CSCI-3753: Operating Systems Fall 2019

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Welcome

Abigail Fernandes

- MS in CS (since 2018)
- Focus on Deep Learning, Machine Learning, Robotics, Web Development
- TA for Cyber Security and GCA for ML

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Welcome

- Office hours:
  - Monday: 10:15 AM – 12:15 PM (Tentatively CSEL)

- Available other times as needed, send me an email to schedule

- Attendance might be taken at the TA's discretion.

Course Learning goals 🏁

Lectures

- What are Operating Systems?
- Why are they needed?
- How are they designed and implemented?

Recitation

- OS-specific concepts and examples
  - Linux environment
  - Detailed explanation of key algorithms, topics covered in lectures

Grading Policy

Recitation Quizzes

- **11** quizzes – drop ONE lowest score
- Content
  - From Tuesday and **PREVIOUS** Thursday's lectures and corresponding readings
- Time
  - The last 10 minutes of the class
- Method
  - Online on Moodle → Bring your LAPTOP !!!
- Grade Breakdown
  - 10% of the final grade

Grading Policy

Programming Assignments

- **4 – 5** assignments
- Interview-style grading
  - 20-40% **working** code
  - 60-80% interview
- The extra credit for early submission is 10% of the grade that you get.

  min(100, actual grade * 1.1)

Highly encourage you to submit running programs that have partially completed functionality for partial credit !!!

Week 1: OS & Environment Setup

What is an Operating System?

Operating System

- A special piece of software that
  - **Abstracts (simplify)** and
  - **Arbitrates (manages)**
- Hide hardware complexity
- Resource Management
- Provide isolation and protection

Operating System Components Quiz

Which of the following are likely components of an operating system. Check all that apply.

- ❑ File Editor
- ❑ File System
- ❑ Cache memory
- ❑ Device Driver
- ❑ Scheduler
- ❑ Web Browser

5 Main Managers Developed in an OS

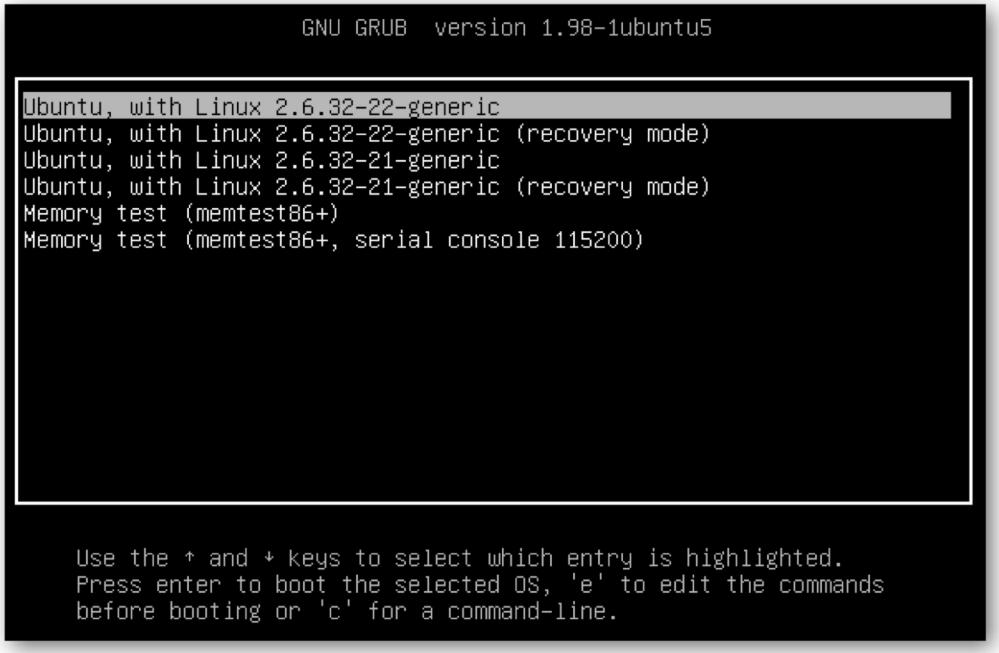
- Device manager
- File system manager
- Memory manager
- Scheduler
- Networking

Getting your environment set up

- Download CU CS Virtual Machine.
  - https://foundation.cs.colorado.edu/vm/
  - Two download options (HTTP and Torrent)
- Download and install VMware hypervisor
  - Player/Workstation/Fusion.
  - You should have a CU VMware webstore account.
  - If not, contact help@cs.colorado.edu
- Import CU CS VM to VMware

Loading an OS using Grub

- Grub is a boot loader which provides configuration options to boot from a list of different kernels available on the machine.



Configuring the Grub

- Step 1: From the command line, load the grub configuration file:

```
sudo emacs /etc/default/grub
```

- Step 2: Make the following changes to the configuration file:
  1. Comment out (#):

```
GRUB_HIDDEN_TIMEOUT=0
GRUB_HIDDEN_TIMEOUT_QUIET=true
GRUB_CMDLINE_LINUX_DEFAULT="quiet splash"
```

Configuring the Grub

- Step 2: Make the following changes to the configuration file:
  2. Add:

     GRUB_CMDLINE_LINUX_DEFAULT=""
  3. Save updates

- Step 3: From the command line, update Grub:

  sudo update-grub

- Step 4: Reboot your virtual machine and verify you see a boot menu.

Get ready for PA1!

Goals

- Compile a kernel
- Add your own System Calls into the OS
  - What is a system call?
  - Examples: `open()`, `read()`, `write()`, `close()`, `wait()`, `exec()`, `fork()`, `exit()`, `kill()`
  - Snapshots function in VMware

Week 1 – Checklist

- ❑ Self-enroll on Moodle
- ❑ Have VMware setup ready
- ❑ Have CU CS Virtual Machine Fall 2018 Ed. Installed
- ❑ Read more about system calls