CSI 450 — Operating Systems, FALL 2009

Review Sheet #2

- Chapter 4 - Threads

    – heavyweight vs. lightweight
    – The register/stack/code/data/files view of threads of execution
    – Four major categories of benefits of multiprogramming - responsiveness, resource sharing, economy, multiprocessor utilization
    – user threads vs kernel threads
    – many-to-one, one-to-one, many-to-many
    – pthreads (POSIX THREADS) - thread library - API
    – pthread_attr_init, pthread_create, pthread_join, pthread_exit
    – Threading issues (fork?, exec?)
    – thread cancellation, target thread, asynchronous, deferred, cancellation points
    – signal handling, signal handling process, synchronous, asynchronous
    – default signal handler vs. user-defined signal handler
    – delivery (thread who signaled, every thread, certain threads, a specific thread)
    – thread pools (e.g. web server)

- Chapter 5 - CPU Scheduling

    – multiprogramming goal
    – CPU burst, I/O burst, cycle of processes
    – large # of short CPU bursts
    – I/O bound vs CPU bound
    – Short-term scheduler selects a process when a process switches from: running to waiting, running to ready, waiting to ready, running to terminated
    – nonpreemptive (cooperating) schedule scheme vs. preemptive scheduling scheme
    – dispatcher (switch context, switch to user mode, jump to proper location in user program), dispatch latency
    – scheduling criteria (CPU utilization, throughput, turnaround time, waiting time, response time)
    – Scheduling Algorithms, Gantt chart, FCFS, SJF, priority scheduling (internal or external), RR, burst prediction, time quantum, context switch delay

- Chapter 6 - Process Synchronization

  - producer/consumer, bonded buffer, concurrent execution
  - The critical section problem
  - The critical section solution (mutual exclusion, progress, bounded waiting)
  - race conditions, preemptive kernel vs nonpreemptive kernel
  - Peterson's Solution
  - atomic instructions,TestAndSet, Swap
  - semaphores, counting, binary, mutex, synchronization
  - implementation- busy waiting, spinlock, or blocking
  - deadlock and starvation
  - classic problems - bounded buffer, dining philosophers, sleeping barber