CSC 507

Foundations of Operating Systems

Textbook: **https://plus.pearson.com/home (you're only doing half of the chapters in the textbook)**

- Ch. 1 and 2 - OS intro
- OS abstractions
  - threads, process
  - Ch. 3, 4
- Ch.5 and 6 - Multithreading
  - ***Concurrency*** is the ability of your program to deal (not doing) with many things at once and is achieved through ***multithreading***.
- Ch.7 and 8 - Resource management
  - Memory aka resource management
- OS mechanisms
  - schedule, create, open, write, allocate
  - Ch. 9 and 10, yes 11 - this will be on the test. definitely a module
- Abstraction (sockets)
  - Ch.17

Elements of OS

- **Abstractions:** Abstraction is the simplification of what hardware actually looks like, some OS abstractions are a process, thread, file, socket, memory page, etc. I'll be

discussing them in future posts.

- **Mechanism:** To operate on the above abstraction the OS must know the mechanism i.e the implementation or the steps involved which determine how to perform some activities. Some common mechanisms are: create, schedule, open, write, allocate, etc.
- **Policy:** Policy is the ways to choose which activity to perform, maximum number of sockets that an application can have access to, how much memory to allocate, etc. Some common policies are Least Recently Used (LRU), Earliest deadline first (EDF), etc.

Course Description

This graduate course provides students with a foundational knowledge in operating system concepts. Students will gain a detailed understanding of appropriate operating system constructs that involve OS abstractions and mechanisms. Students will also understand the constructs of multithreading and resource management in compute systems.

- OS abstractions
  - threads, process, file
- OS mechanisms
  - schedule, create, open, write, allocate
- Multithreading
- Resource management

- Operating system: the software that supports a computer's basic functions, such as scheduling tasks, executing applications, and controlling peripherals.
- Types of operating systems: Microsoft Windows, Linux, macOS, iOS, Android
- Multithreading:

    - Multithreading is a CPU (central processing unit) feature that allows two or more instruction threads to execute independently while sharing the same process resources.
    - A thread is a self-contained sequence of instructions that can execute in parallel with other threads that are part of the same root process.
    - When data scientists are training machine learning algorithms, a multithreaded approach to programming can improve speed when compared to traditional parallel multiprocessing programs.
- Resource management:
    - refers to techniques for managing resources (components with limited availability)

👩‍🎓 Module 1