Lesson 1: Operating Systems

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
- understand the relationship between software and hardware
- understand software updates

What is an Operating System?

Throughout this course, you will learn about using computers. A computer is essentially a collection of connected components and devices which must be able to communicate with each other and with the user in order to function correctly and efficiently.

Communication is made possible through collections of computer code known as programs, operating systems, and device drivers. The components and devices described above are known collectively as hardware. Programs, operating systems and device drivers are known as software.

As you work through this course, you will become familiar and comfortable with various types of hardware and software. In this lesson, you will be introduced to operating systems.

An operating system or environment is a collection of programs designed to control all the hardware and application software on the computer, and to manage the computer’s interaction and communication with the user. It performs two important functions:

- manages the input devices (keyboard and mouse), output devices (monitor and printer), and storage devices (hard, flash, and optical drives)
- manages the files stored on the computer

Every computer requires an operating system to function. A computer must load the operating system into memory before it can load any application software or interact with the user. Examples of operating systems include DOS, Windows, UNIX, Linux, and Mac OS.

Disk Operating System (DOS) was the original operating system developed for the PC. DOS is a text-based software; you enter single line commands to perform such tasks as managing files, starting programs, or sending output to the printer.

Most operating systems (except UNIX) use an integrated graphical user interface (GUI), or "gooey" for interacting with users. In a GUI, many functions and commands are represented by menus and clickable buttons or icons (pictures or symbols which are shortcuts for launching a program or wizard). The GUI makes it possible for a user to "point and click" in order to perform most tasks. This makes it easy for novice users to work with the operating system.
Software programs designed to run on a particular operating system use the same buttons, symbols, or pictures for common functions (such as copy, paste, bold, save, print, and so on) as those used in the operating system. This consistency reduces the time required to learn new software.

The operating system manages hardware, programs and files. For example, you would use the operating system to copy a file.

Application software, on the other hand, allows a user to be productive – to create documents or complete specific tasks such as writing a report, creating a budget, removing red-eye from a photograph, watching a movie, or searching the Internet. Examples of application programs you may use include Microsoft Word, Adobe Photoshop, Windows Media Center, or Internet Explorer. For example, you would use an application program such as Microsoft Word to create a letter.

While a user works in an application program, the application program interacts with the operating system behind the scenes.
Modern Operating Systems

There are several operating systems in wide use today and it is not uncommon for an organization to include computers which run different operating systems. Consequently, operating systems are designed with a certain amount of interoperability, which is the ability for different operating systems to communicate and share/exchange information with one another.

The following screens are examples of the first screen that appears when you start the computer and the operating system loads into memory. This screen is commonly known as the Desktop.

Microsoft Windows 7
Windows 7 is an operating system for PCs released in October 2009. Like previous Windows products, it includes a WYSIWYG (What You See Is What You Get) screen display, which provides an instant preview of what is available. Windows 7 is designed to make computing simple and easy.

Mac OS
Mac OS is designed by Apple Inc. for the Macintosh computers. It was one of the original graphic user interface systems and set the standard for true WYSIWYG programs. Newer versions of the Macintosh operating systems use UNIX as the underlying structure, providing a very secure and stable operating environment. The most recent version is OS X Mountain Lion.
UNIX
UNIX was one of the first multi-tasking, multi-user operating systems and was originally developed in 1969. Unlike Windows or Mac OS which were designed for desktop systems, UNIX was originally developed for use on large mainframe computers and servers. Modern versions are available for desktop systems, and modern versions include a GUI; however, the GUI is separate from the operating system. (You can uninstall the GUI and still have a completely functional UNIX system.) UNIX is widely used in universities and scientific or research organizations, and is often used on machines which support engineering or computer-aided design (CAD) applications.

Linux
First developed in 1991, Linux is a UNIX-like operating system which is freely available and modifiable. Linux is packaged into formats called distributions. A distribution includes the operating system, various utilities and libraries, and even some application software. Distributions available for servers and desktop systems usually include a GUI desktop. Linux is widely used on supercomputers and high-end servers, and is very popular with entrepreneurial software developers.

