CS632/SEP564: Embedded Operating Systems (Fall 2008)

Welcome!

KAIST

Introduction

- **Lectures**
  - 14:30 – 17:30 (Tuesday)
  - CS Bldg. Room #4448

- **Instructor**
  - Jin-Soo Kim
  - CS Bldg. Room #4405 (4th Floor, West Wing)
  - x3545, jinsoo@cs.kaist.ac.kr
  - Office hours: Tuesday only (by appointment)

Course Plan

- **Lectures**
  - Topics on embedded operating systems.
  - Case study on (embedded) Linux
- **Projects**
  - Hands-on experiments.
  - Require in-depth study on the Linux kernel internals.

Projects

- **Projects overview**
  - There will be five project assignments.
  - All the assignments require modifications of the Linux kernel 2.6.
  - Do them alone.
  - Questions on project assignments will be answered via BBS by the TA.
  - Cheating will not be tolerated!

Experimental Platform (1)

- **Nokia N810 Internet Tablet**
  - Successor of 770 & N800
  - Mozilla based browser with Adobe Flash9 plug-in
  - Skype
  - Google talk
  - MP3s and videos
  - GPS receiver
  - Web camera & Bluetooth, ...
  - Linux-based

Experimental Platform (2)

- **Hardware specification**

CPU	400MHz TI OMAP2420 (ARM1136-based)
RAM	DDR RAM 128MB
Flash	OneNAND 256MB 2GB internal MoviNAND Support for miniSD and microSD memory cards
Display	4.13-inch, 800x480 touch screen, up to 65536 colors
Keyboard	Slide out (backlight) QWERTY keyboard
Connectivity	WLAN 802.11b/g (STMicro STLC4550) Bluetooth 2.0 USB 2.0
Peripheral Devices	GPS receiver (TI GPS5300 chipset) 640x480 web camera
Form Factor	128mm x 72mm x 14mm, 226g

Experimental Platform (3)

- **Software environment**
  - Internet Tablet OS 2008
  - Maemo SDK 4.1 (Diablo) available for OS2008 version 4.2008.23-14
  - Based on Debian Linux (e.g., package management)
  - ARM/OMAP-based Linux kernel version 2.6.21
  - GNU C/C++ library
  - BusyBox
  - X windows system/GTK+ widget with Hildon UI framework
  - http://www.maemo.org

Syllabus (1)

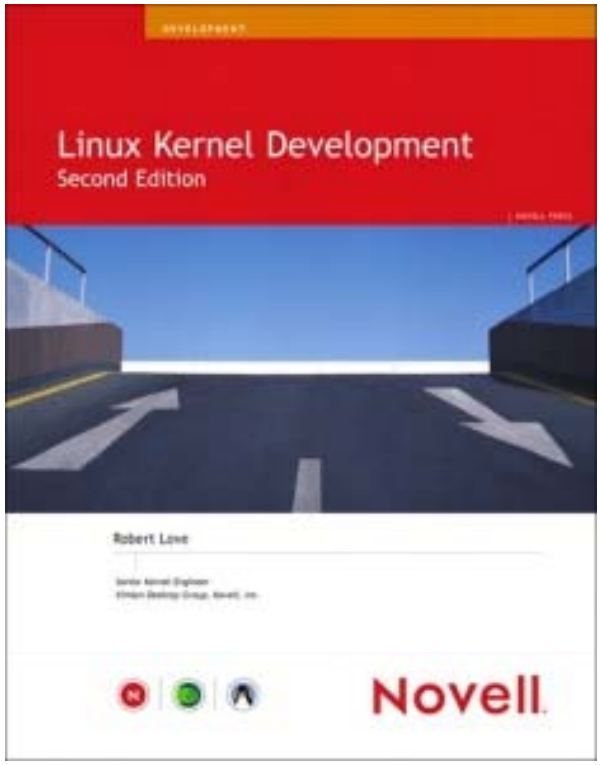
Date	Lecture	Projects
9 / 2	Course overview	
9 / 9	Introduction to embedded systems	Distribute Nokia N810
9 / 16	No class	Introduction to the N810 development environment Project #1
9 / 23	Introduction to the Linux kernel I	Project #2
9 / 30	Introduction to the Linux kernel II	
10 / 7	Exceptions and interrupts	
10 / 14	Kernel synchronization	Project #3
10 / 21	Midterm exam	

Syllabus (2)

Date	Lecture	Projects
10 / 28	CPU scheduling	
11 / 4	Real-time support	Project #4
11 / 11	Virtual memory	
11 / 18	Physical memory management	
11 / 25	Flash memory support	Project #5
12 / 2	File systems	
12 / 9	Embedded software optimization	
12 / 16	Final exam	

Literature (1)

- **Textbook**
  - **Linux Kernel Development** (Second Edition)
    Robert Love,
    Novell Press, 2005.



