CS201
Computer Organization

B. Tech. II (CSE) Sem-3

Dipti P. Rana
dpr@coed.svnit.ac.in

http://172.16.1.10/moodle

?

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

Computer Organization

- Concern with ‘How does a computer work?’
- Considers all physical aspects of computer systems
  - The way in which various circuits and structural components come together to make up fully functional computer systems is the way the system is organized
- Logical aspects of system as seen by the programmer
  - e.g., instruction sets, instruction formats, data types, addressing modes
- While the Computer Architecture considers design and components

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
  - Performance Measures
  - Interfaces between hardware and software
    - Instruction Set Design, Datapath and control path
  - 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

PreRequisites

- Data Structures and Algorithms
  - Arrays, pointers,
- Logic Design
  - Number system, basic computer arithmetic
  - Logic circuits

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

- Test
  - Designing, 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 **OR**
- Computer Organization – HW/SW Interface, Patterson and Hennessy, 5th edition
- 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

Relation to Other Courses

Software Tools 1,2,3,4

Operating System

Digital Circuit

Next

Computer Organization