Handheld Operating Systems
These operating systems are used on PDAs and Smartphones; the options for each system vary depending on the type of handheld device. Popular handheld operating systems include Symbian, Windows Mobile, Palm, iOS and Blackberry.
Embedded Operating Systems

Embedded operating systems manage and control operations on the specific type of equipment for which they are designed, such as a vehicle, a machine that controls robotic manufacturing, or a piece of medical equipment. When the equipment is turned on, the embedded operating system loads into memory. 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.

Exercise

In this activity, your instructor will show one or two short videos that introduce the power and flexibility of modern operating systems. If there is insufficient class time to view both videos, your instructor will select one. The first video compares Windows 7 to Linux, giving you a glimpse into how another operating system works. The second video demonstrates some features of an operating system for an Apple machine.

1. Instructor: Open a web browser and play one or both of the following videos:
   - Windows 7 vs. Linux: The Desktop Comparison (approx. 8 minutes)
     http://www.youtube.com/watch?v=QHCDU-CUoaQ&feature=related
   - Mac OS X Lion Demo (approx. 9 and a half minutes)
     http://www.youtube.com/watch?v=mr-e0mRyrH4&feature=related

2. Instructor: After showing the video(s), close the browser and lead a short discussion on the following questions:
   a. How do the operating systems compare to one another?
   b. Does either one of them seem significantly more feature-rich or powerful than the other?
   c. What factors might be considered when deciding which operating system to use?
   d. Which one looked most intriguing to you?

Operating System Capabilities and Limitations

Operating systems provide specific capabilities and limitations. Following are some examples:

- You can save files using names that are up to 255 characters long, enabling a detailed description of a file’s contents.
- If you are using a PC (that is, running a Windows operating system), you cannot include certain characters (\ / : * < > ? |) in a file name, whereas with a Mac only the colon cannot be used in file names.
- You can open multiple programs at the same time; the number of simultaneous programs you can run is restricted only by the amount of memory available to support each program. (You will learn more about memory later in the course.)
- You can customize an operating system to suit your personal preferences by changing the desktop background, the color, or the screensaver. In a corporate network environment, your customization options may be restricted; for example, you may not be allowed to change certain system settings, or you may be forced to adhere to company standards for colors, background picture, and so on. In some school environments, the network is set to provide a standard format for the operating system so that any custom changes revert to the default settings when the computer is shut down.
On a stand-alone computer, you may be able to install programs or download items from the Internet. On a system within an organization, you may not have sufficient rights to perform such tasks. (You may also be restricted from activities on a stand-alone computer if you do not have administrative rights for that computer.)

Your access to files located on a network could be restricted. For example, you may be able to view the contents of folders for other departments but be unable to move or delete any of these files.

Common Operating System Features

Modern operating systems not only interact with hardware and programs, but also allow for multiple users to use the same computer. The operating system can maintain separate accounts for each user, keep track of each user's documents and settings, and keep user accounts secure.

When you first turn on a Windows 7 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.

Power On / Power Off

Powering on and powering off a computer are two different processes. When you first power on (start) the computer, you press the power button. The computer runs a set of self-diagnostic programs to ensure that critical hardware is working properly, and then it loads the operating system into memory. Once the operating system is loaded, you are either logged on to your account automatically or you must log on manually.

Although you simply press the power button to turn the system on, you should never simply press the power button to turn the system off. You should always use the operating system's Power Off or Shut Down option. This option ensures that any changes you have made to the system are properly saved, and that any temporary files, which are no longer needed, are deleted.

Starting the Computer

On many desktop computers, the power switch is located at the front or top of the system case. The power switch for the monitor is usually located at the lower right corner. Do not try to feel for the switches the first time you want to start the computer – locate them visually.

