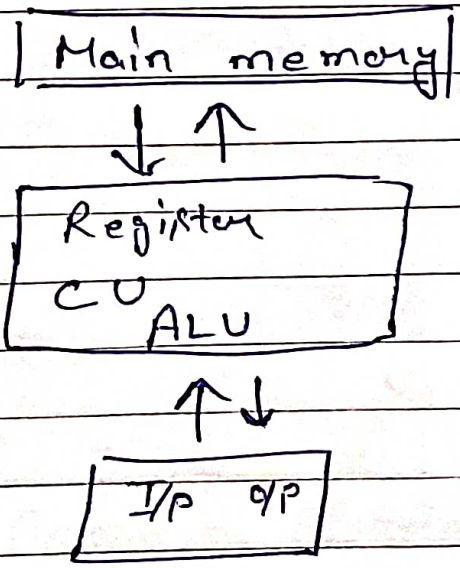
ii) Data bus.

→ it carries the data among the memory unit, the i/p o/p devices & the processor.
→ bidirectional

iii) Control bus:

→ carries Control commands.
→ Bidirectional.

VON Neumann architecture



CHARECTER CODES

BCD

↳ binary coded decimal

→ when using binary numbers for higher decimal nos., it becomes long chain of zero & one

→ To avoid this diff BCD codes are used to represent decimal nos.

→ 8421 BCD code is very common method to represent decimal no.

→ other BCD codes are 5421, 5311 etc.

→ in BCD code each decimal no. is represented by 4 bit code.

Q) $(539)_{10}$ in BCD

↓

5 3 9

$(0101\ \ 0011\ \ 1001)_{BCD}$

Q) $(0111\ 0111\ 0100) = (764)_{BCD}$

ASCII

↳ American Standard code for Information interchange

→ it is character encoding standard for electronic communication.

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→ it represent text in computers, Telecommunication equipment and other devices.

a → 97, 3 → 122

→ it uses 7 bit to represent a character.

EBCDIC

↳ extended binary code decimal interchange code

→ 8 bit character encoding.

A → 11000001 → 193

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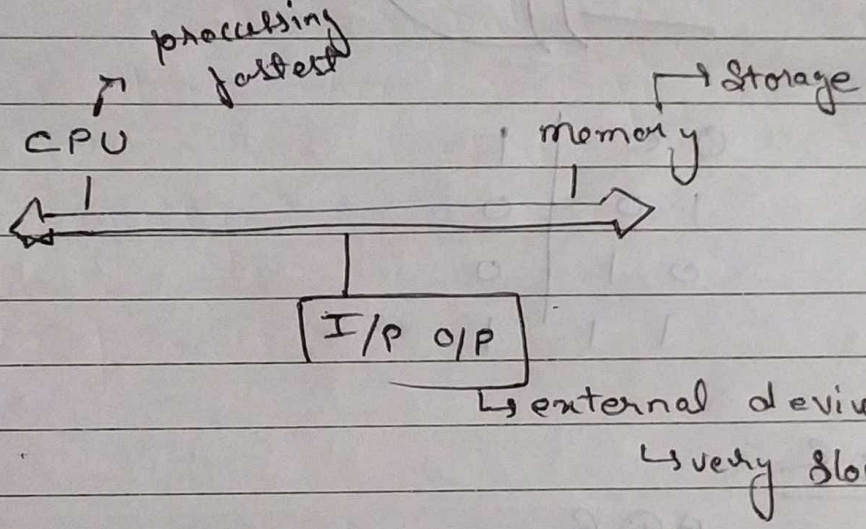
SYSTEM BUS

→ Bus is a communication channel used ~~to~~ to provide communication.

→ The Bus used to provide communication b/w CPU, memory & I/P O/P component it called SYSTEM BUS



Advantage of System bus:

i) Shared transmission media

disadvantage:

i) only 1 transmission at a time

* **Address line:**
→ these lines are used to carry the address towards memory & I/P O/P
→ Unidirectional

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→ based on the no. of lines we can determine the capacity of memory system.

eg. 8085 contains 16 address lines hence memory capacity is 2^{16} or 64K

8086 contains 20 address lines, memory capacity is 2^{20}

* DATA Lines :

→ these lines are used to carry the binary sequence b/w CPU and memory and I/P O/P

→ Bidirectional

→ Based on no. of data lines we can determine the word length of processor & based word length we can determine performance of a processor.

eg 8085 contains 8 data lines, so the word length of processor is 8 bit.

8086 → 16 data lines, so word length = 16 bit

* CONTROL LINES :

→ used to carry Control Signal & timing Signal.

→ Control Signal indicates types of operation

→ timing Signal used to Synchronise memory & i/p o/p operation with processor clock.

→ When there are common bus, common control Signal & common address Space b/w memory, i/p o/p, processor then there is the possibility of ambiguity.

i) I/P O/P processor

	common bus	common control Signal	common address Space
I/P O/P processor	X	✓	✓
Isolated I/O	✓	X	✓
Memory peripery I/O	✓	✓	X

→ introducing additional bus is expensive operation so, this configuration is used in high performance computing.

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2) Isolate i/p o/p :

Different control signal → Memory based → MEMRD (Load) (memory read)
→ MEMWR (Store) (mem. write)

I/O based → IORD (IN)
→ IOWR (OUT)

→ 8082, 8086 contains isolated I/O configuration