

# IC3 Spark

Courseware #  
7328-1



# 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?

### IC3 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.

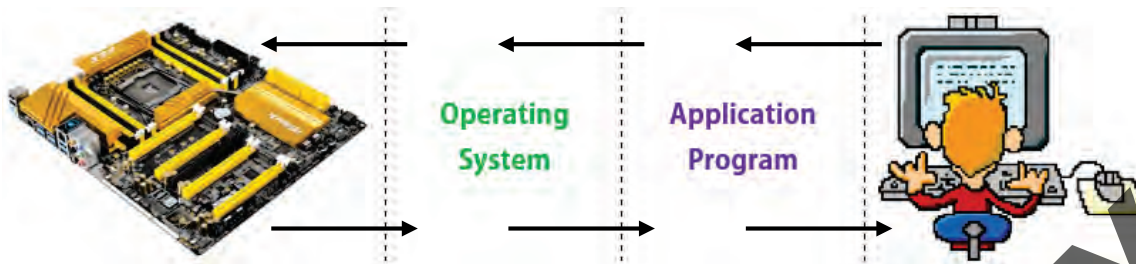
Instead of "talking" to one another directly, these parts all talk to the operating system. An *operating system* is a program in charge of communication and organization. It keeps all the working parts organized and running smoothly.

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.



```
C:\>
```

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 “goeey.”

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.

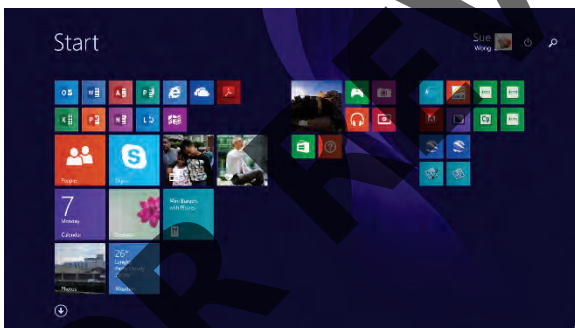
Some of the most popular operating systems include:

### 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:

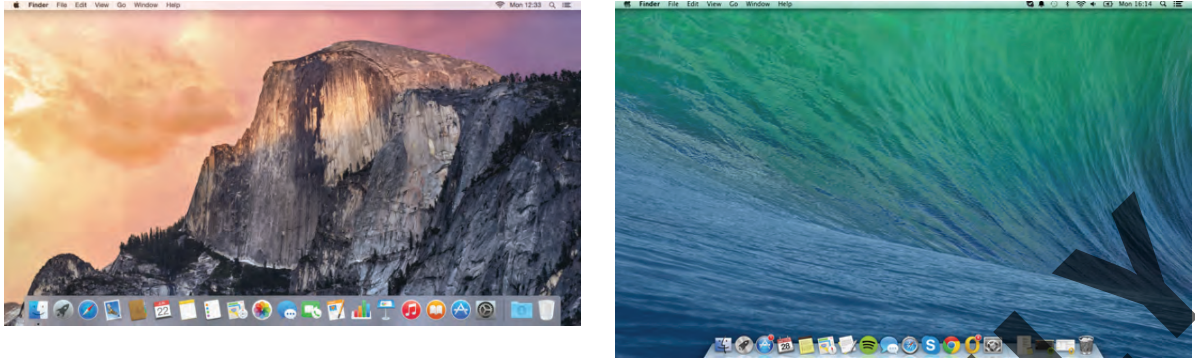


### Mac OS X

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

- **Version 10.9 – Mavericks**
- **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

## IC3 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.

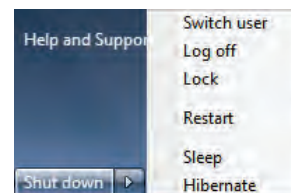
## Powering Off the Computer Properly

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.



<b>Switch user</b>	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.
<b>Log off</b>	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.
<b>Lock</b>	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.



<b>Restart</b>	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.
<b>Sleep</b>	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.
<b>Hibernate</b>	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.