Some desktop systems include a Reset button. Pushing the Reset button causes the system to restart without powering all the way down.
The location of the power button on a notebook will vary from the outside left or front side of the notebook to the top of the notebook, usually above the keyboard. Perform the following steps to correctly power on a computer:

1. Turn on everything connected to the system unit (e.g. the monitor and printer) first. This ensures a steady flow of power to the system unit when it is finally turned on. Otherwise, the power to the system unit could be interrupted each time one of these devices is turned on.

2. Turn on the system unit. Make sure that this is the last power switch you turn on. In cases where you are using a power bar to turn on all the devices, simply turn off the system unit power switch, turn on the power bar, and then manually turn on the system unit.

Several lines of information are displayed to the screen; this is the diagnostic part of the operating system checking that everything is working. The computer then starts to look for the operating system files.

**What’s Happening in the Background?**

The process of turning on the computer and loading the operating system is called *booting* the computer. The term is derived from the phrase *to pull oneself up by one's bootstraps*, and calls to mind the paradox that a computer cannot run without first loading software but some software must run before any software can be loaded.

Special computer chips called ROM-BIOS chips are used to make the bootup procedure possible. When the computer is powered on, it loads the instructions stored in ROM-BIOS into memory and then executes the instructions. (You will learn about ROM-BIOS in a later lesson.) The computer then takes an inventory of its internal and external equipment and performs several self-tests collectively known as the power on self-test (POST). The BIOS program checks and counts the memory, and then the computer looks for and loads the operating system into memory. Messages may display on the screen, or the text "Starting Windows" may appear on screen.

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. In this case, you must enter the appropriate account information to log onto the computer before you can access 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 7 Desktop displays.

**Exiting the Computer Properly**

It is important that you save your files, close open programs, and either log off or shut down the computer when you finish working in order to prevent unauthorized access to your files and, more importantly, to your company’s network.
Never turn off your computer without closing your files and open software programs in the correct manner; always shut down or log off properly. This will protect the software and data files from being corrupted or lost.

In Windows 7, you click the Start button to access the Shut Down options. You can click the **Shut down** button to turn off the system, or you can select one of the options in the menu that appears to the right of the Shut down button. When you shut down, the computer closes all open files, closes all programs, exits the operating system and then completely turns off the computer.

![Shut down options](image)

**Switch user**
Switches to another user account without logging out of the current account. Clicking this option takes you to the log on screen.

**Log off**
Closes all open items, logs out of the current user account, and returns to the log on screen.

**Lock**
Hides the desktop behind a log on screen. You can use this option if you need to walk away from your desk. When you lock the system, all your programs and files remain open and ready, but only the log on screen displays and you must enter the log on password before you can resume working. If you are working on your company network, you may be required to press **Ctrl+Alt+Delete** to enter a login ID and password to identify your account. Once your network account has been validated, the computer will unlock. In cases where there is no password associated with the currently logged on account, the user need only press **Enter**.

**Restart**
Closes all open items and restarts the computer without powering down; also called a reboot or warm boot. Restarting the system in this manner clears the memory and reloads the operating system, but does not cause the system to perform the self-diagnostic tests.

**Sleep**
Puts the computer in a state called sleep mode, where it consumes less power. When a computer is in sleep mode, the display turns off and often the computer fan stops. A light on the outside of the case may blink or turn yellow to indicate that the computer is asleep. Windows puts your work and settings into memory and then draws only a low amount of power. When you wake the computer, the screen will look exactly as it did when you put it to sleep. If you are using a desktop computer, the Sleep command may appear as Standby.

**Hibernate**
Available only on notebooks; click this option to put a notebook into a mode where it draws no power. Hibernation is like sleep mode, except that instead of maintaining the current state of all programs and files in memory, the computer writes them to the hard disk and then turns off the system. When you press the power button on a notebook that is in hibernation, the system starts back up and resumes the state it was in when you put it into hibernation. That is, your programs and files are read back into memory from the hard disk, and you can resume where you left off. Hibernate mode is designed to save battery power on notebooks and is not available on desktop systems.
Always allow Windows to complete the Shut down or Restart process properly. Reactivating the computer before Windows has completed these processes may cause files to be corrupted and result in a message, the next time you turn on the computer, indicating the machine was not shut down properly.

