CS2106

Introduction to Operating Systems

Lecturer #1

Djordje Jevdjic (George)

~~COM2-03-34~~ **WFH**

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Email to arrange for consultation

- Research interests: computer architecture, operating systems, DNA-based data storage
- Academic history: Univ. of Belgrade → Barcelona Supercomputing Center → EPFL → Univ. of Washington → Microsoft Research → NUS

Lecturer #2

Colin Tan

~~COM2-02-08~~ **WFH**

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Email to arrange for consultation

- In the 2nd half of semester
- Tutorials (if you're lucky to be in his group)

Course Objectives

- **Synopsis:**
  - Introduces **basic concepts** in operating systems
  - Focuses on these areas:
    - OS Structure and Architecture
    - **Process** Management
    - **Memory** Management
    - **File** Management
    - OS **Protection Mechanisms**

- **Objectives:**
  - Identify & understand major functionalities of modern operating systems
  - Be able to extend and apply the knowledge in future related courses

Specific Learning Outcomes

- After this course, you should:
  - understand how an OS **manages computational resources** for multiple users and applications, and the impact on application performance
  - appreciate the **abstractions and interfaces** provided by OS
  - be comfortable in **writing multi-process/thread programs** and avoid common pitfalls such as deadlocks, starvation and race conditions
  - be comfortable **writing system programs** that utilize POSIX syscall for process, memory and I/O management
  - be able to **self-learn advanced OS topics**
  - Understand important design principles in complex systems

Lectures

- Wednesday at 10AM
  - The music show starts at 9:50AM to motivate attendance
- The Zoom link is always the same
- Lecture slides uploaded the day before
- Lecture recording will be available on Wednesday afternoon
  - Without the music show ☺
- We will be using archipelago for anonymous questions
- Archipelago sessions will be running until Sunday 12pm.
  - You can ask/vote for your lecture-related questions

“Office” Hours on Zoom

- Monday 8-9pm
- Will happen only if there’s at least one student present
- Zoom: same link as for the lectures (recorded)

Structure:

- Answering any unanswered questions from Archipelago
- Any other questions you may have
- Revisions and additional exercises (if time permits)

Not mandatory to attend, but likely useful to many of you.

Assessment Weightage

- Weightage for various components:
  - Weekly Take-Home Quizzes: **5%**
    - Published on Wednesday, due Saturday
    - In lieu of tutorial participation
  - Lab Assignments: **25%**
  - Midterm: **20%**
    - **Save the date! Sat, March 12 (Week 8)**
    - Timing: **10AM**
    - Online (LumiNUS quiz)
  - Final exam: **50%**
    - Thu, April 28th 5PM, *possibly* in-person

Assessment – Lab Assignments (25%)

- **Four or Five Graded** Lab Assignments:
  - Done individually, or in **teams of two**
  - Each assignment spans 2 weeks
    - Simple exercise(s) related to the core problem (1-2%)
    - Complete the assignment (the remainder %)
  - Lab session for:
    - Clarify lab questions and clear doubt
    - Both weeks: Demo the simple exercise(s) to lab TA for the (1-2%)
    - You don't have to be in the same lab group as your teammate
    - Demoes are graded individually, the rest is graded per team
  - Submit online - you can work from home
  - "Simple" programming questions:
    - **Linux on x86**, using C
- Put the theory in lecture into actual practice
  - Learn Linux (or Unix in general)
  - Learn to interact with OS or simulate aspects of OS

Excellence Points

- Unrelated to anyone's grade
- Earned by solving optional challenges throughout the semester, or through outstanding in-class participation
- For recommendation letters and selection of UROP/FYP students
- Potentially relevant for admission into the Turing program

Academic Misconduct

- We take a **serious** stand on academic misconduct
  - All lab assignments will be sent for plagiarism checks
  - Any online exams will have enhanced proctoring

- As per the new NUS policy on plagiarism, **every** violation of the NUS academic conduct must (and will) be formally reported to the UG office

- Please take this seriously

Resources

- Mainly on LumiNUS/Piazza Forums:
  - Workbins:
    - Lectures, tutorials and labs
  - Piazza Forums:
    - Lectures
    - Tutorials
    - Labs
    - General
  - Email Announcements
  - and ……

References

- Main ***supplementary*** text (not mandatory):
  - **Modern Operating Systems** (Edition 3+)
    by *Andrew S. Tanenbaum*
  - **Operating System Concepts** (Edition 8+)
    by *Abraham Silberschatz*, *Peter Baer Galvin* & *Greg Gagne*
  - **Operating Systems: Three Easy Pieces**
    by *Remzi H. Arpaci-Dusseau* & *Andrea C. Arpaci-Dusseau*
  - All three books can be found online!

- Lecture notes:
  - As self-contained as possible

Acknowledgement

- Many of the lecture materials are created by

  A/P Soo Yuen Jien

  - Lecture notes and tutorials reused with some changes