ICE3028: Embedded Systems Design

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Introduction

▪ Schedule
  • 15:00 – 16:15 (Monday), 16:30 – 17:45 (Wednesday)
  • Lecture room #400118, Semiconductor Bldg.
  • PC room #400212, Semiconductor Bldg.

▪ Course homepage
  • http://csl.skku.edu/ICE3028S17/
  • Lecture slides, announcements, exam scores, projects, …
  • Don’t waste your time in i-Campus
About me

- Jin-Soo Kim (김진수)
  - Professor @ SW & CE & SSE Dept.
  - Computer Systems Laboratory
  - Operating systems, storage systems, embedded systems, distributed systems, …
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  - Office: Corp. Collaboration Center #85566 (5th floor)
  - Office hours: Monday & Wednesday
  - The best way to contact me is by email
Textbook

- **Computers as Components**
  - Marilyn Wolf
  - Fourth Edition
  - Morgan Kaufmann Publishers
  - 2016

- [http://marilynwolf.us/CaC4e](http://marilynwolf.us/CaC4e)
References (1)

- Modern Embedded Computing: Designing Connected, Pervasive, Media-Rich Systems
  - Peter Barry and Patrick Crowley
  - Morgan Kaufmann Publishers
  - 2012
References (2)

- Embedded System Design: A Unified Hardware/Software Introduction
  - Frank Vahid and Tony Givargis
  - John Wiley & Sons
  - 2002
References (3)

- Introduction to Embedded Systems: A Cyber-Physical Systems Approach
  - Edward A. Lee and Sanjit A. Seshia
  - Second Edition
  - Lulu.com
  - 2015
  - PDF version available at [http://LeeSeshia.org](http://LeeSeshia.org)
Solid State Drive (SSD)
SSD Internals

![SSD Internals Diagram]

- SRAM (96KB) Controller
- ROM Controller
- ARM7TDI-S Core
- Clock Generator
- APB Bridge
- UART
- GPIO
- Timer
- WDC
- PMU
- ICU
- JTAG
- NAND Flash
- SATA Host Interface
- DRAM
- JTAG debug port
The OpenSSD Project

- http://www.openssd-project.org
Course Plan

- Lectures
- Projects
- Exam
Lectures

- **Embedded Systems**
  - Processors and memory, compilers,
  - Program design and analysis, OS, …

- **Issues surrounding SSDs**
  - NAND flash memory, SSDs, FTLs

- **Lab sessions**
  - Jasmine OpenSSD platform
  - Cosmos OpenSSD platform

- **Invited talks**
Projects

- There will be two or more projects using the Jasmine/Cosmos OpenSSD platform
- These are team projects
- You’ll need a Linux-based PC for projects
- Most of Wednesday classes will be devoted to Lab sessions led by the TA
Exam

- No midterm exam
- We will have only the final exam at the end of this semester.
Prerequisites

- ICE3003: Computer Architecture (Must!)
- SSE2030: Introduction to Computer Systems
- SSE3044: Operating Systems
- You should be fluent in C programming!
Grading Policy

- Class attendance 10%
- Projects 70%
- Final exam 20%
- Grading policy is subject to change.

- If you miss the final exam, you will fail this course.
Attendance Policy

- Do not be late! You should be present when I take class attendance.
- You can miss the class up to “four” times without any penalty.
  - Applies to excused absences as well.
- There will be a (small) bonus for students who attend all the classes.