

CO204

Computer Organization (CS-II)

B.Tech. II (CO) Sem-3

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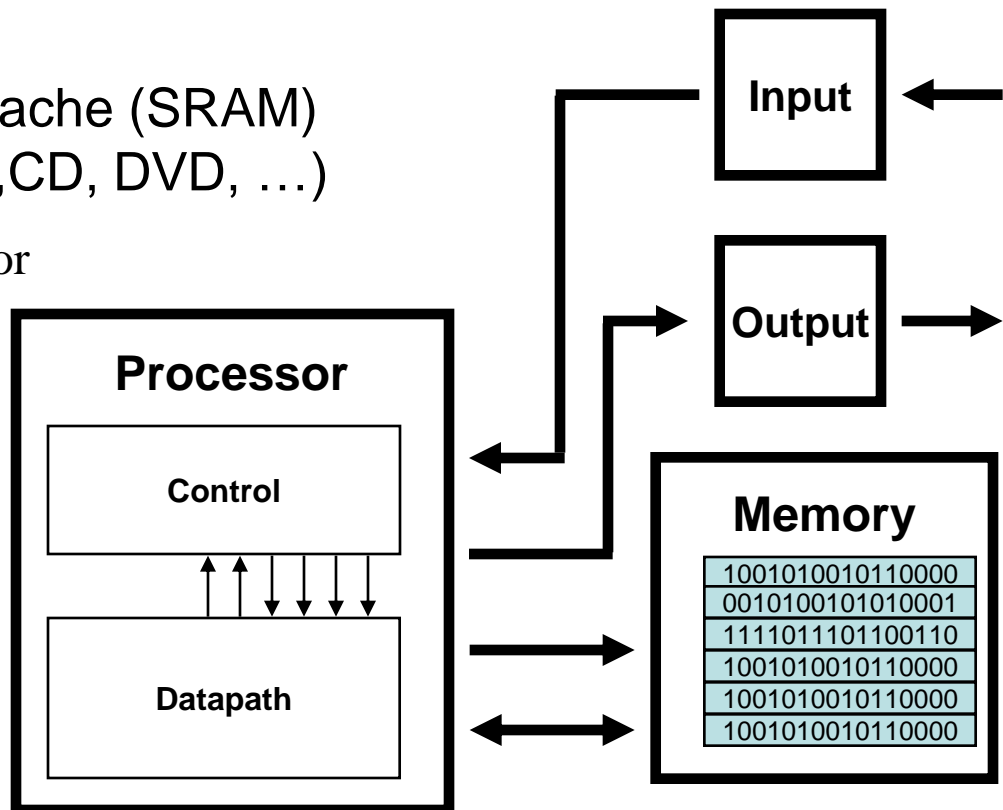
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?

- Future Work Area ?
 - Not the Hardware...
 - Software areas
 - like programming, computer system design, or the installation and maintenance

Components of a Computer

1. Input (mouse, keyboard, ...)
2. Output (display, printer, ...)
3. Memory
 - main (DRAM), cache (SRAM)
 - secondary (disk, CD, DVD, ...)
4. Datapath } Processor
5. Control } (CPU)



Subject Overview

- Goal is to Provide the Knowledge of :
 - Computer system's functional components, their characteristics, their performance, and their interactions.
 - Computer architecture in order to structure a program so that it runs more efficiently on a real machine.
- Study of:
 - The laws of computer organization and design for RISC architectures
 - Interfaces between hardware and software
 - Influence of instruction set on performance
 - Computer arithmetic
 - Memory hierarchy and their influence on performance
 - Elements of interfacing and I/O organization
 - Design of a processor with pipelining is analyzed

Subject Overview

Principle of Equivalence of Hardware & Software

Anything that can be done with
SOFTWARE can also be done with HARDWARE
&

Anything that can be done with
HARDWARE can also be done with SOFTWARE *

* Assuming speed is not a concern.

Can help in

- ***System design tools***
 - Application of design theories that is used at the lowest level of system design AT higher levels
 - ***Example:*** The interface between a processor and its memory chips are used to design the addressing scheme of an IP network
- ***Software design tools***
 - To optimized/simplify the logic portions of software to run faster
- ***Improved troubleshooting skills***
 - To isolate a problem quicker and with greater accuracy
- ***Interconnectivity***
 - Writing software to control the hardware
- ***Marketability***
 - The software engineer with experience in hardware design has a significant advantage over hardware engineers in this market

Can help in

- To select the most cost effective computer for a large organization.
 - Larger cache or a higher processor clock rate
- To do a particular task,
 - Design a software program on a processor
 - Design a hardware component to do so

Schedule

Credit: 5

- Lectures : 3
- Tutorial : 1
- Practical : 2

Tutorial & Practical

Tutorial:

- Class Test:
 - Calculation and Analysis using examples
- Online quizzes:
 - Format
 - Objective type: Select the best choice
 - Questions on material already discussed in class

Practical:

- Related to the Design and Implementation...

Books

- John L. Hannessy, David A. Patterson- “Computer organization and Design”, 3/E, Morgan Kaufmaan, reprint -2003
- Stallings,” Computer Organization & Architecture : Designing For Performance”, 4/E, PHI EEE ed, 1997
- Tanenbaum – “Structured Computer Organization “, PHI EEE, reprint 1995
- Morris Mano – “Computer Systems Architecture”, 3/E, PHI, reprint 1997
- Hamacher – “Computer Organization”, McGraw-Hill IS ed, 1994

Next

Computer Organization

Architecture & Organization

- All Intel x86 family, The IBM System/370 family
 - Share the same basic architecture
 - Why ?
 - This gives backward code compatibility
 - Logical aspects of system as seen by the programmer.
 - e.g., instruction sets, instruction formats, data types, addressing modes.
- Organization
 - Physical aspects of computer systems.
 - e.g., circuit design, control signals, memory types.