CIS 415
Operating Systems
Midterm Review

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Fall 2015
Logistics

- Assignment 2 due today at 5pm
- Answers to Assignment 1 by end of today
- Answers to Assignment 2 by end of day Friday
- Midterm on Tuesday, November 3
  - Closed book
  - No computers
  - No notes
  - No discussion with neighbors
  - No Halloween candy to bribe with instructor
What did we cover so far?

- Operating systems introduction
  - OSPP: Chapter 1
- Kernels and Processes
  - OSPP: Chapter 2 – The Kernel Abstraction
    - Lecture 2: OS Structure and System Calls
  - OSPP Chapter 3 – The Programming Interface
    - Lecture 3: Processes
    - Lecture 4: IPC
- Concurrency
  - OSPP: Chapter 4 – Concurrency and Threads
    - Lecture 5: Threads
  - OSPP: Chapter 7 – Scheduling
    - Lecture 6: Scheduling
  - OSPP: Chapter 5 – Synchronizing Access to Shared Objects
    - Lecture 7+8: Synchronization
  - OSPP: Chapter 6 – Multi-Object Synchronization
    - Lecture 9: Deadlocks
What do we need to know for the midterm?

- All OSPP chapters covered thus far
- All lectures presented thus far
- Assignments 1 and 2
- Project 1
- Everything!
Study Advice

- Read book
- Review lectures
  - Please DO NOT print lecture slides – save the forest!
- Review assignments
- Think about concepts
Let’s try this again … what will you ask?

- Ah, that’s a different question!
- Let’s start first with what you might expect the midterm to look like
- Then maybe I will be more specific about what will be actually on the midterm … maybe
What to expect on the midterm?

- 80 minute exam
  - Extended to 90 minutes if no follow class
  - Extended to 90 minutes if everyone can stay

- Structure
  - 4 parts with each part having either or both:
    - Concept questions
    - Problems
  - At least 50% of the grade will be on concept questions

- Concept questions
  - Intended to be short answer and take limited time

- Problems
  - Intended to involve a bit more thinking and more time
What will be covered on the midterm?

- All areas covered are fair game
  - Especially for short answer questions
- But I cannot reasonably expect to ask you about everything … Hmm, can I?
- Will have concept questions and/or problems on:
  - Part 1: Processes and threads
  - Part 2: Scheduling
  - Part 3: Concurrency and synchronization
  - Part 4: Deadlock
- My problem is to make sure you have enough time
Processes and Threads

- What are they?
- How are they different?
- How does the OS represent and manage them?
- How do they operate with respect to each other?
- How do they execute with respect to the OS?
  - System calls
  - Interrupts
- How do they interact?
- What are the threading models?
Scheduling

- Know your scheduling algorithms
- Easy topic to write a problem for
Concurrency and Synchronization

- What is a critical section?
- What is the critical section problem?
- What are solutions to the critical section problem?
- Look at the classic synchronization problems
  - Dining philosopher
- Know about synchronization constructs …
  - Mutex
  - Semaphore
  - Condition variables
- … and how they are used
Deadlocks

- Understand the issues with multi-resource synchronization
- What is the multi-resource deadlock problem?
- What are the solution approaches:
  - Deadlock prevention
  - Deadlock avoidance
    - Banker’s algorithm
  - Deadlock detection and recovery
- Easy topic to write a problem for
Next Class

- Midterm