Lesson 1: Operating Systems Basics

Lesson Objectives

In this lesson you will learn how to start a computer and access the operating system. You will also be introduced to Windows. On completion you will be familiar with:

- how an operating system works
- how to start and exit Windows
- what the Windows desktop is
- how applications differ from operating systems
- how to use the Start button
- how to navigate around the desktop
- how to use the taskbar
- how to start the Control Panel
- how to change the display of the desktop

What is an Operating System?

Objective 1-1.1

A computer is a collection of electrical and mechanical parts that we refer to as hardware. Each part performs its own job, and all the parts must be able to communicate in order for the computer to work correctly.

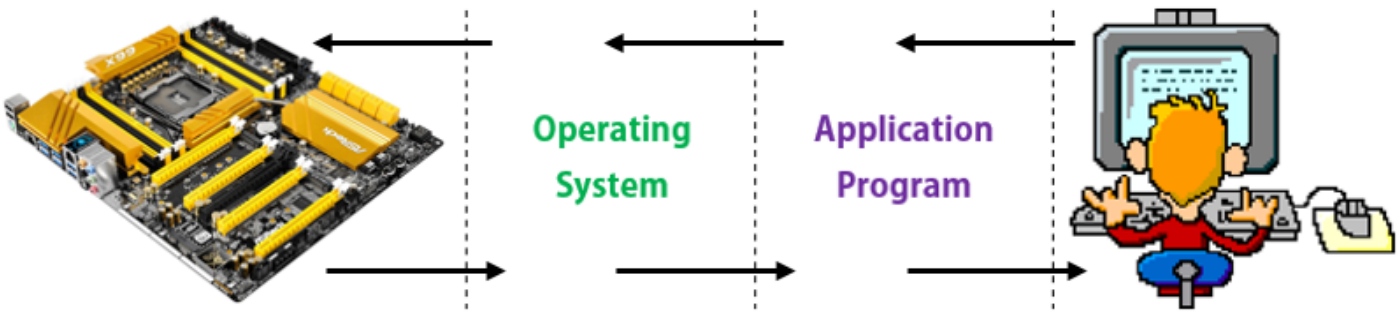
Instead of “talking” to one another directly, these parts all talk to the operating system. An *operating system* is a program in charge of communication and organization. It keeps all the working parts organized and running smoothly.

You, as a computer user, “talk” to the operating system whenever you log on to the computer, or type on the keyboard, tap on a touchscreen, or use an application program such as an email program or a word processor.

The operating system has some very important functions:

- it manages hardware devices, and
- it controls communication among the hardware devices, and
- it controls communication between application programs and hardware devices

It works like this:



As you work in your application program, the program “talks” to the operating system, and the operating system “talks” to the hardware devices that perform the tasks and store your work. As the work is performed, the hardware “talks” to the operating system, and the operating system “talks” to the application program, which in turn “talks” to you.

Differences between software applications and operating systems

We use the term “software” to describe any program that makes a computer run. This includes operating systems

and application programs.

While both are software, there are some important differences:

- Application programs are used to produce work. You use application programs to create documents or spreadsheets or presentations.
- An operating system manages devices and makes sure that communication takes place between an application program and the hardware devices.
- An operating system also manages files stored on the computer.

OS Evolution – from the Dinosaur Days to Today

“OS” is an abbreviation for operating system. And over the years, they have evolved from simple text screens to full color point-and-click (or tap) screens.

Disk Operating System (DOS) was the original operating system developed for the personal computer (PC). When you first started the computer, you were greeted by a flashing cursor called a command prompt.

And that was it! No user-friendly desktop. You began working on the computer by typing commands at the command prompt. It was from here that you could manage files and start programs.

Today, operating systems communicate with you through a graphical user interface (GUI), or “gooey.”

GUI is a fancy name for a system that lets you use menus and clickable buttons or icons to start programs, move files, or perform other tasks.

The GUI makes it possible for you to "point and click" in order to perform most tasks. This makes it easy for new users to work with the operating system and get things done.

> Here’s a Tip:
> An interface is a point where two systems (or people, or devices) meet and communicate with one another. Anytime you use a computer, you communicate with it through a user interface.

Modern Operating Systems

Today, you can choose from several operating systems. You might like Windows, while your best friend prefers Mac OS, and your teacher likes Linux.

