CSC 139 Operating System Principles – Spring 2019

Midterm 1 Study Guide

Exam Policies:

* Closed book, closed notes. One double-sided cheat sheet is allowed.
* 75 minutes.

Ch.1 – Introduction

* OS definition, goals
* Computer system structure
* Kernel
* Interrupts
  + Interrupt vector
  + Trap
  + Polling vs. vectored interrupt system
* Storage hierarchy
  + cost, capacity, volatility and speed
* Caching
* Multiprocessor architectures (symmetric vs. asymmetric)
* Multiprogramming and timesharing
* Dual-mode (user mode vs. kernel mode)

Ch.2 – OS Structures

* User interface
* Other system services
* System calls
  + APIs
  + Parameter passing
* Types of system calls
* OS layered approach
* Microkernels
* Modules

Ch.3 – Processes

* Process definition
* States and state transitions
* Process layout in memory
* Process control block
* Types of Process (CPU bound, I/O bound)
* Context switching
* Long-term, medium-term, and short-term scheduling
* Parent processes create children processes
* Inter-process communication
  + Shared memory
  + Message passing (direct and indirect; blocking and non-blocking)

Ch.4 – Threads

* Thread definition
* Multithreading models
  + Many-to-one
  + One-to-one
  + Many-to-many
* User-level and kernel-level threads
* Thread libraries
* Implicit threading
  + Thread pools, OpenMP, Grand Central Dispatch
* Threading issues
  + fork() and exec()
  + thread-local storage

Ch.6 – CPU Scheduling

* CPU scheduling criteria
* CPU scheduler and dispatcher
* Preemptive vs. Non-preemptive scheduling
* Scheduling algorithms
  + FCFS, SJF, SRTF, RR, Priority
* Time quantum
  + CPU bound vs. I/O bound
* Multilevel Queues and Multilevel Feedback Queues
* Linux O(1) and CFS scheduler