



CIS 415

Operating Systems

Midterm Review

Prof. Allen D. Malony

Department of Computer and Information Science

Spring 2020



UNIVERSITY OF OREGON

Logistics

- ❑ Midterm next Tuesday, May 5
 - Online using Canvas
 - Honor system
 - Will have 2 parts, each taken separately
 - ◆ concepts
 - ◆ problems
 - You will be given 1.5 hours for each part
 - ◆ need to allocate up to 3 hours on the exam day
 - No programming will be required
- ❑ Monday office hours
 - Extended 1-3pm

Canvas Exams

- ❑ Canvas provides support for “Quizzes”
 - Variety of types of questions
 - ◆ multiple choice and true/false
 - ◆ fill-in-the-blank and matching
 - ◆ essay
 - Control of when a quiz is available
 - ◆ 8:00am to 11:59pm, Tuesday, May 5
 - Control of quiz duration
 - ◆ 90 minutes (1.5 hours) for each part (take separately)
 - ◆ each part will be designed to take 45 minutes
 - ◆ this will give everyone plenty of time

Honor System

- ❑ We will not use the “LockDown Browser” to prevent you from accessing your computer or the internet
 - Too problematic (does not run on some platforms)
 - Not configured with UO Canvas options (I think)
- ❑ Open book, open notes, ...
- ❑ However, the honor system applies
 - Do the exams by YOURSELF
 - Do not discuss the exams with your classmates on test day
 - Do not share answers with your classmates
 - Do not search for questions online (e.g., to find old tests)
- ❑ Taking tests are part of your learning process
- ❑ If you have someone else help you take the test, you are cheating, both yourself and your classmates

What did we cover so far?

Topic

Lecture

❑ *Overview*

- Chapter 1 – Introduction
- Chapter 2 – Operating System Structures

1: Introduction

2: OS architecture /
System Calls

❑ *Process Management*

- Chapter 3 – Processes and IPC
- Chapter 4 – Threads
- Chapter 5 – CPU Scheduling

3: Processes

4: IPC

5: Threads

6: Scheduling

❑ *Concurrency*

- Chapter 6/7 – Process Synchronization
- Chapter 8 – Multi-Resource Allocation

7: Synchronization

8: Deadlocks

What do we need to know for the midterm?

- ❑ All OSC chapters covered thus far
- ❑ All lectures presented thus far
- ❑ Things learned in lab exercises
- ❑ All of it

Study Advice

- ❑ Read book
- ❑ Review lectures
 - Please DO NOT print lecture slides – save the forest!
- ❑ Think about concepts
- ❑ You do not need to know specific details that pertain to specific operating systems, as described in the OSC book

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?

- ❑ Online using Canvas
 - Two parts, taken separately
 - Each part is 90 minutes
 - Will be available from 8:00am to 11:59pm on May 5
 - Must begin the 2nd part before 10:30pm to get the full 90 minutes
- ❑ Structure
 - Three sections (see next slide)
 - Each with concept questions and problems
- ❑ Part 1: Concepts
 - Each question is intended to take limited time to answer
 - Includes true/false, multiple choice, short answer
- ❑ Part 2: Problems
 - Intended to involve a bit more thinking and more time
 - Include more essay answers

What will be covered on the midterm?

- ❑ All areas covered are fair game
 - Especially for concept questions
- ❑ But I can not reasonably expect to ask you about everything ... Hmm, can I?
- ❑ Will have concept questions and/or problems on:
 - Section 1: Processes and Threads
 - Section 2: Scheduling
 - Section 3: Concurrency/Synchronization and Deadlocks
- ❑ My job 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?

What makes up a process / thread?

- ❑ Process address space
- ❑ Process control block
- ❑ User-level threads / kernel-level threads
- ❑ Thread control block
- ❑ How is a process created?
- ❑ How is a thread created?

Interprocess Communication (IPC)

- ❑ What is IPC?
- ❑ What are different types of IPC?

Scheduling

- ❑ Know your scheduling algorithms
- ❑ Easy topic to write a problem for
- ❑ Think about non-preemptive versus preemptive



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 (not so much)
- ❑ ... 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