ITBU 373, Operating Systems Homework 01

Chapter 2, *Operating Systems, Three Easy Pieces*

Readings

Read chapter 2 in the *Operating Systems, Three Easy Pieces* book.

Discussion Questions

Answer the discussion questions in writing. Also, watch "Software Drag Racing: C++ vs C# vs Python - Which Will Win?" at `https://www.youtube.com/watch?v=D3h62rgewZM`. Note that C++ is a superset of C, that is, compiled C++ results in the same machine code that a C program would have — the difference is in programmer productivity, not machine code. (Not that there's much difference between C and C++ as opposed to Python.)

1. List three things that a *computer program* does when it runs. The book notes that this is the basis of the *Von Neumann* model of computing.
2. Generally (that is, at a very high level), what does an *operating system* do?
3. Why is an OS sometimes called a *resource manager*? Name some of the resources that it manages.
4. What is a CPU? How many CPUs does your machine have? How many cores?
5. What does the general technique of *virtualization* do?
6. What does the book call *virtualizing the CPU*?
7. How is *physical memory* arranged? How do you write to memory? How do you read from memory?
8. (not in book) What are the parameters of the `malloc()`, `calloc()`, and `realloc()` functions in C? What are the return values of the three functions? What do these functions do?
9. What is the *address space* of a process? What does it mean to say that each process has its own *virtual address space*?
10. What is a *process*? What is a *thread*? What is the difference between processes and threads?
11. What do we mean when we talk about *concurrency* in the context of the operating system.
12. What do we mean when we talk about *persistence* in the context of the operating system.
13. What does the concept of *isolation* entail?
14. What do we mean by *batch processing*?
15. What is the difference between a *procedure call* and a *system call*?
16. Your grandmother asks you what you will study in this class. She knows nothing about technology or computers. Summarize the three things that an *operating system* does (according to the book[1]) in a simple way so that she understands it.

[1] The Three Easy Pieces