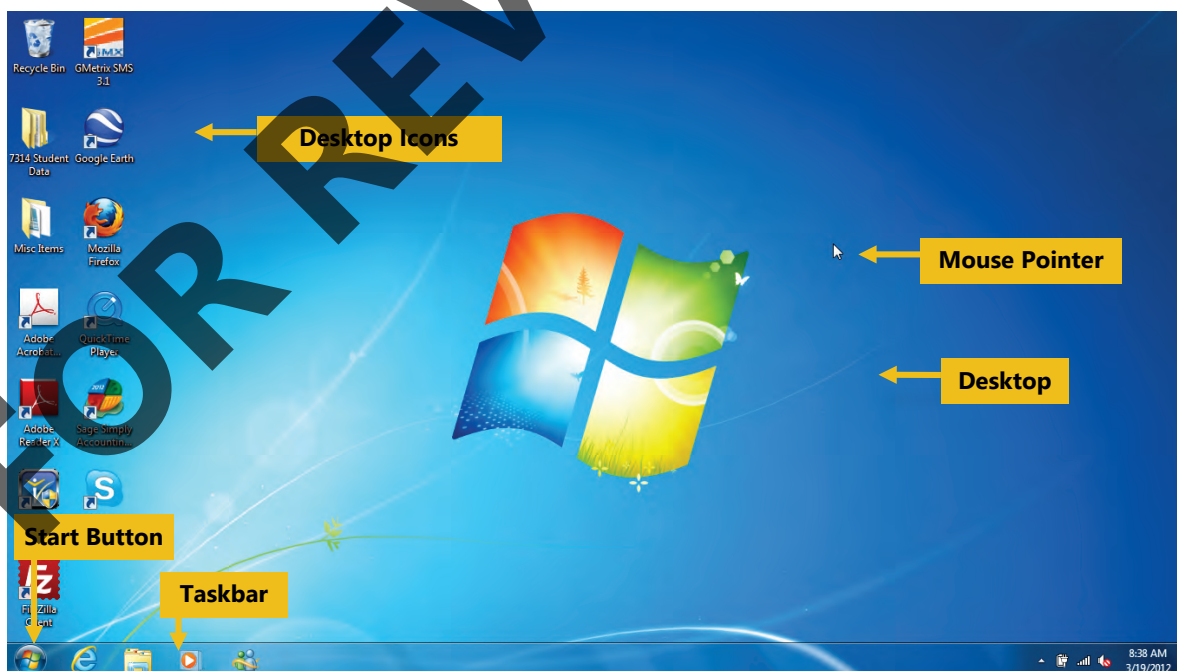
Windows shuts down, and then the system turns off.

21. Press the power button on the computer to start the system.

22. Log on to Windows.

## Looking at the Windows Desktop

### IC3 Objective 1-1.2



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

<b>Desktop Icons</b>	The “shortcuts” you can click to open frequently used programs, folders, or files.
<b>Mouse Pointer</b>	The arrow that follows the movement of the mouse and highlights icons on the screen when you point to them.
<b>Desktop</b>	The main screen on which windows, icons, menus, and dialog boxes appear. You can change the colors and pictures on the desktop.
<b>Start Button</b>	Click to start programs, open documents, find items on your computer, and get help. As you have seen, you also use the Start button to shut down your computer.
<b>Taskbar</b>	The long horizontal bar at the bottom of the screen that includes three main sections: <ul style="list-style-type: none"><li>• Start button</li><li>• middle section that displays the buttons for open programs and files</li><li>• notification area that displays symbols and alert messages</li></ul>


## Navigating Around the Desktop

### Using a Pointing Device

You use a pointing device such as a mouse or the touchpad to move the mouse pointer:

- To select an item, move the mouse pointer (arrow) over top the item and then click the left mouse button once; this is called a **single-click**.
- To activate an item, point the arrow at the item and then press the left mouse button twice quickly; this 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 is called a **right-click**.

### Using the Keyboard


A number of features can be accessed through the keyboard. For example, press the  button to open the Start menu, press **Esc** to cancel an action, or press **Tab** to move to the next field in a dialog box.