All operating systems include a “desktop” which is the screen that opens once you log on and are ready to begin working. Desktops usually include colorful backgrounds, icons or buttons for accessing commands, and a status bar to show which programs are open and running.

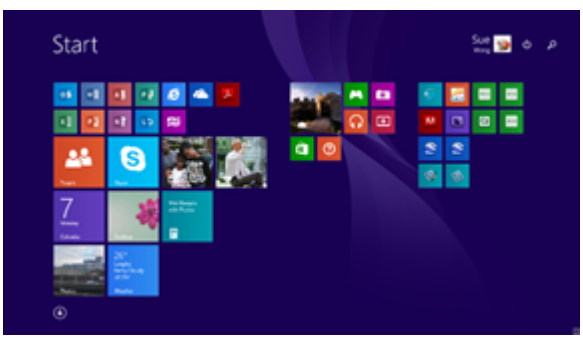
Some of the most popular operating systems include:

Windows

Windows operating systems are designed by Microsoft. Recent versions are:

- **Microsoft Windows 10**
- **Microsoft Windows 8**
- **Microsoft Windows 7**

The Windows 8 and Windows 7 desktops are shown here:



Mac OS X

Mac OS X is designed by Apple Inc. for Macintosh computers. Recent versions are:

- **Version 10.9 – Maverick**
- **Version 10.10 – Yosemite**
- **Version 10.11 – El Capitan**

The Mac OS X Yosemite and Maverick desktops are shown here:

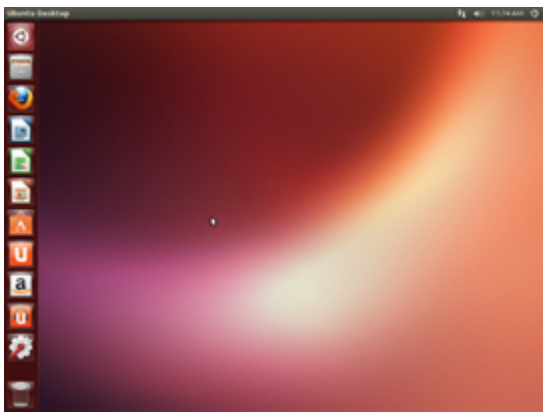
Linux

Linux is a free operating system. You can find Linux installed on supercomputers – such as those used by Google and NASA. But it is also installed on millions of home computers. Because anyone who uses Linux can modify it, it is very popular with power users (users who like to program).

Versions of Linux are called distributions – or “distros” for short. Some popular distros are:

- **Knoppix**
- **Ubuntu**
- **Gentoo**

The Knoppix and Ubuntu desktops are shown here:



UNIX

UNIX was one of the earliest operating systems and was first designed for use on large mainframe computers and servers. Modern versions are available for desktop systems, and include a GUI; however, the GUI is separate from the operating system.

Specialized Operating Systems

Most operating system developers (Windows, Mac, Linux, and so on) make specialized versions to run on different types of devices.

- **Handheld Operating Systems** are used on Smartphones and tablets. These are scaled-down versions of the operating system. That is, they are smaller and perform fewer tasks. Popular handheld operating systems include:
  - Windows Phone (based on Windows)
  - Android (based on Linux)
  - iOS (based on Mac OS X)
  - Blackberry (a mobile operating system designed for Blackberry phones)
- **Embedded Operating Systems** manage and control operations on the specific type of equipment for which they are designed, such as a vehicle, robotic manufacturing, or medical equipment. Embedded operating systems are designed to be compact and are highly specialized; they include only the functions that are

required by the specific devices for which they are developed.

Try It! Exercise

In this activity, your instructor will show two short videos that highlight the look and feel of three modern operating systems. The first video shows a brief tour of Ubuntu Linux, and the second video compares the appearance and features of Windows 10 and Mac OS X El Capitan.

1. **Teacher**: Open a web browser and play the following videos:
   - **Tour of Ubuntu Linux** (approx. 3 minutes) `https://www.youtube.com/watch?v=krLBzoFlqnI`
   - **Windows 10 vs Mac OS X El Capitan** (approx. 2 minutes) `https://www.youtube.com/watch?v=uqwU3q4Yhgc`
2. **Teacher**: After showing the video(s), close the browser and lead a short discussion on the following questions:
   a. Do you think these operating systems are very different from each other, or do you think they seem to offer the same basic features and capabilities?
   b. What do you think are the major features highlighted in each video?
   c. What factors might you consider when deciding which operating system to use?
   d. Which one looked most interesting to you?

