Final Exam Study Guide, ECCS 3661, S25

What to Study

You are responsible for studying all content that can be found in a PowerPoint slide. In general, you should be able to:

- Describe the basic architecture of computer hardware
- Justify certain critical design decisions of operating systems (why use processes? Why use interrupts?)
- Replicate exercises done in class (i.e., things I write in ink)

Format of exam

- No raw coding/memorization of C++ concurrency
- Short answer question
- You may be expected to explain a given snippet of code from any of the topics below

Previous exams

See previous exam study guides for what to study in these previous exams.

C++ Concurrency

Be able to understand and annotate code similar to what you wrote in the most recent HW on multithreading, such as:

- Creating threads with objects, structs, and functions
- Joining/detecting threads
- Passing arguments to threads
- The mutex library
- Condition Variables
- Tricky conditional variable scenarios

Memory Management

- System requirements for memory management
  - Relocation
  - Protection
  - Sharing
  - Logical organization
  - Physical organization
- Fixed partitioning
  - Equal/unequal sized
- Dynamic partitioning
  - Best-/first-/next-fit
- Logical/relative/physical addresses
- Linking/loading
- Paging

- Paging address to physical address translation
- Segmentation
  - Segmentation address translation to physical

Virtual Memory

- Definition of virtual memory
- Paging versus segmentation
- Justification for virtual memory
- Paging
  - Hierarchical page tables
  - Paging address translation
  - Translation lookaside buffer
  - Trade-offs in page size
- Segmentation
  - Segmentation address translation
- Combined paging/segmentation approach