## Using the Start Button

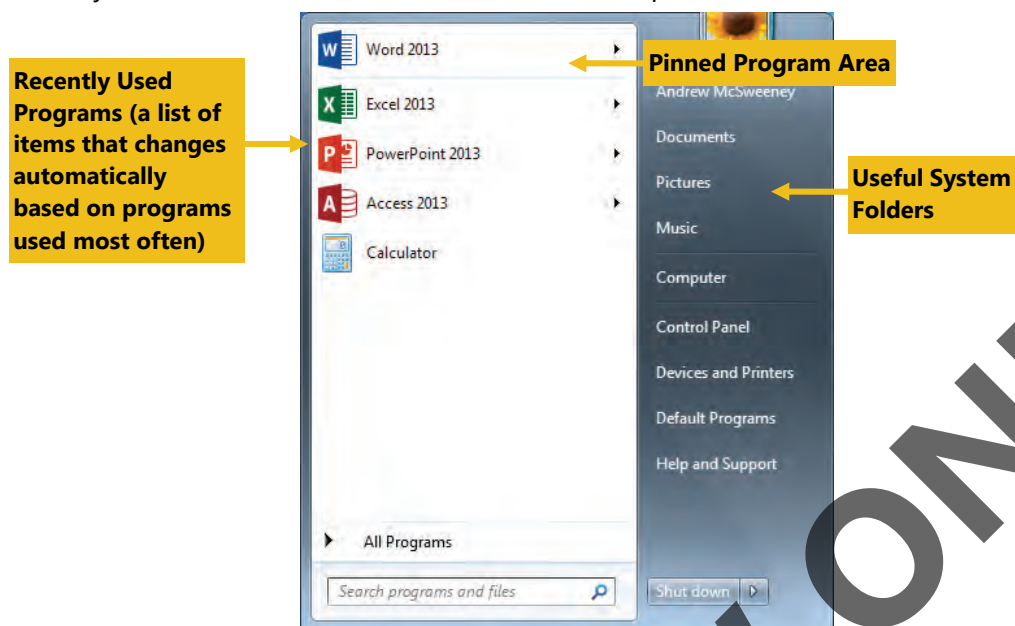


Almost everything you do begins with the Start button – including starting programs, finding files, logging off Windows, switching between users, or shutting down the computer.

To activate the Start button, you can:


- Click the **Start** button, or
- press , or
- press **Ctrl**+**Esc**.

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





- A ► (triangle) with a command beside it indicates that a submenu will display when you click or point to an item.
- 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 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  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.

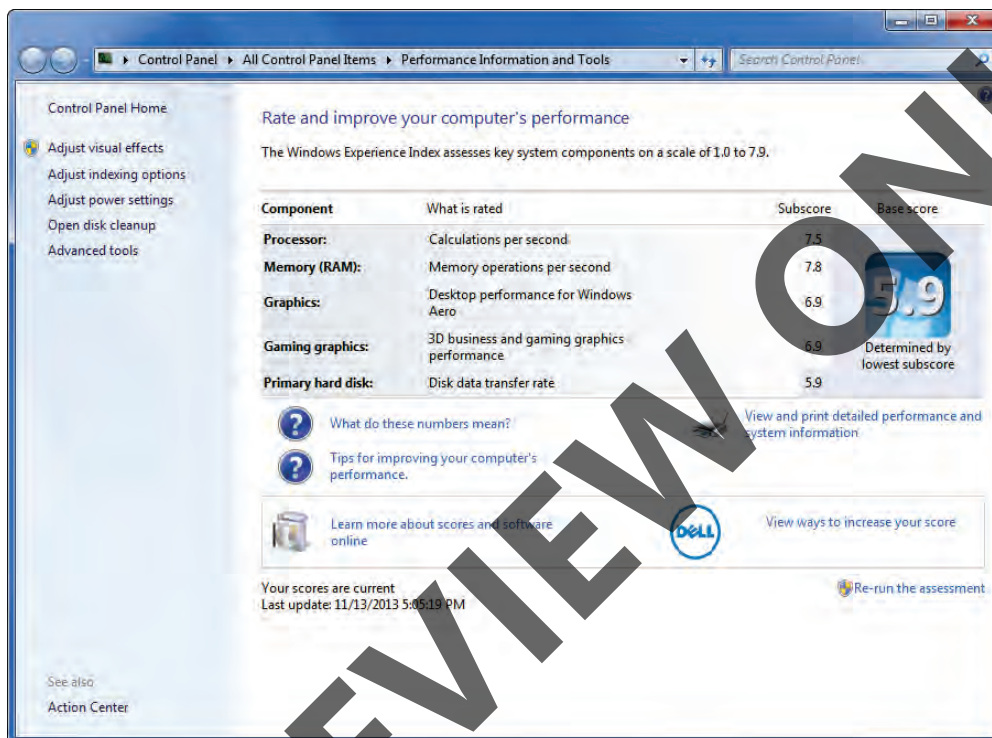
## Try It! Exercise

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 appears, put your hand on the mouse 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  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.
7. At the top of the menu, click **Check the Windows Experience Index**. Windows opens the Performance Information and Tools window on the Desktop.

