嵌入式系統程式設計
Embedded System Program Design
(Fall 2007)

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What will you learn from this course?

- What is an embedded system?
  - Hardware
  - Software
- What are the design issues?
  - Constraints: time, memory, power, …
  - Code efficiency, optimization, size, etc.
- How to design embedded software?
- Embedded Software Examples

Who should take this course?

- Interested in becoming an embedded system (software) engineer
- Interested in designing embedded software
- EE background: learn real-time OS, embedded software design, …
- CS background: learn embedded system architecture, embedded software design, …
- Essential background: C/C++ programming, computer architecture, OS

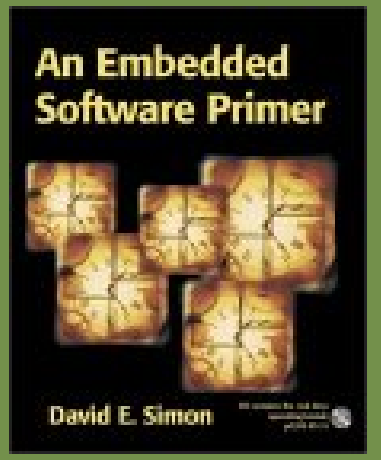
Who should NOT take this course?

- Only wants course credits
- Only because embedded system is popular
- Does not like research
- Does not like projects
- Does not like using tools or lab work
- Not creative (lack of new ideas)
- Yawns and goes to sleep when someone is talking about system design

Textbooks

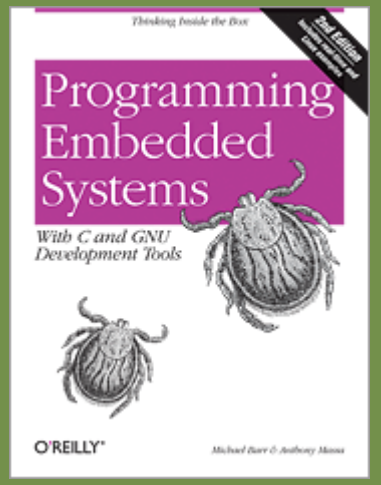
- **Textbook 1**:

  David E. Simon, "**An Embedded Software Primer**," Addison Wesley, 2001.



- **Textbook 2**:

  Michael Barr and Anthony Massa, "**Programming Embedded Systems in C and C++**," 2nd Edition, O'reilly & Associates, 2007.



Course Syllabus & Schedule

Topic	Week
Introduction	1
Hardware Fundamentals (ARM)	2
Processor Instructions (ARM)	3
Getting Started	4, 5
Interrupts	5, 6
Mid-Term	7
Software Architectures	8
Peripherals	9
Real-time OS	10, 11, 12
Java	13
Project	14
Final Exam	15

Course Grading

- Mid-Term Exam 25%
- Final Exam 25%
- Project 20%
- Labs and Assignments 30%
- Bonus: class Q/A, quiz, attendance, etc.

Dates & Deadlines

- Labs & Assignments — 2 weeks due
- Project Proposal — Nov 13
- Mid-Term Exam — Nov 13
- Final Exam — Jan 15
- Project Results Presentation — Jan 8

Term Project

- Platform
  - Creator (ARM+FPGA)
  - You may use your own board, also!
- Topics
  - HW-SW Codesign
    - Embedded software in FPGA systems
    - Embedded software in HW IPs
    - HW-SW interface development (drivers)
    - GUI development with Embedded QT / Linux
    - Embedded software code generation

Term Project (contd)

- Topics (continued)
  - Applications
    - Sensor network application
    - Pervasive computing applications (食衣住行)
    - Dispatch/Navigation system (GPS, GIS, GPRS)
    - Physiological monitor (sensors, recorders, GPRS)
    - Medical systems (sensors, controllers, GPRS)
    - Home appliances (intelligence, sensors, networked)
  - Theory
    - Embedded software scheduling
    - Embedded software verification
    - Embedded software modeling and design paradigms

Labs

- What to do?
  - Form a group of 3 ~ 5 persons
  - Demonstrate your lab within 2 weeks from announcement
  - Platform
    - Creator (ARM + FPGA) Board
  - Labs
    - Totally 5 labs (need to submit only 4 labs)

Assignments

- Individual assignment
- Written homework
- Due 2 weeks from announcement
- Source: Embedded Software Primer

Embedded Software Engineering

ENJOY THE COURSE!!!