If a power failure occurs while a computer is in Sleep or Standby mode, you will lose any unsaved information, so be sure to save your work every time you leave the computer, even if you will not be gone for long. To turn off Standby and return to normal mode, simply move the mouse or press a key on the keyboard.

To turn off hibernation, press the Power button on the notebook.

**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 require assistance identifying/locating objects on the screen, ask your instructor for assistance. Navigating the Desktop will be covered in detail later in this lesson. For now, you will simply explore power on and power off techniques.

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 and note any messages or prompts 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 instructor for assistance if necessary.) 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 to view the Shut down options menu. (Ask your instructor for assistance if necessary.)
7. In the Shut down options menu, click **Switch user** to access the log on screen. If there are multiple 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 view 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. Again, if there are multiple accounts on the computer, an icon will display for each user account.

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.

13. In the Shut down options menu, click **Lock** to lock the system.

   Notice that the Desktop is hidden by a log on screen that displays only the account which is currently logged on.

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.

   Notice that 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. If your system has been configured to require a password upon waking, then putting the system to sleep also locks it and you will have to click the icon for your user account or enter your password to return to the Desktop. If your system has not been configured to require a password upon waking, then you are 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.

   Notice that Windows shuts down, and then starts again without performing the self-diagnostic 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.

   Notice that 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

Exam 1 - Objective 1.2

The Windows 7 Desktop will look similar to the following screen. You will notice several objects or icons on the desktop; these vary from one system to another depending on how the system was set up.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desktop Icons</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Mouse Pointer</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Taskbar</td>
<td></td>
</tr>
</tbody>
</table>

**Desktop Icons**
These are “shortcuts” you can select to open frequently used programs, folders, or files.

**Mouse Pointer**
The arrow that follows the movement of the mouse. Use the mouse pointer to identify which option you want to select or activate.

**Desktop**
This is the work area or screen on which windows, icons, menus, and dialog boxes appear. You can customize the appearance of the desktop using features such as wallpaper, themes, pictures, or solid colors, and you can create shortcuts that will take you directly to frequently used folders, files, programs, or web pages.

**Start Button**
Use the Start button to start programs, open documents, find items on your computer, and get help, as well as log off and shut down your computer.

**Taskbar**
The Taskbar is the long horizontal bar at the bottom of the screen. It includes three main sections: the Start button, the middle section (which displays the taskbar buttons for open programs and files), and the notification area (which includes a clock and icons that communicate the status of certain programs and computer settings). The taskbar is an integral part of Windows’ multitasking features.
Navigating Around the Desktop

Using a Pointing Device
You can use a pointing device such as a mouse or the touchpad to move the mouse pointer on the desktop, or to select or activate items. Using a pointing device is faster than using the keyboard to navigate to different areas or options on the screen.

- To select an item, move the mouse pointer (arrow) over top the item and then click the left mouse button once. This action is called a **single-click**.
- To activate an item, point the arrow at the item and then press the left mouse button twice in quick succession; this action is called a **double-click**.
- To display a shortcut menu with more options, point the arrow at the item and then click the right mouse button once; this action is called a **right-click**.

Using the Keyboard
A number of features can be accessed through keyboard shortcuts. For instance, to display the Start button, you can press the `Esc` button on the keyboard, press `Esc` to cancel an action, or press `Tab` to move to the next field in a dialog box. Many keyboard shortcuts are standardized between applications, and are listed in this courseware when applicable.

Using the Start Button
The Start button is the primary means of starting programs, finding files, accessing online help, logging off Windows, switching between users, or shutting down the computer. You can use the mouse or the keyboard to navigate through the Start menu.