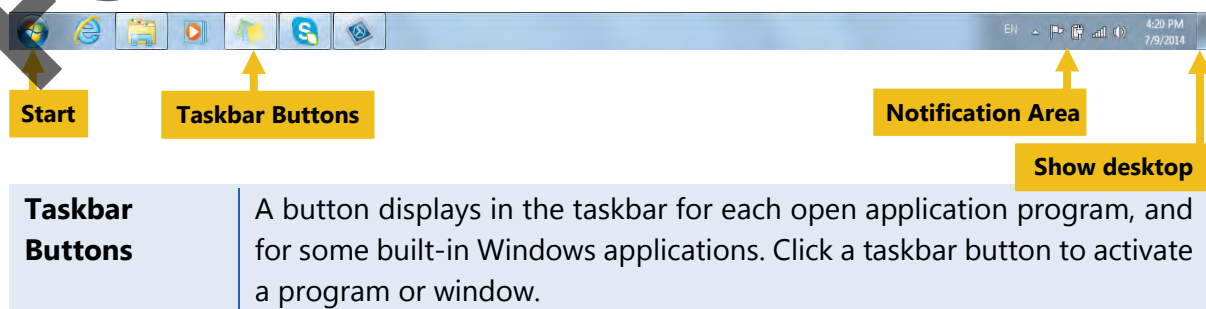


The information shown in this window will vary from system to system. This feature looks at the hardware and programs on your computer and calculates a rating of how well your system performs.

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


## Using the Taskbar

The taskbar appears at the bottom of the Windows desktop (although you can move it to either side or to the top of the window). It includes the items described below.



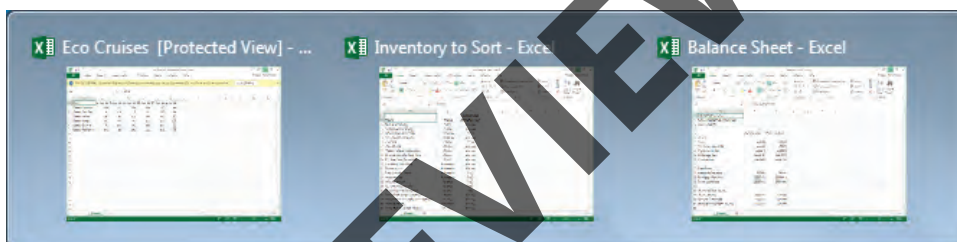
<b>Notification Area</b>	Displays the clock, icons and shortcuts; sometimes this area is called the system tray.
<b>Show desktop button</b>	Point at this button to make all open windows transparent, so you can see the Desktop for a moment, or click it to instantly minimize all open windows on the Desktop. You can restore all the windows to their previous state by clicking it again.

### Notification Area

- Displays the time and provides quick access to items such as the volume control or network connections.
- Can also display information about the status of the power level of a laptop battery.
- Can also control which icons are visible.
- Hides icons in the notification area when you haven't used them in a while; click the **Show hidden icons** button  to temporarily display the hidden icons.



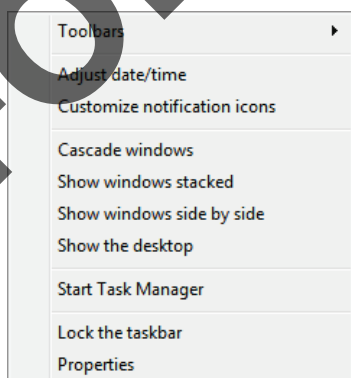
When you open a program, a button appears in the taskbar as a visual clue that program is running. As you open or create files within that program, a preview window appears for each file when you point at the program button on the taskbar.



