TECHNOSpecialist

Student Workbook

For Office 2010

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Assignment 8: About Storage Devices

If the computer could not store data, each time you turned the computer off, you would lose everything. You would not be able to install any programs or save your work.

The computer uses different storage devices to store data. Read the information to learn about floppy disks, CDs, DVDs, flash drives, and hard disks.

In the next assignment, you will add slides to the information package that explains storage devices to customers.

Storage Mediums

Over the years, the technology used to store information has changed dramatically. The storage mediums used today are faster, have a larger capacity, are more durable, and in many cases are more portable, than those used in the past.

Each storage medium has a surface that stores information. This surface is divided into small sections that are used to store data. The reason a storage medium is divided into sections is so the computer knows where to look for the information stored on the disk.

sector   tracks
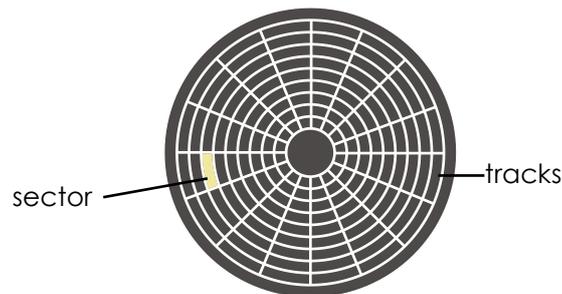
A disk is divided into sectors that are shaped like wedges.
Data is stored in each sector.

There are different types of storage mediums used to store data. Often the type used depends on the purpose. For example, there are floppy disks, CDs, DVDs, flash memory, and the hard disk.

Floppy disk

Many years ago, a floppy disk was used for data storage. A floppy disk is a removable disk that stores information magnetically using a floppy disk drive. The floppy disk used to store up to 1.44 MB of information. Since this is not very much, the floppy disk is now rarely used by people. In fact, most computers today do not contain a floppy drive. Despite not being used anymore, the floppy disk remains the symbol used in most programs for the *Save* tool.
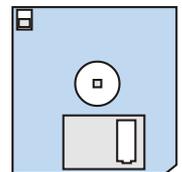
1.   Does your computer have a floppy disk drive?

2.   Do you use a floppy disk drive to store information? Why or why not?

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CD and DVD

CD is a short form for compact disc and DVD is a short form for digital versatile disc. Both are round storage devices that are about 4.75 inches (12 cm) in diameter. They are commonly used to store software programs, music files, and movies. As well, they can be used to save a back up of important data files.

How is information read and written to a CD?

Data on a CD or DVD is read and written using an optical drive. Once a CD or DVD is inserted into an optical drive, a motor starts to spin the disc. A laser scans the surface looking for changes in light. It is the lightness or darkness of the surface that tells the computer about the data that is stored on the disc.

Both a CD and DVD are made out of plastic. Information is added or *written* to the disc with a laser that heats the surface. This is why creating a disc is called *burning*. Information is stored in a track that is in the shape of a spiral. The track goes from the center of the disc to the outer edge.

Is burner speed important?

CD and DVD optical drives are rated based on burning speed. The burning speed is how many times faster the drive spins the CD or DVD when burning data to the storage medium than when it is just reading a CD or DVD. Reading a CD or DVD is 1x. Therefore, a burning speed of 16x means that the optical drive is spinning the CD or DVD 16 times faster than normal. A faster burning speed is preferred. However, to avoid errors, it is often a good idea to burn a CD or DVD at a speed slower than the maximum rate.

Why does a DVD hold more data than a CD?

Although a CD and DVD look the same, each device can hold different amounts of data. For example, a CD can hold 650 MB of data, whereas a DVD can store 4 GB. Data on a CD or DVD is stored in tracks. In the case of a DVD, the tracks are thinner than on a CD, which means more information can be burned onto the same size surface.

Why are there different types of CDs and DVDs?

There are several types of CDs and DVDs. Some CDs and DVDs are designed so that you can look at the information on the disc, but you cannot edit, add, or delete files. Others are designed so you can add data but afterwards the data is permanent and cannot be edited or deleted. Still others can add, edit, and delete files repeatedly.

> CD-ROM and DVD-ROM: ROM stands for *read only memory*. Information on the disc is permanent and cannot be added, edited, or deleted. This method of data storage is used for software, audio CDs purchased from a store, or a movie that you rent.
>
> CD-R and DVD-R: R that stands for *recordable*. Information on the disc can be added, but once on the disc it is permanent. This type of disc is good if you want to burn data and then never change the content. For example, if you were making a custom music CD, video of a family trip, or back up of important data files you would use a CD-R or DVD-R.
>
> CD-RW and DVD-RW: RW stands for *recordable* and *writeable*. These discs can have files added, edited, and deleted from the disc over and over again.

