ICE 3003
Computer Architecture

2014 Spring

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Overview

- What this course is about
- Who teaches this course
- Why you have to take this course
- What you will learn in this course
- What you will earn in this course
- How to succeed in this course
What This Course is About

- Computer Architecture
  - Internals of components
  - Relationship between components
  - Interface to upper layers

- Components?
  - Processor
  - Memory
  - Storage Device
  - I/O
World’s Tallest Lego Tower

- **Legoland Windsor, UK**
  - May 2-5, 2008
  - To celebrate 50\textsuperscript{th} anniversary of the Lego bricks
  - 100 ft (~ 30.5m)
  - 500,000 bricks
Intel Xeon – 2.6B Transistors
Administrative Information

- **Course Code**
  - ICE 3003

- **Class Hour**
  - Tue & Thu 15:00 PM ~ 16:15 PM

- **Lecture Room**
  - #26312
Textbook

- **Computer Organization and Design**
  - The Hardware/Software Interface, 4th Ed.
  - D. A. Patterson and J. L. Hennessy
  - Morgan Kaufmann, 2008
Textbook

- Computer Organization and Design – The Hardware/Software Interface, 5th Ed.
  - D. A. Patterson and J. L. Hennessy
  - Morgan Kaufmann, 2013
Reference

- Computer Architecture: A Quantitative Approach
  - From the same authors of our text book
Course Components

- Lectures
  - Concepts
  - Backgrounds

- Reading Assignment
  - Technical details
  - Supplementary concepts

- Programming Assignment
  - Assembly programming practice

- Exams
  - Four exams
  - All of them are equally important
Course Web Page

- http://csl.skku.edu/ICE3003S14
- Check the web site regularly
- Class material, project information and other useful things will be posted there
Grading

- **Proportion of Activities**
  - Participation 10%
  - Programming assignment 10%
  - Exams 80%
    - There are four exams. One for each quarter.
    - If you miss two of them, you will fail

- **Up to four absences will be tolerated**
Ethical Code

- No academic misconduct will be tolerated
  - Zero-tolerance policy
  - One who is found guilty will be kicked out of my class immediately
Lecturer

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Why You Have to Take This

- To become a good software engineer
- To become a good hardware engineer
What You Will Learn

- Components in a Computer System
  - Roles and internals of them
  - Relationship between them

- Code optimization techniques
What You Will Learn

- Overview
- ARM instruction set architecture
- Arithmetic for computers
- Processor – data path and control
- Pipelining and hazards
- Cache memory
- Virtual memory
- Storage and I/O
- Multiprocessors
What You Will Learn

Software

Operating Systems

Application

Architecture

Hardware

CPU

Mem

I/O Devices
What You Will Learn

System Programming

Computer Architecture

Application programs
Data structures & algorithms
Programming languages & compilers
Operating System
Architecture
Microarchitecture
Hardware Description Languages
Digital logic
VLSI layout
Processing, Fabrication
Chemistry, Physics
What You Will Earn

- **You will get familiar with computer architecture**
  - A strong background for building extreme performance software
  - A good starting point for designing new hardware

- **You will be prepared for later “systems” classes in CSE**
  - Compilers, Operating Systems, Embedded Systems etc.
Keys to Success

- Read and understand textbook thoroughly
- Memorize everything
- Invest as many hours as possible