Common Operating System Features

Objective 1-1.1, 1-1.3

No matter which operating system you use, certain features are common among all of them.

User Accounts

In addition to managing communication, devices, and file storage, an operating system keeps track of who is using the computer. You may be lucky enough to own your own computer, or you may share a computer with family members or with classmates when you are in school.

It is easy to share computers because each person who uses it can have his or her own account. You can think of an account as a special area on the computer where you can work and keep your files, separate from other users.

An account name (and usually a password) is associated with each account.

When you first turn on a Windows computer, one of two things can happen:

- If you are the only user on the computer and your user account does not require a password, then you will be automatically logged on to your account and the Desktop appears.
- If you are using a computer on which multiple user accounts have been set up, or if your user account requires a password, then Windows displays an icon and account name for each user account and you must log on to your account by clicking your account icon and entering your password.

Fun Fact: The process of powering on a computer and loading the operating system is also called *booting* the system. Restarting a computer is often called *re-booting*.

Power On / Power Off

You press the power button to turn the system on; however, you should never just press the power button to turn the system off. You should always use the operating system's Power Off or Shut Down option.

Powering On the Computer

Perform the following steps to correctly power on a computer:

1. Turn on devices that are connected to the system unit (such as the monitor and speakers and maybe a printer) first.
2. Turn on the system unit.

Several lines of information are displayed on the screen; the computer performs a start-up test and then loads the operating system files into memory.

When the operating system is loaded, Windows will display a Welcome screen, quickly followed by the Windows desktop.

If the computer is connected to a network or set up for multiple users, Windows will display a logon screen before you get to the desktop. A sample logon screen is shown here.

If a logon screen displays, click the icon for your user account (or enter your login ID), type your password and press Enter. When you have logged on successfully, the Windows Desktop displays.

Powering Off the Computer Properly

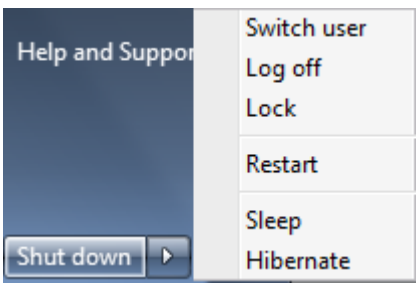
Power Off procedures are built into an operating system to ensure that no information is lost or damaged. To properly power off a Windows computer:

1. Click the **Start** button – this will show you the Shut Down button. 

2. Click **Shut down** to finish powering off the system. The computer closes all files and programs, closes the operating system and turns off the power completely.

Shut Down Options

Did you notice that the **Shut down** button includes an arrow? Click the  to see other things you can tell the computer to do.



Switch user	You can switch to another user account without logging out of your account. You can work in only one account at a time, but more than one can be open at the same time.
Log off	When you log off, you close your account. The computer closes your files and programs, but does