3.   What advantage is there to using a DVD to store data in comparison to a CD?

Flash Memory

Flash memory is a computer chip that is used to store information. Flash memory is commonly used in cameras, fax machines, and other electronic devices to save photos, music, user settings, or other data. Flash memory chips are also used in a storage device called a *flash drive* or *USB drive*. A flash drive is a small device the size of a thumb.

A flash drive contains a flash memory chip that is used to store data. The flash memory chip is protected by a small plastic case. The plastic case has a USB slot at the top that is used to plug the flash drive into the USB port on a computer. Information can then easily be read or written to the flash drive. Since the device is plugged into the USB slot, it is sometimes called a *USB* drive.

Storing data happens in a *flash*! Data on a flash drive is added or erased with electronic pulses. Flash memory has a grid of columns and rows that divide the surface into blocks that can be erased or written to without affecting the other areas. Flash memory offers a quick method of data storage, because the information is erased one block at a time, instead of one byte at a time.

The use of the flash drive continues to grow in popularity. This is likely because it is an affordable portable device that can hold lots of information. You can purchase a flash drive that holds 1GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB or more! It is easy to see why more and more people are using it to store files instead of using a CD or DVD.

4.   Why do you think the device is called a *flash* drive?

5.   Do you have a flash drive? If yes, what files do you store?

6.   List three reasons why flash memory is a popular storage medium.

> A flash drive can be called a thumb drive, USB drive, or flash drive.

Hard Disks

A hard disk or *hard drive* is a storage medium used to store programs, user settings, and files. Hard disks were invented in the 1950s. They started as large disks up to 20 inches in diameter holding just a few megabytes. Today, they are the size of your hand and can hold one terabyte of data.

Nearly every desktop computer and server in use today contains one or more hard disks. Every mainframe and supercomputer is normally connected to hundreds of them. The hard disk is used to store digital information in a relatively permanent form. They give computers the ability to remember things when the power goes out.

Hard disks have an aluminum or glass disk that is layered with a magnetic recording material. Information is read and written to the disk using read/write heads.

How does a hard drive work?

When the computer requests information the circuit board inside the hard drive box, tells a motor to spin, which causes the hard disk or platter to turn. A mechanism moves an arm that holds the read/write heads. The arm moves quickly from the center of the disk called the hub to the outer edge of the platter to locate the information in the proper sector. Once the information is found, the read/write heads send the information to the circuit board, which then relays it to the computer, or more specifically, the CPU. This all happens without the read/write heads ever touching the platter. Instead, they rest directly over the platter.

Hard disks have dramatically increased their storage capacity over the years, although the overall design has changed very little. *How is this possible?*

The difference between hard disks from the past and today are the size of the heads. Since the heads are made tinier, it is possible to divide the platter into smaller sectors. The more sectors, the more data storage.

Year: 2006

500 GB

Year: 1992

6 GB
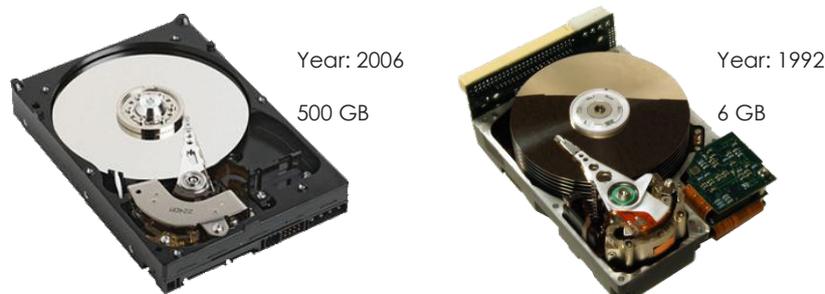
There are three ways to measure the performance of a hard disk:

- **Storage Capacity:** amount of bytes of data the hard disk can store
- **Data Rate:** number of bytes per second that the drive can deliver to the CPU
- **Seek Time:** amount of time it takes between the time that the CPU requests a file and the first byte of the file starts being sent to the CPU

7.   Why does a computer need a hard drive?

Assignment 9: Information Package and Storage Devices

> You are going to create a set of slides in the information package that explains to customers about storage devices. For each device, you will explain the purpose, offer recommendations about purchasing, and include a picture.

Open Information Package in Microsoft PowerPoint

- ⌐ Open Microsoft PowerPoint.

- ⌐ Click the *Office Button* and select *Open*.

- ⌐ Go to the place where you saved your work. Select the **company name** file and then click *Open*.

