3/7/23

Computer Organization & Architecture

Prerequisites :-

* Number System
* Digital logic basic
  - Logic gates
  - decoder
  - multiplex
  - Instructions

Architecture vs Organization

- Architecture:
  - Conceptual design & fundamental operational structure.
  - Cpu design → Instruction set, Addressing modes, Data format
- Organization: Implementation of Com. architecture.
  - Deals with physical and their inter-connection.
  - with a perpective of improving the performance

- How the cpu will communicate with memory?
- how we can improve the performance of memory access — Add cache memory

these are organizational decisions

we are implementing all those devices like cpu, memory, io devices and while they are performing communicating we are improving the performance.

Organization :- I/O organization
- Memory organization
- performance organization Improvement

* Data format (in binary)
  - Number
    - Fixed point representation
    - floating " "
  - Character

Fixed point representation
- unsigned
  - 5 = 101
  - 6 = 110
  - 9 = 1001
- signed number
  - 1's Complement
  - 2's Complement
  - Signed Magnituted

we represent every thing in Computer in the form of binary characters as well, not directly.

Like : ascii representation is one of the implementation

Chars
- ASCII
- EBCDIC

Binary Code decimal : bcd is only for numbers so that the bcd of extended and that extension is

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Ebedic Extended binary coded decimal interchange code. This is having support of characters also in the form of binary.

Course Structure - COA

1. Basic
2. Instruction ← Adressing moder
3. CPU design
4. I/O organization
5. Memory organization
6. Performance (parallel processing (pipelining)
7. Data formate

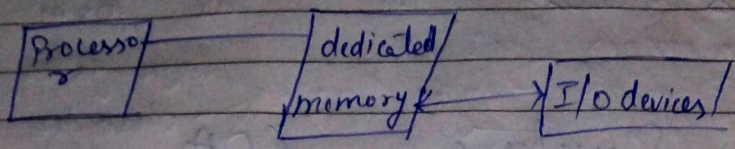
Time reduction is continual phenomena

* Punch card computers

If suppose you wanted to run a program on a computer, you type down program on punch and now you put that ~~punch~~ punch card in that kind of machine and you put another punch card where you type down the input now you give that punch card to machine

Suppose if program is not correct then we need to write it again on another punch card this was the manual work.

That manual work eliminated by Von Neumann's Architecture



He attached the dedicated memory to processor to store the program, input, data, instruction.

* All the current modren day computers having same architecture it is also knowns as princton architecture or stored program architecture.

Bottleneck : The instruction and data both cannot be fetched from memory simultaneously.

This issue is solved by harvar professors knows as harvard ~~architectures~~ architectures by adding one more memory.

But this architecture not implemented much

This to implementation of cache systems we us this architecture