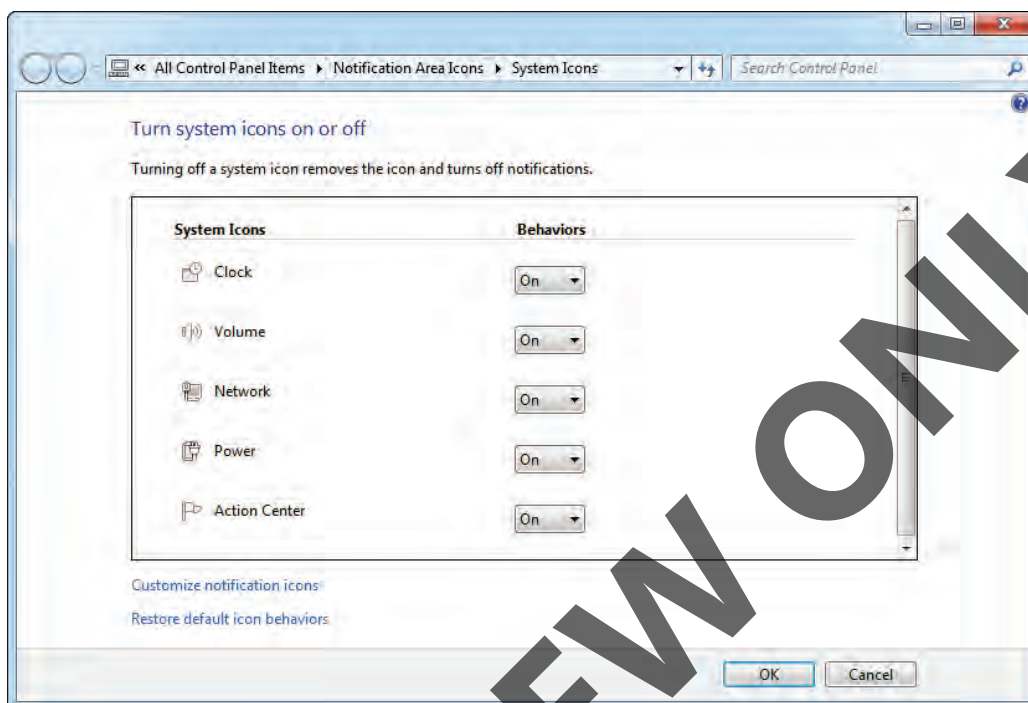
## Try It! Exercise


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 look at the items on the shortcut menu.



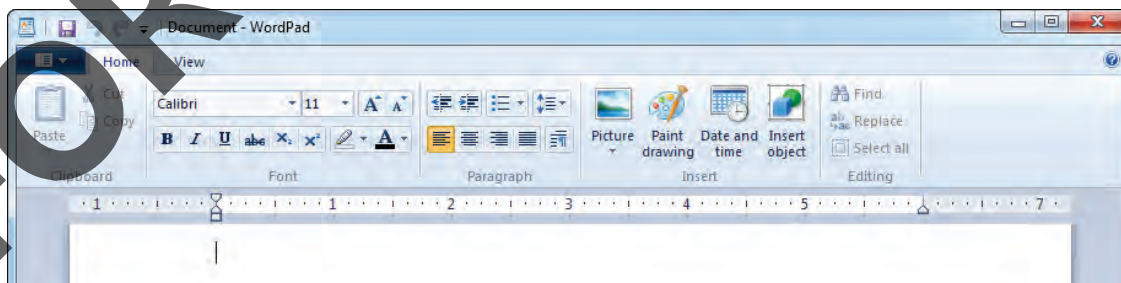
- Click in an empty area of the Desktop to close the shortcut menu.
- Right-click the time in the notification area, then click **Properties** in the shortcut menu to open a window that allows you to control system icons.



- Scroll through the list of items to see what you can adjust, and then click **Cancel** to close the window.
- Click the  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.

- 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.

- Click the **Internet Explorer** button in the taskbar to open a web browser. (Ask your teacher for help if you cannot find the Internet Explorer button.)
- Point at the Internet Explorer button in the taskbar.

Windows displays a small preview window of the web page you currently have open on the screen. Notice that the button now has a border around it to show that 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 will be covered later.)

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.

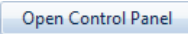
15. Click the **Close** button in the WordPad window to close the application.

## Using the Control Panel

### IC3 Objective 1-1.3

The Control Panel is the area in Windows where you can access features to customize your computer to look and run the way you like.

Use one of the following methods to access the Control Panel:

- Click **Start, Control Panel**; or
- in Windows Explorer, click **Computer** in the Navigation pane, then click  in the Command bar.

