Operating Systems

2016

Michael O'Boyle
Overview

How to get the most of the course

- Read ahead and use lectures to ask questions

- Take notes

- Do the coursework well. Straightforward - schedule smartly

- Exam questions are a mix of simple conceptual and challenging applied ones

- If you are struggling, ask earlier rather than later

- If you don't understand – ask!

Course Aims

- Understanding the *concepts* that underlie OS

- Purpose, structure and functions of OS

- Illustration of key OS aspects by example

Course Outcomes

By the end of the course you should be able to

- Describe, contrast and compare differing structures for OSes
- Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files

In addition, during the practical exercise and associated self-study, you will:

- Become familiar (if not already) with the C language, gcc compiler, and Makefiles
- Understand the high-level structure of the Linux kernel both in concept and source code
- Acquire a detailed understanding of one aspect of the Linux kernel

Course Structure

- Introduction: overview of OS
- Basic OS functions
- Process management: scheduling, concurrency
  - Scheduling: CPU utilization and task scheduling
  - Concurrency: mutual exclusion, synchronization, deadlock, starvation, etc.
- Memory management
  - Physical memory, early paging and segmentation techniques
  - Modern virtual memory concepts and techniques
  - Paging policies
- Storage Management
  - Low level I/O functions, high level I/O functions and filesystems
- Other topics to be determined, e.g. security.

Administrative Details

- TA: Tom Spink (IF-1.34, t.spink@sms.ed.ac.uk)

- Out-of-class communication
  - Instructor/TA
  - Course mailing list: os-students@inf.ed.ac.uk
  - Q&A via Piazza

Administrative Details

- When and Where: <u>Semester 2</u>
  - Mondays and Thursdays, 9:00-9:50
  - Lecture venue: AT3 Appleton Tower
- Course descriptor
  - http://www.drps.ed.ac.uk/15-16/dpt/

- Course webpage
  - http://www.inf.ed.ac.uk/teaching/courses/os/
  - Schedule w/ lecture slides, assignments, TA contact info, past exam papers, examinable material, etc.

Assessment

- Exam: **75%** and one practical exercise: **25%**
- **2 practical exercises** (Coursework)
  - Part 1: User space shell
    - Due: 4pm on Thurs, 4th Feb (30% of practical)
  - Part 2: Linux Kernel Module
    - Due 4pm on Thurs 17th March (70% of practical)
- **Exam**
  - Past exam papers:
    http://www.exampapers.lib.ed.ac.uk.ezproxy.is.ed.ac.uk/Informatics0405.shtml

Textbooks

- **Main Textbook**: A. Silberschatz, P. Galvin and G. Gagne, "Operating System Concepts", 9th International student edition, John Wiley, 2013

- Most of the other major OS texts are also suitable.

- You are expected to read/know Silberschatz 9th edition.

- Slides are a supplement not a replacement of book

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