To activate the Start button, you can:
- Click the **Start** button, or
- press `Esc`, or
- press `Ctrl` + `Esc`.

When you click the Start button, the Start menu opens:

1. **Pinned Program Area**
2. **Recently Used Programs** (dynamic items that change automatically based on programs used most frequently)
3. **Useful System Folders**
4. **Search Box**
A ▶ (triangle) with a command beside it indicates that a submenu will display when you click or point to an item. For example, when you point to the All Programs command, Windows displays a list of all programs available on your system.

To return to the main Start menu, point to or click the Back command.

Items with a ▼ (folder) icon indicate there is sub-list of options (in alphabetical order) that you can choose to start.

Items can be selected from the Start menu using the mouse or keyboard.

- If using the mouse, click the Start button once. Point to All Programs to display a list of programs you can click to start. If a program name appears in a folder, click the folder to open it and display a list of options for the program, then click the option you want to start.

- If using the keyboard, press the Esc key to display the Start menu. Then press the arrow directional keys to navigate to the required command, and when it is highlighted, press Enter to activate it. To move quickly to a main area such as the Shut Down button, press Tab until the item is highlighted and press Enter to activate it.

**EXERCISE**

In this exercise you will explore the Desktop and navigate the Start menu.

1. If necessary, start the computer and log on to Windows.
2. When the Desktop is visible, put your hand on the mouse appropriately and then slide the mouse along your desk and watch how the mouse pointer (⿴) follows the movements you make with the mouse.
3. On the keyboard, press Esc to open the Start menu.
4. On the keyboard, press Esc to close the Start menu.
5. Click the Start button to display the Start menu again.
6. In the Search field near the bottom of the Start menu, type: windows experience.

   A list of possible matches for the term you typed displays at the top of the menu.

![Control Panel](image1.png)
7. At the top of the menu, click **Check the Windows Experience Index**. Windows opens the Performance Information and Tools window on the Desktop.

The information displayed in this window will vary from system to system. This feature calculates a rating of how your system will perform based on the installed hardware and software.

8. Click the **(Close)** button at the top right corner of the window to close the window.

### Working with an Application Program

Application programs are the packages such as Microsoft Word or Windows Notepad that you use to create documents or presentations or spreadsheets. These are the programs that allow people to perform productive work using computers. Every operating system provides a method for starting application programs. In Windows, you can use the **Start** button at the lower left corner of the screen or click an icon on the Desktop.

When you start an application program, Windows (the operating system) loads a copy of the program into memory. When you close the application program, the memory that was used by the application is released and available for the operating system to reallocate to another task.

As you work with application programs, the operating system monitors your work in order to identify specific requirements. For example, if you attempt to close a file that has not been saved, the operating system will notify you and ask if you would first like to save your changes.

### Using the Taskbar

By default, the taskbar appears at the bottom of the Windows desktop. It includes the Start button, a notification area, the clock, and a taskbar button for each open program. Windows also automatically installs some commonly-used programs in the taskbar for easy access, e.g. Windows Explorer.
Taskbar Buttons | A button displays in the taskbar for each open application program, and for some built-in Windows applications, such as Windows Explorer or Internet Explorer. Click a taskbar button to activate a program or window.

Notification Area | Displays the clock, icons and shortcuts; sometimes referred to as the system tray.

Show desktop button | The Show desktop button provides quick access to the Desktop. You can point to it to make all open windows transparent, so you can see the Desktop for a moment. Or you can click it to instantly minimize all open windows on the Desktop. You can restore all the windows to their previous state by clicking it again.

The notification area displays the time and provides quick access to items such as the volume control or a wireless network connection. It can also display information about the status of the power level of a laptop battery or whether operating system updates are available. You can also control which icons are visible.