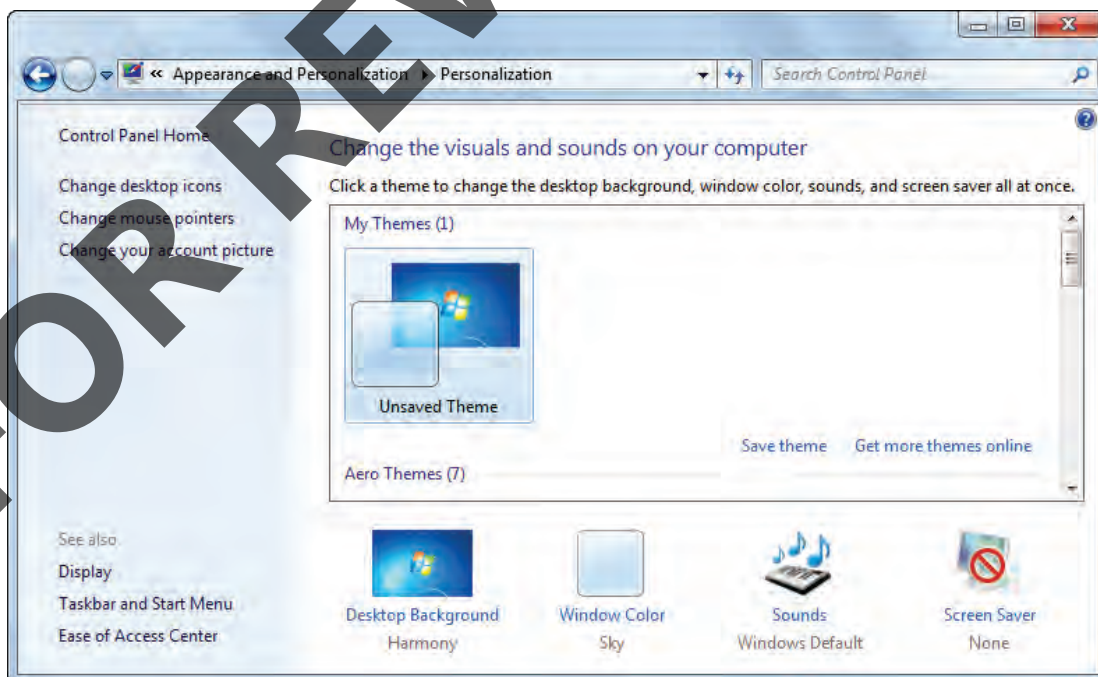




## Customizing the Desktop Display

Customizing the desktop display includes changing the background, screen saver, desktop appearance, or screen resolution. To change the display, use one of the following options:

- Click **Start, Control Panel, Appearance and Personalization, Personalization** or
- right-click a blank area of the desktop, click **Personalize**, and then click the display option to change, or
- if in one of the icon views, click **Personalization** in the Control Panel window.





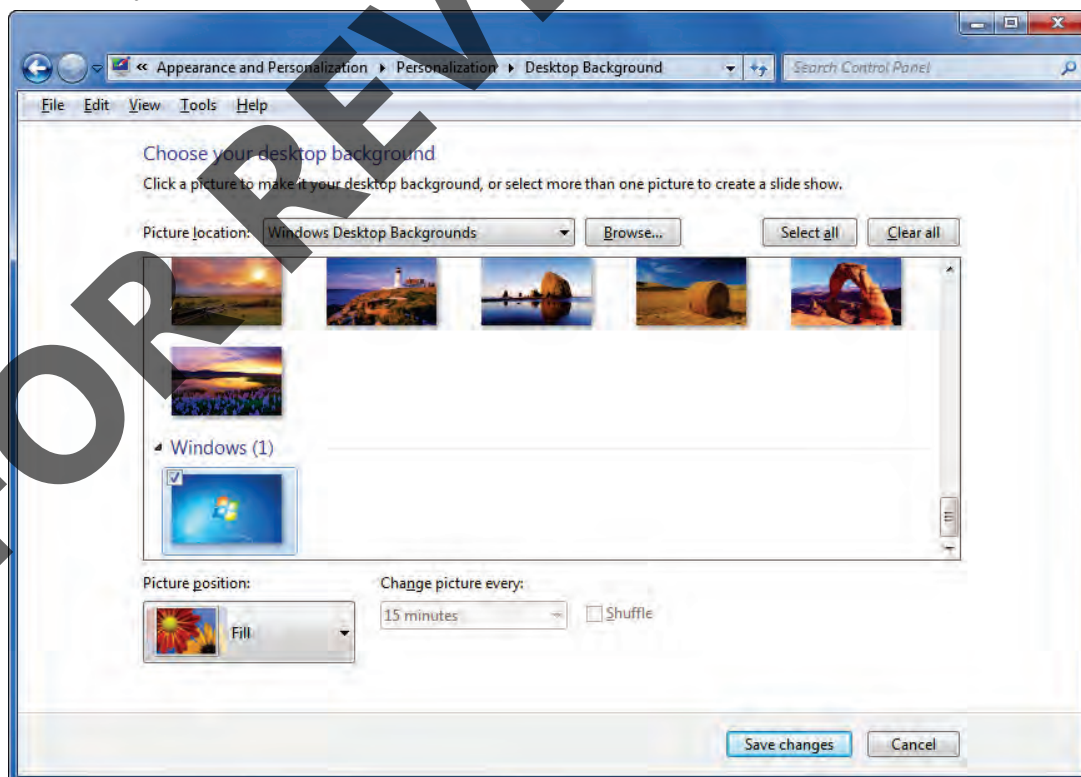
From here you can apply a theme to the desktop, customize an existing theme, or create your own theme. A theme is a combination of pictures, colors and sounds. Each theme includes a Desktop background, a window border color, sounds and a screensaver.

<b>My Themes</b>	Themes you customized, saved or downloaded. When you make changes to a theme, the new settings appear in this section as an unsaved theme.
<b>Aero Themes</b>	These include Aero glass effects and many include a desktop background slide show.
<b>Installed Themes</b>	Themes created by computer manufacturers or non-Microsoft providers. Not every system includes installed themes.
<b>Basic and High Contrast Themes</b>	Themes designed to improve computer performance or to make items easier to see. These themes use less computer memory than Aero themes, but they do not support all of the Aero features. This means, if you apply one of these themes, you may not be able to see thumbnail previews of programs when you hover over their buttons in the task bar, or you may not be able to see the Desktop when you point at the Show Desktop button.

