Operating Systems (INFR09047)

2019/2020 Semester 2

Course Overview

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How to Get The Most Out 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 analyze theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files
- 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 OS kernel both in concept and source code
  - Acquire a detailed understanding of at least three aspects of the OS kernel

Course Structure

- Introduction: overview of OS
- Basic OS structure and functions
- Process management, scheduling, concurrency
  - Processes and threads implementations
  - 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., virtualization

Course Schedule (Tentative)

- Overview
- **Introduction to CW1**
- Introduction
- OS Structure
- Processes and Threads (2)
- Scheduling
- **Introduction to CW2**
- Memory and Virtual Memory (3)
- Synchronization, Semaphore/Mutexes, Monitors (3)
- Deadlock
- **Introduction to CW3**
- Devices and Disks
- File Systems
- **Virtual Machines**
- Reviews (2)

Administrative Details #1

- Instructors
- Antonio Barbalace
  - IF-2.04B
  - abarbala@inf.ed.ac.uk
- Tom Spink
  - IF-1.46
  - tspink@inf.ed.ac.uk

Administrative Details #2

- Teaching Assistants (TAs)
  - Dimitra Giantsidi s1879801@sms.ed.ac.uk IF-1.05
  - Chris Vasiladiotis C.Vasiladiotis@sms.ed.ac.uk ?
  - Resul Tugay s1822053@sms.ed.ac.uk IF-4.31
- Out-of-class communication
  - Instructors/TAs
  - Course mailing list: os-students@inf.ed.ac.uk
  - Q&A via Piazza

Administrative Details #3

- When and Where: (Semester 2)
  - Mondays 10:00-10:50 @ Medical School, Teviot Lecture Theatre – Doorway 5
  - Thursdays 10:00-10:50 @ Appleton Tower, Lecture Theatre 1
- Course descriptor
  - http://www.drps.ed.ac.uk/19-20/dpt/cxinfr09047.htm
- Course webpage
  - http://course.inf.ed.ac.uk/os
  - Schedule w/ lecture slides, assignments, TA contact info, past exam papers, examinable material, etc.

Assessment

- Exam: **70%** and Practical exercise: **30%**
- **3 practical exercises** (Coursework, **CW**)
  - **Part 1:** Scheduler
    - Due: 4pm on Thurs, 30th of January (10% of practical)
  - **Part 2:** Memory Management
    - Due 4pm on Thurs, 5th of March (60% of practical)
  - **Part 3:** Device Driver
    - Due 4pm on Thurs, 19th of March (30% of practical)
  - Check *Learn -> Course Material -> Coursework Specification*
- **Exam**
  - Past exam papers: http://www.exampapers.ed.ac.uk

Textbooks

- **Main Textbook**: A. Silberschatz, P. Galvin and G. Gagne, "Operating System Concepts", 10th Edition, John Wiley, 2018
- Most of the other major OS texts are also suitable
- You are expected to read/know Silberschatz 10th edition
- Slides are a supplement not a replacement for the book
- If in doubt, read the book!
- **Notes**
  - We will not cover anything about Java
  - We will mostly focus on Linux/UNIX

Attendance

- It is required to take attendance in at least one lecture a week
- https://app-ca.tophat.com/e/974323/
- Join Code: **974323**
- **Let's take attendance!**

Acknowledgments

Slides from many sources (ab)used in this course

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