You can move the taskbar or change the way it displays as follows:

- Position the mouse pointer over a blank area of the taskbar and drag it to any side of the screen.
- To prevent changes to the taskbar, right-click any blank area of the taskbar and ensure that the Lock the taskbar feature is active. (The feature is active if its check box is checked.)
- To customize the properties for the taskbar, right-click the area you want to customize or right-click the Start button, and then click Properties.

- To reduce clutter, Windows hides icons in the notification area when you haven't used them in a while. If icons become hidden, click the Show hidden icons button to temporarily display the hidden icons.
When you open a program, a button appears in the taskbar as a visual clue that program is running. As you open or create files within that program, a preview window appears for each file when you point at the program button on the taskbar.

**Exercise**

In this exercise, you will practice using the pointing device to activate different items on the desktop, and you will work with the Start menu and the Taskbar.

1. Right-click the time in the notification area and review the items on the shortcut menu.

2. Click in an empty area of the Desktop to close the shortcut menu.

3. Right-click the time in the notification area, then select **Properties** from the shortcut menu to open a window that allows you to control system icons.
4. Scroll through the list of items to see what you can adjust, and then click **Cancel** to close the window.

5. Click the **Taskbar** in the notification area to view any hidden icons, then click in an empty area of the Desktop to close the hidden icon window.

You will now start a program using the Start menu.

6. Click **Start**, point to **All Programs**, scroll and click **Accessories**, and then click **WordPad**. Windows opens the WordPad application in its own application window. All application programs run inside their own dedicated application window.

Now try using the taskbar.

7. Click the **Internet Explorer** button in the taskbar to open a web browser. (Ask your instructor for assistance if you cannot locate the Internet Explorer button.)

8. Point at the Internet Explorer button in the taskbar.

   Windows displays a small preview window of the web page you currently have displayed on the screen. Notice also that the button now has a border around it to indicate this program is active.

9. Click the folder button to the right of Internet Explorer to open Windows Explorer.

   Windows Explorer is the file management tool for Windows. (Windows Explorer is covered later in this courseware).

10. Click the **Show desktop** button at the right edge of the taskbar to make the open windows invisible and display only the Desktop.

11. Click the **Show desktop** button again to redisplay the open windows.

12. Point at the Internet Explorer button in the taskbar.

   Notice that the web browser is still open even though you started additional programs from the taskbar.

13. With the web page preview window displayed, click the **Close** button in the preview window to close Internet Explorer without having to make the browser window active.

14. Click the **Close** button for Windows Explorer to close this program. Now only the WordPad window remains open.

15. Click the **Close** button in the WordPad window to close the application.
The Software/Hardware Relationship

Exam 1 - Objective 1.1

As you have learned, the physical components and devices that comprise the computer are called hardware. The operating system and application programs that run on the computer are called software. Although you have been only very briefly introduced to operating systems and application programs, you should understand the nature of the relationship between hardware and software.

All software, whether operating system software or application program software, is designed to work with specific types of computer hardware. As computers have evolved over time, their speed and storage capacity have steadily increased. Software is designed to take advantage of the speed and capacity offered by modern systems as these become available.

For this reason, new software (designed with modern computing systems in mind) may not run correctly on older systems if those older systems are not fast enough or cannot provide the required capacity. This situation creates an interesting dynamic: if you must use a particular version of software in order to perform a task, then that choice of software may dictate which type of computer system you can use. You may have to replace an old desktop system with a new one. On the other hand, if you do not have a choice regarding your system hardware (that is, perhaps you were given an older system and you cannot change it), then you must select software that will run on the system you have available.

As you progress through this course, you will learn more about hardware and software, and you will revisit and re-examine the software/hardware relationship.

Understanding Updates

Exam 1 - Objective 1.1

Operating systems are routinely updated for the purposes of increasing security, fixing bugs and adapting to new hardware. Application programs and plug-ins (specialized programs that run inside web browsers) are updated as well. Updates can be released in various forms. These include:

- **Patches** – a patch is a file of programming code that is inserted into an existing program to fix a known problem, or bug. Patches are designed to provide an immediate solution to a particular programming problem. Patches are intended to be only temporary solutions until problems can be permanently repaired.