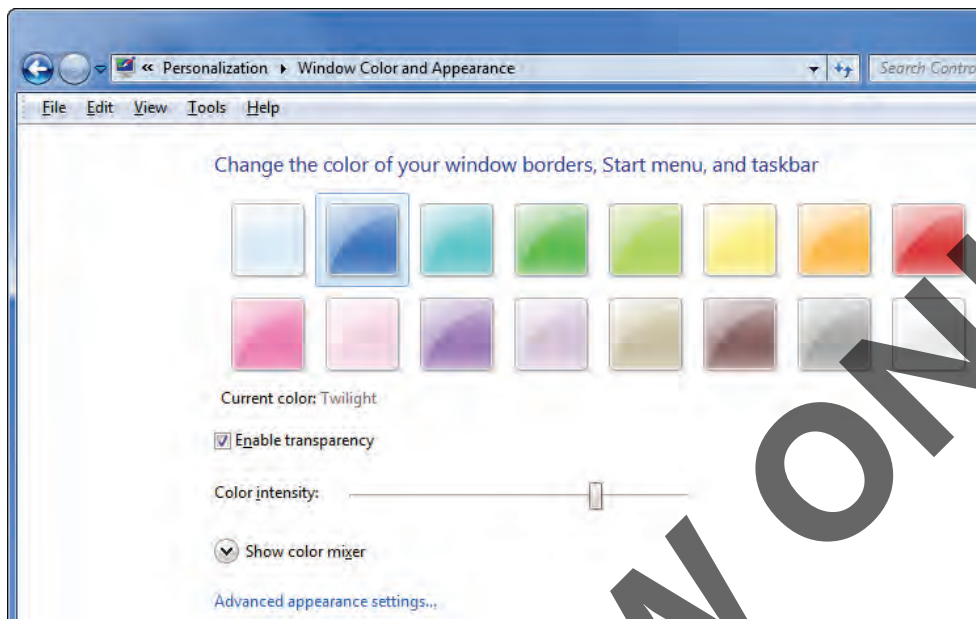
Click any theme in the dialog box to select it. For the selected theme, you can change the window color, sounds and screen saver settings.

To customize the desktop:

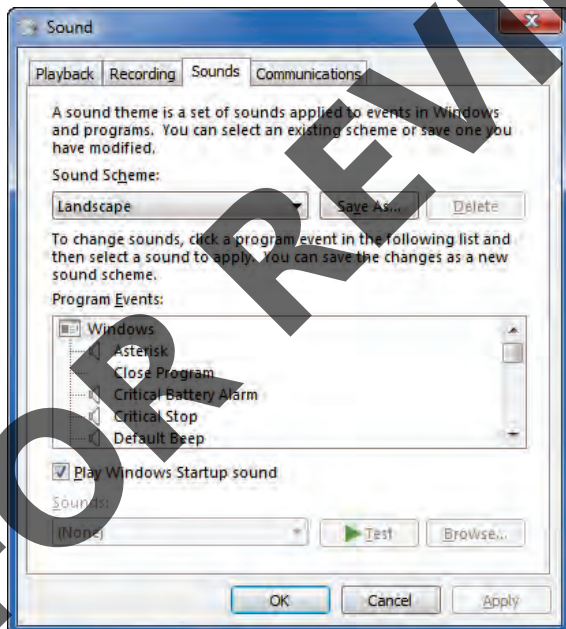
- Use the **Desktop Background** option to apply a theme or to customize how the themes will display in the list for selection, or



- use the **Window Color** option to choose a specific color for the window borders, Start menu, or taskbar. You can also adjust how deep the color is, and control whether or not the window is transparent.



- Use the **Sounds** option to apply a specific sound scheme to the theme. The sound scheme controls which sounds play when particular Windows events (such as closing a program or minimizing a window) occur.



- Use the **Screen Saver** option to select and apply a screen saver. If the screen saver includes options that you can configure, you can set those too.

