Learning Objectives

After completing this unit, you should be able to:

- Define what an operating system is, and name five components.
- Explain the difference between the kernel and the user interface.
- Navigate a Unix system via the command line remotely over ssh.
- Describe the process table and how/why processes are scheduled.
- Describe interrupts and what happens during a context switch.
- Explain virtual memory and how virtual addresses are translated.
- Explain the purpose of device drivers, and name three examples.

Textbook Sections

3.1 The History of Operating Systems

3.2 Operating System Architecture

3.3 Coordinating the Machine's Activities

Video Lectures

- Operating Systems
- Memory Management
- How Linux is Built
- Map of Computer Science

Assignments

Act04 What is an OS?; Chapter 3 Problems

Lab04 Command Line Basics; Unix Commands and Files

Unit 4 Checklist: Sep 16 – Sep 22

Before Wednesday	Date Completed
FINISH models 1 and 2 of the OS activity	
READ textbook 3.1 The History of Operating Systems (take notes) ANSWER questions 2 and 4 in your notes	
WATCH video lecture: Operating Systems (take notes)	
WATCH video: How Linux is Built (take notes)	
DO tutorial: Command Line Basics	
START Lab04: Unix commands and files	(10 pts)
Before Friday	**Date Completed**
READ textbook 3.2 Operating System Architecture (take notes) ANSWER questions 1 and 2 in your notes	
READ textbook 3.3 Coordinating Machine's Activities (take notes) ANSWER questions 1 and 3 in your notes	
WATCH video lecture: Memory Management (take notes)	
WATCH video: Map of Computer Science (take notes)	
START Act04 exercises (complete at least 75%)	(15 pts)
Before Monday	**Date Completed**
COMPARE your Lab04 and Act04 with the solutions in Canvas	
SUBMIT Quiz04 – 1st attempt closed: see what you don't know	
STUDY your notes, ask questions on Piazza, meet with the TAs	
SUBMIT Quiz04 – 2nd attempt open: try to get the full 10 points	(10 pts)

TAKE Exam04	(40 pts)

Activity 4: What is an OS?

According to Google, an operating system is "the software that supports a computer's basic functions, such as scheduling tasks, executing applications, and controlling peripherals."

Model 1   Screenshots

Write the name of the operating system under each screenshot:
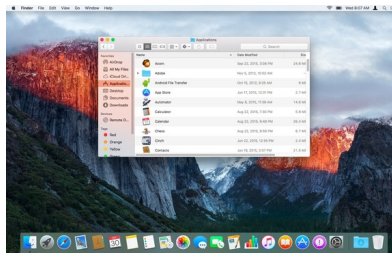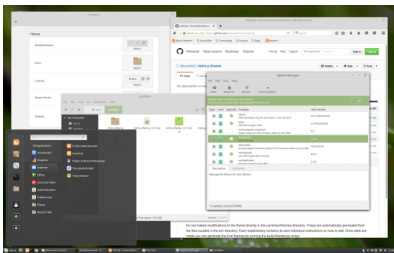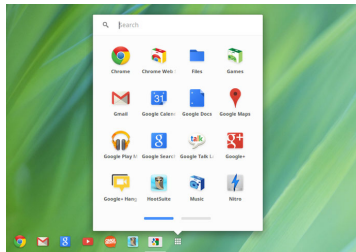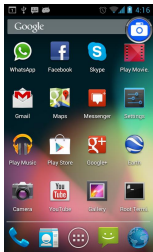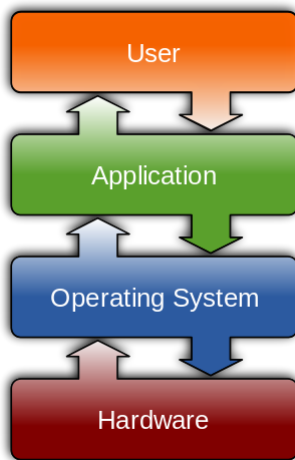

Questions (10 min)   Start time: _____

1. What do these operating systems have in common? Describe at least three similarities.

2. How are these operating systems different? Describe at least three major differences.

3. Based on your experience as a computer user, what does an operating system do?

Model 2   Interactions

To the right of each box, list several examples of what the word means in the context of the diagram:

User

Application

Operating System

Hardware

Questions (10 min)   **Start time:** _____

4. Consider a smartphone or tablet. Describe how users interact with applications.

5. With respect to hardware interactions, what does the operating system need to do?

6. Why do applications need to go through the operating system to access hardware?

Chapter 3: Operating Systems

This week's activity looks at several main components of an operating system. Refer to Sections 3.2 and 3.3 of the textbook. For each component, write a few sentences that describe what it does. Then answer the corresponding Chapter Review Problems on Pages 151–154.

Scheduler:

#11 (information in the process table)

#12 (ready process vs waiting process)

Dispatcher:

#27 (what happens at end of time slice)

#28 (information in the state of a process)

Memory Manager:

#13 (virtual vs physical/main memory)

#46 (isolating processes from each other)

Device Drivers:

#16 (applications vs system software)

#19 (summary of the booting process)

File Manager:

#9 (what do slashes mean in a path)

#15 (two processes access the same file)

Window Manager:

#2 (batch vs interactive processing)

#53 (how is WM related to the OS)