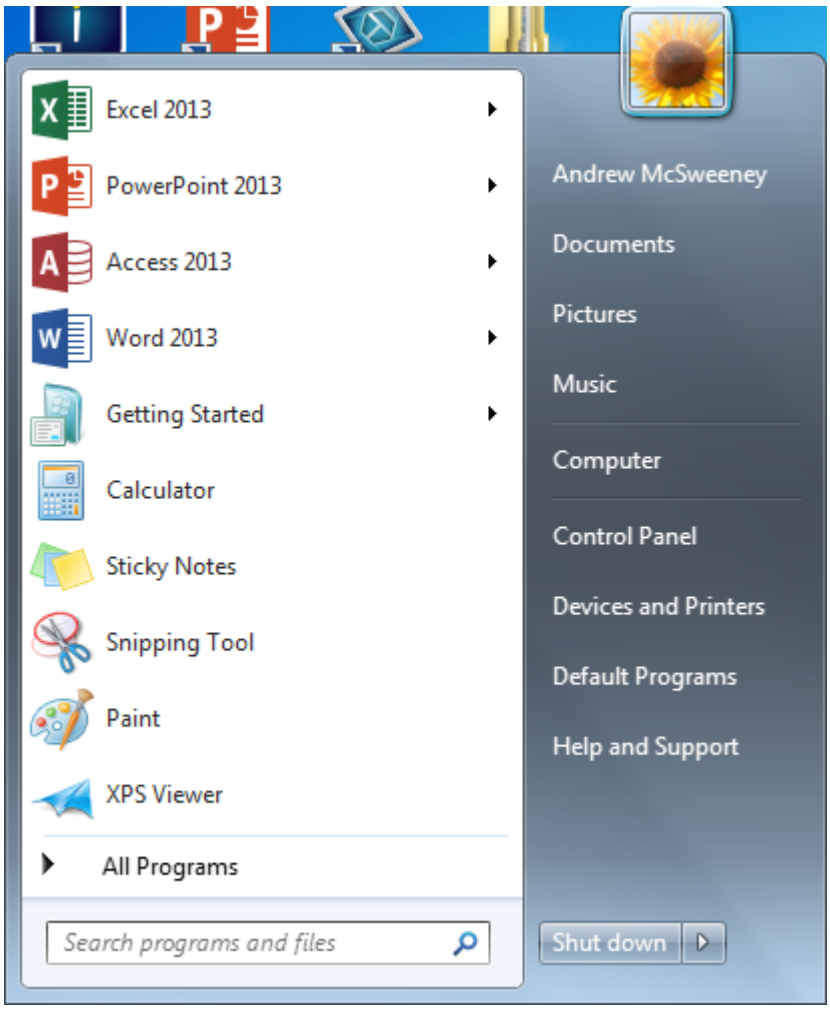
	not close the operating system. The log on screen displays again.
Lock	When you use the Lock option, Windows hides the desktop behind a log on screen. All the programs and files you were using stay open and ready, but only the log on screen shows and you must enter your password before you can start working on them again.
Restart	Windows closes all open files and programs, exits the operating system and restarts the computer without turning off the power. Sometimes when a computer starts to behave strangely or seems to get "lost" or "stuck" restarting it will make it run properly again. Restarting clears the memory and reloads the operating system, but does not cause the computer to perform the startup tests again.
Sleep	Clicking Sleep leaves the computer on, but puts it into a mode where it uses less power. The screen turns off and often the computer fan stops. Sleep mode helps to save battery power on laptops. Windows puts your work into memory. When you wake the computer, the screen will look exactly as it did when you put it to sleep. On a desktop computer, the Sleep command may be listed as Standby.
Hibernate	This option is found on laptops only. When you click Hibernate, the computer writes your open files and programs to a storage location and then turns off the system. When you press the power button on a laptop in hibernation, the system starts back up and puts your files and programs back into memory. You can start working again right where you left off.

To turn off Sleep or Standby mode and return to normal working mode, simply move the mouse or press a key on the keyboard. To turn off hibernation, press the power button on the laptop.

Try It! Exercise

In this exercise you will turn on the computer to start the operating system. You will also log on to Windows and explore various Shut down options. If you need help finding objects on the screen, ask your teacher for help.

1. Identify where the power buttons are located on your computer and the monitor.
2. Turn on the monitor, then press the power button to turn the computer on.
3. Watch the monitor to see the messages that display.
4. If a Windows logon screen appears, click the icon for your user account and enter your password to log on to Windows. (Ask your teacher for help if you need to.) When you have successfully logged on to Windows, the Desktop displays.
5. Click the **Start** button in the lower left corner of the desktop to open the Start menu.



6. Point the mouse pointer over the **Shut down options** arrow so you can see the Shut down options menu. (Ask your teacher for help if necessary.)
7. In the Shut down options menu, click **Switch user** to access the log on screen. If there are many accounts on the computer, an icon will display for each user account.
8. Click the icon for your user account and enter your password if necessary to return to the Desktop.
9. Point the mouse pointer over the **Shut down options** arrow to see the Shut down options menu again.
10. In the Shut down options menu, click **Log off** to log out of your account and return to the Windows log on screen.
11. Click the icon for your user account and enter your password, if necessary, to return to the Desktop.
12. Display the Shut down options menu again.
13. In the Shut down options menu, click **Lock** to lock the system.

    The Desktop is now hidden by a log on screen.
14. Click the icon for your user account or enter your password if necessary to return to the Desktop.
15. Display the Shut down options menu, then click **Sleep** (or Standby) to put the computer to sleep.

    The screen goes dark. Has the power light changed color?
16. Press a key on the keyboard or press the power button to wake the computer. Depending on how your teacher has set up your computer, you may need to click the icon for your user account or enter your password to return to the Desktop; otherwise, you will be returned to the Desktop immediately.
17. If necessary, click the icon for your user account or enter your password to return to the Desktop.
18. Display the Shut down options menu, then click **Restart** to restart the system.

