Operating Systems

2017

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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.

Administrative Details

- Tom Spink (IF-1.46, tspink@inf.ed.ac.uk).
  - Co-lecturer
  - Designed coursework
  - Virtualisation
- TA: Frederico Pizutti (IF-1.07, s1580329@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: Meadows Lecture Theatre, MEDS
- 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: **70%** and Practical exercise: **30%**
  - *Changed from last year*
- **3 practical exercises** (Coursework)
  - Part 1: Scheduler
    - Due: 4pm on Thurs, 2nd Feb (10% of practical)
  - Part 2: Memory Management
    - Due 4pm on Thurs 9h March (50% of practical)
  - Part 3: File System
    - Due 4pm on Thurs 30th March (40% of practical)
- **Exam**
  - Past exam papers: http://www.exampapers.ed.ac.uk

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 for the book

- If in doubt, read the book!

Acknowledgment

Slides from many sources (ab)used in this course

Myungjin Lee/ Ed Lazowska/A. Silberschatz allowed use of teaching slides for this course.