Study Guide for Midterm Exam

Midterm exam is scheduled **11:00 AM-12:15 PM** at **Brown Building 250** on **October 23, 2018**.

Chapter 1. Computer Systems Overview

Be able to define:
- data registers
- address registers
- PC
- instruction register
- interrupt
- hit ratio
- temporal locality
- spatial locality
- cache
- memory/storage hierarchy

Understand:
- general hardware in a computer
- purpose of interrupts
- events that cause an interrupt
- program flow with and without interrupts (Figure 1.5)
- events associated with an interrupt
- handling multiple interrupts
- calculation of EAT
- how computer executes a sequence of instructions

Chapter 2. Operating Systems Overview

Be able to define:
- OS
- kernel
- turnaround time
- multiprogramming
- process switch
- process
- thread
- multithreaded process
- DOM (degree of multiprogramming)
Understand:
- goals of an OS
- multi-task parallel processing and concurrency
- process components
- activities associated with processes
- definition and benefits of various OS structures
- how to draw execution graphs (e.g., as in hw problem 2.1)

Chapter 3. Process Description and Control

Be able to define:
- swapping
- ready queue
- event queues
- preemption
- process (or context) switch
- process image
- process control block (PCB)

Understand:
- process states and their transitions
- transition diagram
- purpose of PCB and what information is kept there
- difference between I/O-bound and CPU-bound processes
- dual-mode (user and kernel mode):
  - how it is implemented
  - why it is used
  - and when it is used
- when does a process switch occur
- events associated with an interrupt (with process switch)

Chapter 4. Threads

Be able to define:
- ULTs
- KLTs

Understand:
- responsibilities of processes vs threads
- components present in both/either processes and/or threads
• advantages and disadvantages of ULTs
• advantages and disadvantages of KLTs
• applications of ULTs versus KLTs
• differences between ULTs/KLTs and user/kernel modes

Chapter 9. CPU Scheduling

Be able to define:
• types of scheduling
• throughput, turnaround time, wait time, arrival time, response time, CPU utilization
• Gantt Chart
• starvation
• aging
• time slice (quantum)

Understand:
• difference between scheduling and dispatching
• difference between preemption and no preemption
• relationship of priority and preemption
• how to calculate the evaluation criteria of a scheduling algorithm
• CPU scheduling algorithms:
  o FCFS
  o SPN
  o SRT
  o RR
  o multilevel queues and multilevel feedback queues
• possible problem/solution with priority algorithms

Homework Assignments 1-4

In-Class Problems