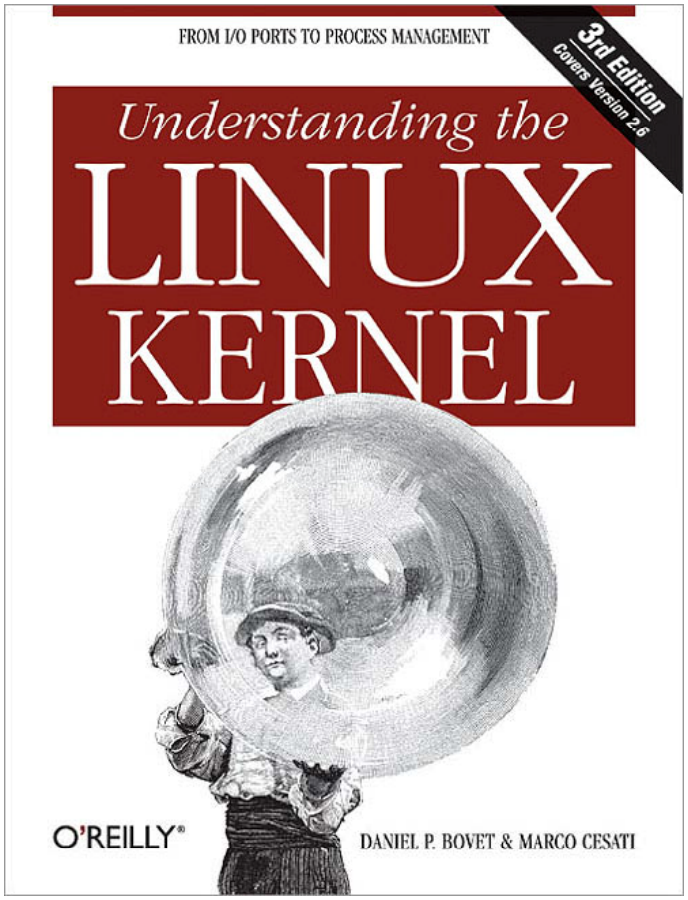
Literature (2)

- **References**
  - **Understanding the Linux Kernel**

    (Third Edition)

    D. Bovet and M. Cesati,

    O'Reilly & Associates, 2005.



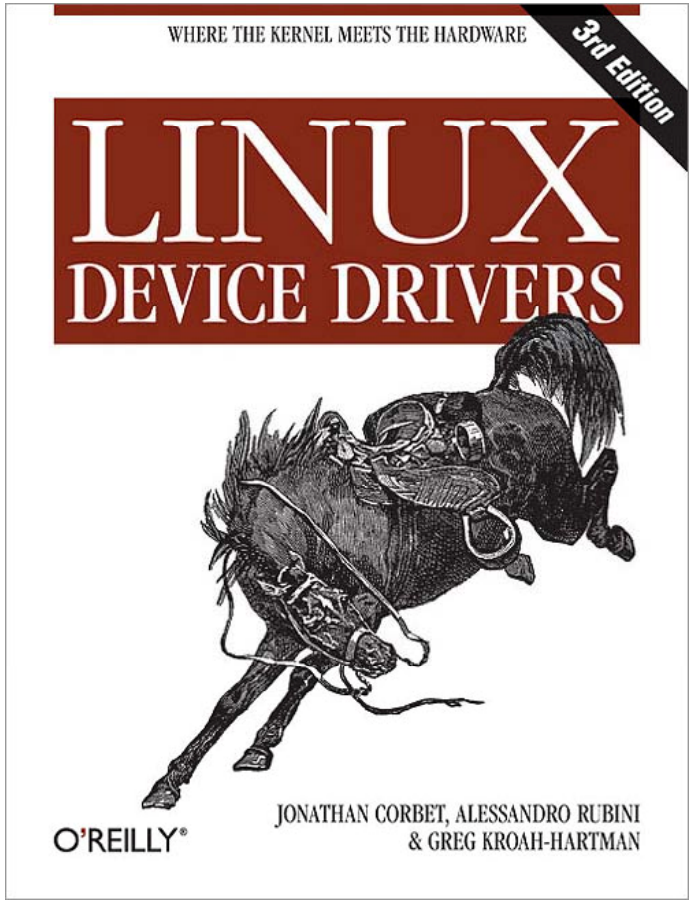
Literature (3)

- **References**
  - **Linux Device Drivers**

    (Third Edition)

    J. Corbet, A. Rubini, and G. Kroah-Hartman,

    O'Reilly & Associates, 2005.



Grading

- **Policy (subject to change)**
  - Exam: 30%
  - Projects: 70%
- **(Voluntary) Teaching Assistant**
  - Youngjae Lee (yjlee@camars)
- **Course Homepage**
  - http://cs.kaist.ac.kr/~jinsoo/course/cs632/