

Operating Systems

2018

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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/C++ languages, gcc compiler, and Makefiles
- Understand the high-level structure of the kernel both in concept and source code
- Acquire a detailed understanding of three aspects of the 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 virtualisation, security

Administrative Details

- Tom Spink (IF-1.46, tspink@inf.ed.ac.uk).
 - Co-lecturer
 - Designed coursework
 - Virtualisation
- TA Frederico Pizutti (IF-1.19A, s1580329@sms.ed.ac.uk)
- TA Siavask Katebzadeh (IF-2.0 m.r.katebzadeh@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: (Semester 2)
 - Mondays and Thursdays, 9:00-9:50
 - Lecture venue: Teviot Lecture Theatre, MEDS, Teviot
- Course descriptor
 - <http://www.drps.ed.ac.uk/17-18/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: **70%** and three practical exercises: **30%**
- **3 task practical exercise** (Coursework)
 - Task 1: Process Scheduler
 - Due: 4pm on Thurs, 1st Feb (10 marks)
 - Task 2: Memory Allocator
 - Due 4pm on Thurs 8th March (50 marks)
 - Task 3: File system
 - Due 4pm on Thurs 29th March (40 marks)
- **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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Myungjin Lee/ Ed Lazowska (Univ. of Washington) allowed use of teaching slides for this course.