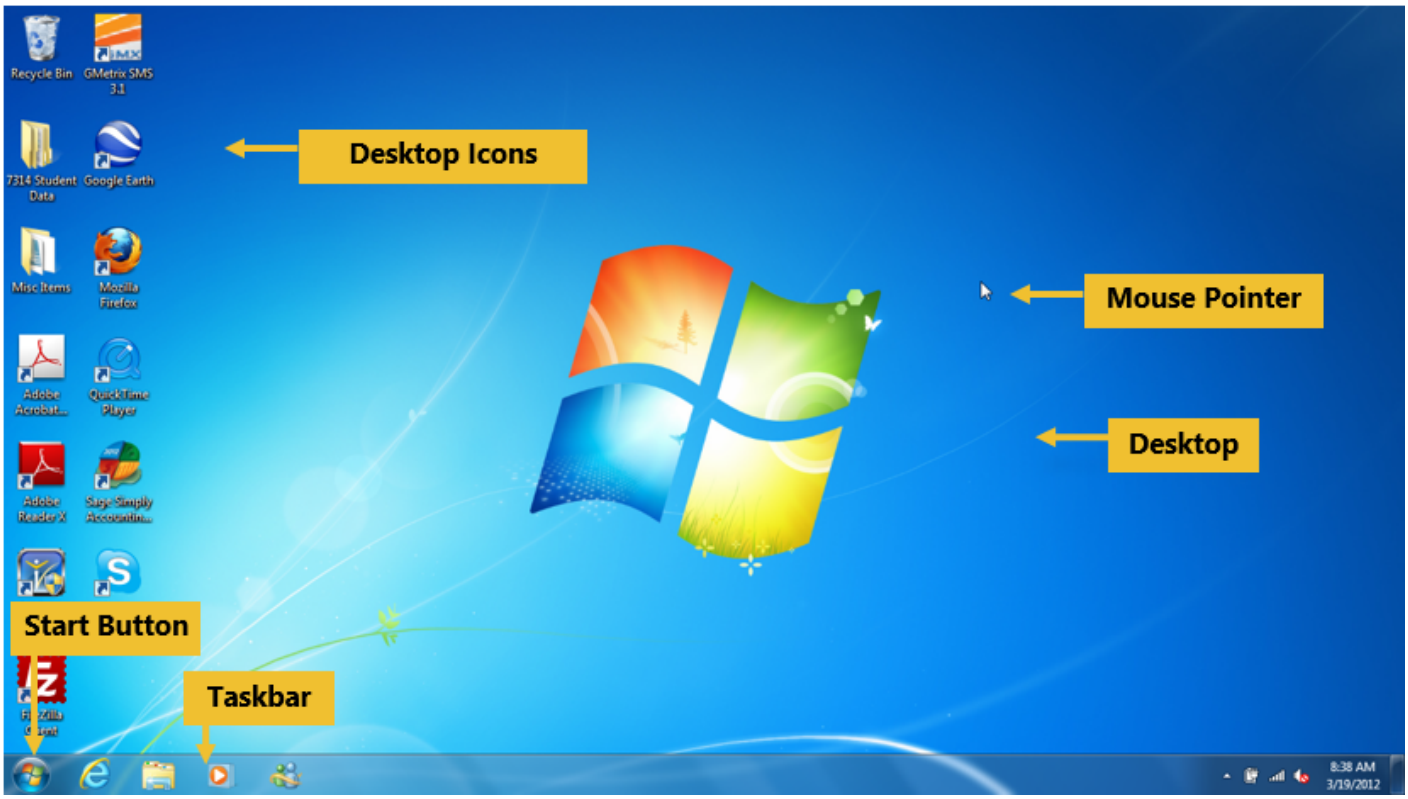
    Windows shuts down, and then starts again without performing startup tests that run when you first power on the system.
19. When the log on screen displays, click the icon for your user account and enter your password if necessary to access the Desktop.
20. Click the **Start** button, then click the **Shut down** button to power off the system.

Windows shuts down, and then the system turns off.

21. Press the power button on the computer to start the system.
22. Log on to Windows.

Looking at the Windows Desktop

Objective 1-1.2



The Desktop includes several types of objects that you use to move around and get work done.