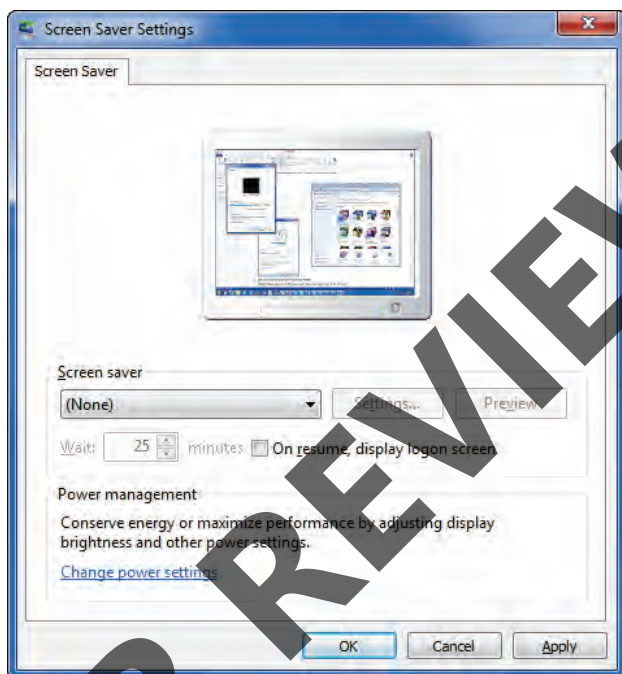
## Try It! Exercise

In this exercise you will customize the desktop by changing the display to a solid color and then applying a screen saver.

1. Close any open windows if necessary, then right-click a blank area of the desktop, and click **Personalize**.
2. Click **Desktop Background** in the area below the list of themes.
3. Click the **Picture location** field and then click **Solid Colors**. Pick a light color such as the light grey in the first row. Click **Save changes**.

The background, behind the Personalization window, changes to the color you've chosen.

4. Click **Screen Saver**.



5. Click the arrow for the **Screen saver** field and click **Bubbles**.

Windows displays a preview of this screen saver. Some screen savers (such as this one) are transparent and will still allow you to see what you were working on before the screen saver activated.

6. Ensure the **Wait** time is 1 minute. Click **OK**.
7. Do not touch your mouse for at least 1 minute so you can view the screen saver.
8. Move the mouse slightly and notice that the screen saver disappears.
9. In the list of background options, locate the Aero Themes section, then click the **Windows 7** theme to return your display to its default setting.

10. Click **Window Color** to customize this a bit more.
11. Click any color other than the default color and notice how certain elements in the windows change color.
12. Click another color and then click the **Enable transparency** check box to turn this option off.  
  
Not only do the window borders change to the new color, they also appear more solid. When transparency is enabled, you can see through the color.
13. Click the **Enable transparency** option once more to turn it back on.
14. Click **Cancel** to exit the customization options here.
15. Close the Personalization window.

## 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:

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> how an operating system works                  | <input checked="" type="checkbox"/> how to navigate around the desktop       |
| <input checked="" type="checkbox"/> how to start and exit Windows                  | <input checked="" type="checkbox"/> how to use the taskbar                   |
| <input checked="" type="checkbox"/> what the Windows desktop is                    | <input checked="" type="checkbox"/> how to start the Control Panel           |
| <input checked="" type="checkbox"/> how applications differ from operating systems | <input checked="" type="checkbox"/> how to change the display of the desktop |
| <input checked="" type="checkbox"/> how to use the Start button                    |  |

## 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 perform complex calculations.
  - d. To edit audio and video files.
2. 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

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



4. What is the best way to shut down the computer?
- Press the power switch on the computer case.
  - Click Shut down from the Start button and let it complete the process.
  - Press **Ctrl** + **Alt** + **Delete** twice.
  - Press **Esc**.
5. How can you access the Control Panel?
- From the Start menu.
  - From a file management tool such as Windows Explorer.
  - By pressing **Win** + **C**.
  - Any of the above.
  - Only a or b.



# IC3 Spark Certification

Courseware # 7328-1  
ISBN: 978-1-55332-469-0  
CCI Learning Solutions Inc.  
[www.ccilearning.com](http://www.ccilearning.com)

Similar to the IC3 Digital Literacy certification, the IC3 Spark exam covers objectives spanning basic computing skills, key applications, and the use of the Internet.

While the two certifications share a similar format and structure, IC3 Spark is specifically designed for a younger target audience, and comprises the following topics:

- Computing Fundamentals
- Key Applications
- Living Online

## Computing Fundamentals

Covers a foundational understanding of computing.

## Key Applications

Covers popular word processing, spreadsheet and presentation applications and the common features of all applications.

## Living Online

Covers skills for working in an Internet or networked environment.

## IC3 Spark is the first step

The need for basic digital literacy skills is an issue that is becoming increasingly more relevant to a younger demographic. IC3 Spark delivers a viable solution for

helping younger students to learn and adopt critical skills that will be necessary for their success in a world where technology is constantly changing.

As the first step in digital literacy, IC3 Spark is the ideal solution for helping students ignite a passion for technology and for helping them create a brighter future.



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