View Slide 2

- ⌐ To move to Slide 2 press the PAGE DOWN key on the keyboard or click Slide 2 in the Outline pane.
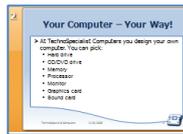
Create a Slide Explaining the Purpose of Storage Devices

- ⌐ On the Home tab, click the *New Slide* arrow.

- ⌐ Select *Title and Content* from the gallery.

- ⌐ In the *Click to add title* placeholder, type **About Storage Devices**.

- ⌐ In the *Click to add text* placeholder, answer the question, **"Why does a computer need storage devices?"**. Press ENTER.

- ⌐ Type **There are several types of storage devices including:** Press ENTER.

- ⌐ Press TAB to indent the bullets. Create a list of storage devices:

  - o **Floppy Disk Drive**

  - o **Optical Drive**

  - o **Flash Drive**

  - o **Hard Drive**

Create Slides About Types of Storage Devices

- On the Home tab, click the *New Slide* arrow.

- Select *Two Content* from the gallery.

- In the *Click to add title* placeholder, type **Floppy Disk Drive**.

- In one of the content boxes, answer the following questions:

  o What is the purpose of a floppy disk drive?

  o Why is the floppy disk drive rarely used today?

  o Most computers no longer come with a floppy disk drive. When would it be necessary to include a floppy disk drive?

- In the second content box, click *Clip Art*.

- Type **floppy disk** in the search box and then click Go.

- Click on a clip art in the pane to add it to the slide.

- **Make a slide for each storage device.** Include a clip art of <u>each</u> device on the slide.

> You can use your skills to format the clip art. Double click on the clip art. Use the commands on the *Picture Tools* tab.

Optical Drive

  o What is the purpose of an optical drive?

  o What should a person look for when selecting an optical drive?

Flash Drive

  o What is a flash drive?

  o Why are flash drives popular?

Hard Drive

  o What is the purpose of a hard drive?

  o What should a person look for when selecting a hard drive?

> You need to write about each storage device using descriptions that people who do not know a lot about the computer will understand.

Save Changes to the Information Package and Exit Microsoft PowerPoint

- Click *Save* on the Quick Access Toolbar.

- Click the *Close* button.

Assignment 10: Comparison of Storage Devices
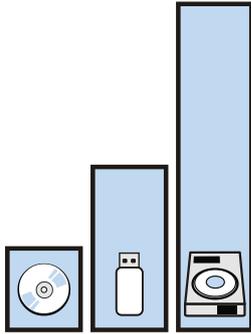
Follow the instructions to compare the storage capacity of a CD, DVD, flash drive, and hard disk.

In the following assignment, you will add this information to the Information Package using a table.

Storage Capacity of a CD

- ᕱ Insert a CD that has content into the optical drive.

- ᕱ Click *Start*. Click *Computer*.

- ᕱ Right click on the optical drive. Click *Properties*.

- – The amount of used and free space will be listed.

■ Used space:	651,511,808 bytes	621 MB
■ Free space:	0 bytes	0 bytes
Capacity:	651,511,808 bytes	621 MB
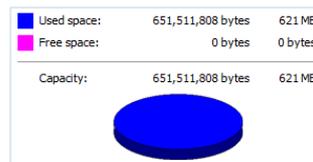
> A CD-ROM will have no free space because it cannot have data added to the device. However, a CD-RW will have free space because data can be added, deleted, and changed.

1. A CD can hold 650 MB.

    How much space is used on the CD?

Storage Capacity of a DVD

- ᕱ Insert a DVD that has content into the optical drive.

- ᕱ Click *Start*. Click *Computer*.

- ᕱ Right click on the optical drive. Click *Properties*.

- – The amount of used and free space will be listed.

■ Used space:	3,428,292,608 bytes	3.19 GB
■ Free space:	0 bytes	0 bytes
Capacity:	3,428,292,608 bytes	3.19 GB

2. A DVD can hold 4 GB.

    How much space is used on the DVD?

Storage Capacity of a Flash Drive

     🖱 Insert a flash drive into a USB slot on the computer.

     🖱 Click *Start*. Click *Computer*.

     🖱 Right click on the optical drive. Click *Properties*.

     – The amount of used and free space will be listed.

■	Used space:	458,883,072 bytes	437 MB
■	Free space:	1,586,528,256 bytes	1.47 GB
	Capacity:	2,045,411,328 bytes	1.90 GB
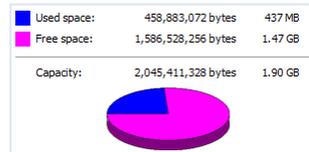
3.   A flash drive can hold 1 GB, 2 GB, 4 GB, 8 GB, 16 GB, 32 GB, or more!

