Operating Systems Intro

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Who are we?

- Instructor: Ahmed Ali-Eldin
- TA: Colin Samplawski
- UCA
  - Yudong Diao
  - Vedant Puri

Prerequisites

COMPSCI 230: Computer Systems Principles

Strong skills with C

The project assignments will be C/C++. If you do not know C++ you will learn it quick and we will provide resources to help you learn quickly. At this level we expect you to pick up a new language easily.

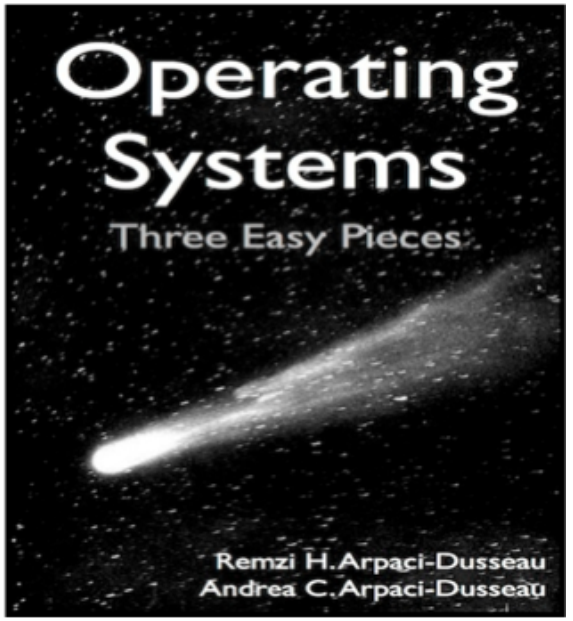
Project 0 will ramp you up.

Textbook

Operating Systems: Three Easy Pieces

Available for **free** online:

http://pages.cs.wisc.edu/~remzi/OSTEP



Goals of the Course (In a nutshell)

- Learn the basics about Operating Systems
- Acquiring hands-on (hacking) experience with Linux (new)

This Course

- First time given by yours truly ☺
- Time_Spent==Return
- Expect constant feedback from you
- Should be fun learning experience

If Course!=Fun:

Tell_teachers()

- Be vocal!

Flipped Classroom

- You get videos instead of lectures
- You watch them home
- We meet for discussions+solving problems
  - i.e., Your HW is **mostly** solved in class
- We will use scalable-learning
  - You will get an email today!

What is a Flipped Classroom?

- One method for active learning
- In essence,
  - learn the easy parts on your own
  - Learn the hard parts with your teachers and with your peers

Why Am I watching classes on ScalableLearning?

- Flipped Classroom + Active learning
- Why a flipped Classroom?
  - You will learn considerably more (scientifically shown!)
  - You will score better (scientifically shown!)
  - You will (hopefully) have more fun!
-

Proof!

David Black-Schaffer / Uppsala University

Can we do better with more active students?

Lous Deslauriers, et al. (2011)

Experiment:

- **538 students** in a quantum mechanics class

For 1 week:

- ½ received 3 hours of lectures from an experienced teacher
- ½ received 3 hours of peer-instruction

Data reproduced from Louis Deslauriers, et al. "Improved Learning in a Large-Enrollment Physics Class." Science 332, 862 (2011).

Implementation: At Home

- Video Lectures
  - Each lecture divided in segments
  - After each segment there is a quiz
  - The quiz has nothing to do with grading!
- I will get feedback from the system on the parts where you have troubles!
- Online forum to ask questions
  - Do not be shy
  - Your gains are directly proportional to your participation!

Implementation: In Class

- Your teacher will ***only*** focus on segments where you had trouble!
- We will solve practice problems together
- Class divided in groups of 3-4
  - Random division
  - Each lecture you will have a new group
- Aim: Solve the hard problems together
  - Make sure no one is left behind!

Task1 (will be sent in an email)

- Get accustomed with the platform
- Use the help menu!
  - It is a very easy system!
- https://www.scalable-learning.com/#/home
- 1. Go to https://www.scalable-learning.com/#/ and create an account with your university email address.
- 2. Add your course by choosing “Join Course” from the “Courses” menu and entering the Enrollment Key for 5DV171 :

UKPUH-82696

Watch this video! (Will be sent by email)

https://www.youtube.com/watch?v=57MvwhSbv3k

I do not want to use it!

- Sure thing!
- You can watch the lectures on Youtube!
  - You lose a lot!
- Scalable-Learning does not store more than your email :)
  - No private info at all

Course Website / Moodle

Course Website: https://sites.google.com/view/umass-cs-377
This just advertises the course.

Moodle:
All material can be found in the Mo
with this course.

- Log in with your UMass username and password
- If you are registered, you should see this course listed
- Organized by week, released every Monday

We will use Gradscope

- Requires your consent ☺
  - Some formalities, an email will be sent
- An email will follow for consent on using both Gradescope and scalable-learning.

Communication

- Please use scalable-learning for as much communication as possible ☺
- Moodle is also a good option
- Email is like snail, If it is urgent, email me/the TA with [Urgent].
- Please communicate as much as you want!

Office hours, physical lectures, etc, etc

- Lecture videos online
- We have three allocated times, one of them will be discussion, one of them will be office hours and one of them we keep in case we need more discussions!
  - Monday is our discussion when we solve problems together
  - Tuesday is the time we keep for backup/extra discussions
  - Thursday my office hours. Drop me an email to book a time.
    - If more time is needed, I will do my best to find other slots during the week!
- Communicate!

