

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 interrupts and what happens during a context switch.
- 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

Exercise04 What is an OS?; Chapter 3 Problems

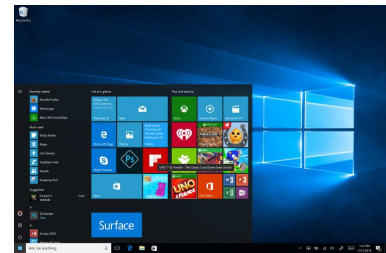
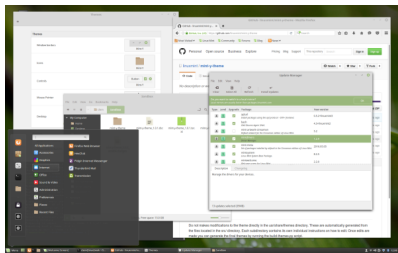
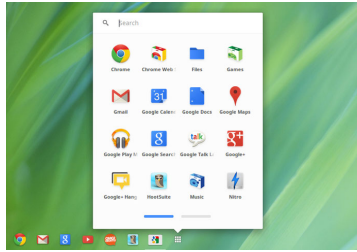
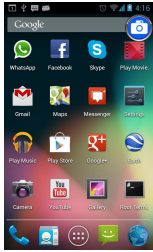
Lab04 Command Line Basics; Unix Commands and Files

Exercise 4: Operating Systems and the Internet

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

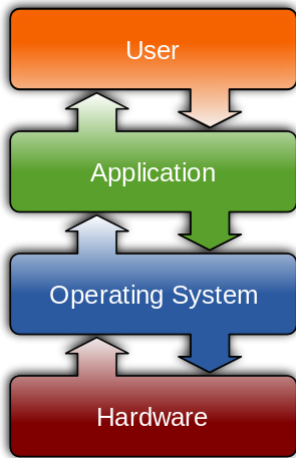
Write the name of the operating system under each screenshot:



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.

Model 2 Interactions

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

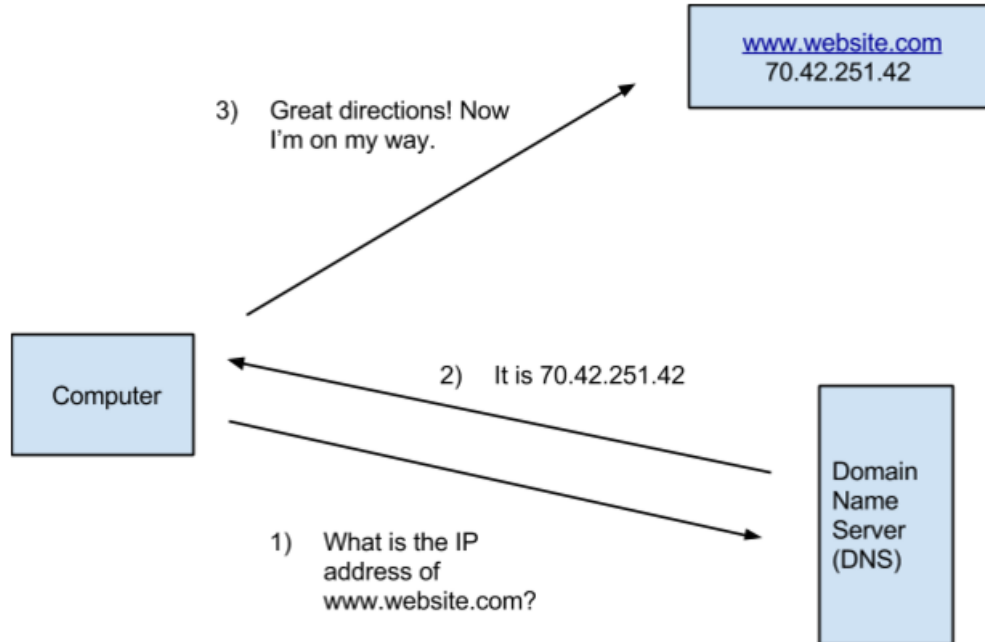


3. Consider a smartphone or tablet. Describe how users interact with applications.
4. With respect to hardware interactions, what does the operating system need to do?
5. Why do applications need to go through the operating system to access hardware?

The Internet is the underlying global network that supports Email, the World Wide Web, and other applications. It consists of many different local networks that are connected together.

Model 3 How the Internet Works

All devices connected to the Internet are assigned an *IP address* made up of four 8-bit numbers separated by dots (e.g., 173.194.208.139). Some are assigned a *static* (permanent) IP address, whereas others are assigned a *dynamic* (temporary) IP address. Since it's difficult for people to remember numbers, we typically use *domain names* when referring to websites.



6. Based on the paragraph above:

- a) How many bits does an IP address have?
- b) What is the largest possible IP address?

7. Based on the diagram above:

- a) What is the domain name of the requested server?
- b) What is the IP address of the requested server?

8. In your own words, what is the function of a DNS server?

9. Give examples of domain names that you use frequently. Name at least two .com, two .org, two .edu, and two of something else.

Model 4 Measuring Your Network

Your network performance can be measured in two ways:

- **bandwidth** – the rate at which data is downloaded or uploaded to a network, measured in bits per second (bps), kilobits per second (kbps), or megabits per second (Mbps)
- **latency** – how much time it takes (in milliseconds) for a request to reach its destination

10. Use an Internet speed test (<https://www.google.com/search?q=speed+test>) to measure bandwidth at home, both download and upload rate, and if possible, from another network.

a) At home upload: c) Elsewhere (optional):

b) At home download:

11. Use Pingdom's speed test (<https://tools.pingdom.com/>) to measure the average latency between San Francisco and:

a) <http://google.com>

b) <http://whitehouse.gov>

c) Any website you use