ICE 3003
Computer Architecture

2012 Fall
Section for Dept. of Software
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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

- **You are in the section for Dept. of Software**
  - However, open to anyone

- **Class Hour**
  - Wednesday 12:00 PM ~ 13:15 PM
  - Friday 12:00 PM ~ 13:15 PM

- **Lecture Room**
  - #330118 (located on 1F in Semiconductor Bldg.)

- **This section will be taught in English**
Textbook

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

- **Lectures**
  - Concepts
  - Backgrounds

- **Reading Assignment**
  - Technical details
  - Supplementary concepts

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

- http://csl.skku.edu/ICE3003F12
- Check the web site regularly
- Class material, project information and other useful things will be posted there
Grading

- **Proportion of Activities**
  - Participation 10%
  - Exams 90%
    - 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
The Lecturer

- Euiseong Seo
  - Software Department
  - E-Mail: euiseong (at) skku.edu
  - Office: #85564
  - Phone: (031) 299-4953
Why You Have to Take This

- To become a good software engineer
  - My experience with S company engineers

- To become a good hardware engineer
  - This course covers the basic principles of computer hardware
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
- MIPS 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

Application

Operating Systems

Architecture

Hardware

CPU
Mem
I/O Devices
### What You Will Learn

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

**Computer Architecture**
What You Will Earn

- You will be 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