- **Updates** – an update is a file or collection of software tools that resolves security issues and improves performance. Updates are released when necessary.

- **Service Packs** – a service pack is a collection of updates that is typically released after enough updates have accumulated to warrant the release. Service packs typically contain all previous updates, which include security patches, bug fixes, and new features.

Microsoft provides updates for the Windows operating system (and the Internet Explorer web browser) through a service called Windows Updates. The updates can be downloaded from the Windows Update web site.

There are different kinds of updates. Security updates or critical updates protect against security vulnerabilities and viruses and spyware. Other updates correct errors that are not related to security, or enhance functionality.
Automatic Updating

Windows Update can be set to automatically check for and install the latest updates. You can also set Windows Update to check for and download updates and then alert you that updates are ready to be installed. You can even set it not to check for updates at all.

You can manually check for (and install) available updates at any time.

Update Categories

Updates are categorized based on their importance. There are three categories for updates:

- **Important** – these updates include security and critical updates.
- **Recommended** – these updates include software updates and new or improved features. Depending on how you set up Windows Updates, recommended updates can be shown together with important updates, or with optional updates.
- **Optional** – these updates include software that you can install manually, such as new or trial Microsoft software or optional device drivers from Microsoft partners.

**Exercise**

In this exercise you will examine the settings for Windows Update. The following steps assume that you are logged on to a Windows 7 computer. If you are using a different version or different operating system, please check with your instructor on how to access the update feature for the operating system appropriately.

1. Click the **Start** button.
2. In the search field at the bottom, type: **windows update**.
3. Click **Windows Update** at the top of the menu.

![Windows Update Panel]

The panel at the left provides links for working with updates.
4. In the panel at the left, click **Change settings**.

The preceding figure indicates that updates are currently set to be installed automatically each day at 3:00 AM. This is the default setting, but may be different on your system.

5. Click the drop-down arrow to view the options for how and when to install updates.

6. Click in a blank area of the screen to close the drop-down list.

7. Click **Cancel** to exit the window without changing any settings.

   You can also check for updates manually at any time, as long as your computer is connected to the Internet.

8. In the left pane, click **Check for updates**. It may take a few minutes for Windows to check for available updates. If any new updates are available, Windows may display a screen similar to the one shown below:
You can manually install updates by clicking the Install updates button. If no new updates are available, Windows will indicate that as well.

9. Regardless of whether updates are available, click the close button at the upper-right corner of the window to close the Windows Update screen.

**Lesson Summary**

In this lesson you learned how to start a computer and log on to the operating system. You also explored the Windows environment. You should now 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
- understand the relationship between software and hardware
- understand software updates
Review Questions

1. For which of the following tasks would you use an operating system?
   a. To create a Contacts list.
   b. To delete files from a folder.
   c. To calculate the return on an investment.
   d. To edit audio and video files.

2. How can you tell where the cursor is on the Windows desktop?
   a. The Start button.
   b. Press the Spacebar to view it.
   c. The white arrow.
   d. The last button on the Windows taskbar.

3. How do you display a shortcut menu for an item on the Windows desktop?
   a. Click the left mouse button.
   b. Click the right mouse button.
   c. Double-click either mouse button.
   d. Tap the scroll wheel.

4. To see the programs installed on your system, which option from the Start button would you use?
   a. Documents
   b. All Programs
   c. Search
   d. List of Quick Start items

5. Circle in the following image which button you would use in the notification area to display the desktop immediately:

6. What is the best way to shut down the computer?
   a. Press the power switch on the computer case.
   b. Click Shut down from the Start button and let it complete the process.
   c. Press Ctrl + Alt + Delete twice.
   d. Press Esc.

7. What is a service pack?
   a. A collection of software updates.
   b. A form of spyware.
   c. A shut down mode designed to conserve battery power.
   d. An embedded operating system.