Grading

Percentage	Component	Notes
5%	Discussion attendance	This is when we solve problems!
10%	Linux Sys Call implementation project	This is a new project (required)
35%	Linux Kernel Module project	This is a new project!
30%	5 Projects	Do at least 3 (fpr 18%)
15%	Exam 01	In Class
15%	Exam 02	In Class
25%	Final Exam	5/8/2018, Tuesday 10:30AM - 12:30PM (required)

How do I pass?

- Do mandatory work plus whatever you choose to get to the passing grade.
- Plenty of headroom to get an A ☺

Projects

7 Programming Projects

Focus on topics covered in class

Projects will use C/C++

Task2: Get Linux installed

- Please do so!
- Almost all work is done in one flavor of Linux or the other!
- If you do not, you will really struggle!
  - " I do not want to mess up my windows installation" is not an excuse for an assignment/project not working
- Run on Virtual box
  - If you have never done so, get help this Monday

Projects

The 5 Programming problems, typically extending minimal code that is provided.

Assignments come with automated tests your code should pass (these are public tests)

You submit your code to the online autograder (Gradescope).

You can submit prior to the deadline as many times as you want. We take the last submission before the late deadline.

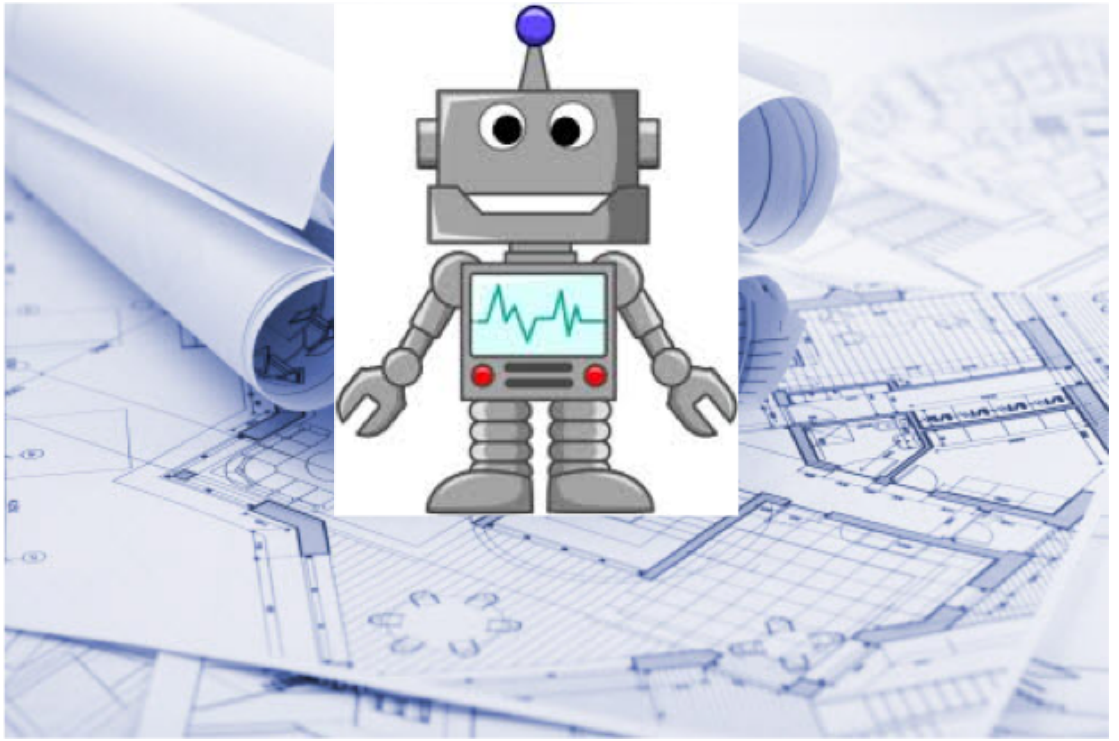
Due on Fridays at 5PM.

Gradescope

Submit to Gradescope **early** and **often**.

Do not wait until the last minute.

You should receive an invite this week once you send in your consent.



Deadlines are non-negotiable.

Academic Honesty

- We take this very seriously. It can have a negative impact on your course grade, your GPA, and your overall record at UMass and beyond.
- You may discuss assignment problems with others in this course, however, your writing (including code) of solutions must be your own.
- Copying any material directly from the web is considered dishonest. Cheating on exams is dishonesty.
- Copying or using sections of someone else's program or assignment, even if it has been modified by you, **is not acceptable**.

UMass Code of Student Conduct

Cell Phone and Laptop Policy

Use them as you wish unless we it is an exam or we specifically tell you not to!

Practicalities

- Lots of effort from your teachers, so please bear with us
- Aim is that you learn, nothing more and nothing less

Practicalities

- Apply for internships after this class!
- Put code on github
  - Specially the LKM code if you choose to do that project!

Reading/Lectures

This course has a substantial reading load. Plan accordingly.

Please do the readings before the class. See Moodle and schedule.

Lectures cover material in the associated chapters in the book.

See the book for additional details and understanding.

Course Outline and Topics

Processes and Threads

Memory Management

Storage and File Systems

Distributed Systems

Now you have two tasks, please start with them!