     What is the capacity of the flash drive?

     How much space is used on the flash drive?

     How much space is free on the flash drive?

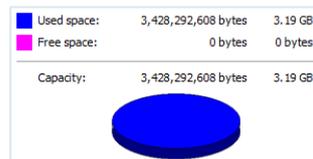**Storage Capacity of a Hard Disk**

     🖱 Click *Start*. Click *Computer*.

     🖱 Right click on the C: drive. Click *Properties*.

     – The amount of used and free space will be listed.

■	Used space:	98,278,625,280 bytes	91.5 GB
■	Free space:	210,997,813,248 bytes	196 GB
	Capacity:	309,276,438,528 bytes	288 GB
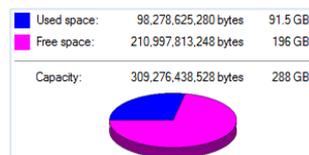
4.   A hard disk can hold 250 GB, 500 GB, 1 TB, or more!

     What is the capacity of the hard disk?

     How much space is used on the hard disk?

     How much space is free on the hard disk?

Assignment 11: Information Package and Comparison Chart

You will create a table that compares the storage capacity of a floppy disk, CD, DVD, flash drive, and hard drive.

Open Information Package in Microsoft PowerPoint

- ⌖ Open Microsoft PowerPoint.

- ⌖ Click the *File* tab and select *Open*.

- ⌖ Go to the place where you saved your work. Select the **company name** file and then click *Open*.

View the Last Slide

- ⌖ To move to the last slide use the PAGE DOWN key on the keyboard or click the last slide in the Outline pane.

Insert a Table for the Comparison Chart

You will insert a table onto the slide. It will have **two** columns and **six** rows.

- ⌖ On the Home tab, click the *New Slide* arrow.

- ⌖ Select *Title and Content* from the gallery.

- ⌖ In the *Click to add title* placeholder type **Comparison of Storage Capacity**.

- ⌖ Click *Insert Table* on the placeholder.

- ⌖ Type in the number of columns and rows for the table.

2 columns

6 rows
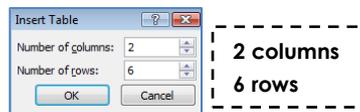
- ⌖ Click *OK*.
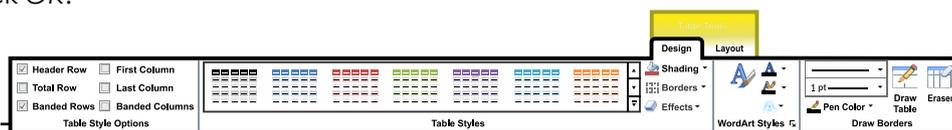
Look for the *Table Tools* contextual tabs that show up on the ribbon. There are **two** contextual tabs– the Design and Layout tabs.

Apply a Style to the Table

You can change the style of the table. Pick a style from the gallery.

Pick a Style

- 🖱 On the *Table Tools Design* tab find the *Table Styles* group.

- 🖱 Click the *More* arrow to see more designs.

More

- 🖱 Click on a style you like.

Change the Shading, Borderlines, and Effects

You can customize the table by changing the shading color, borderlines, and effects.

- 🖱 Select the table.

- 🖱 Click inside a cell <u>or</u> click and drag the mouse to select a row or column.

- 🖱 On the *Table Tools Design tab*, find the *Table Styles* group. Try the following commands to change the way the table looks. After using each command, put a checkmark in the box. ☑
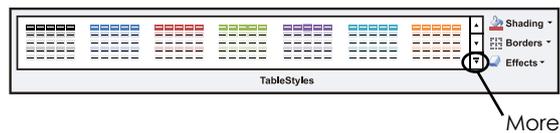
    - ☐   Fill a cell with a color, gradient, texture, or picture.

    - ☐   Apply borderlines to each cell.

    - ☐   Add an effect to the table such as a cell bevel, shadow, or reflection.

- 🖱 **Use your skills to format the table.**

You can edit the borderline color, line style, and width using the commands in the *Draw Borders* group on the Table Tools Design tab.

To exit *Draw Borders,* click *Draw Table*.
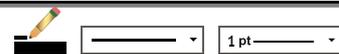
Resize the Table

You need to resize the table to make if fill the slide. When you resize the table, the height of each cell is adjusted, to make each the same height.

- Place the mouse pointer over the bottom sizing handle.

- Click and drag downwards to make the table larger.

Add Table Headings to the Top Row
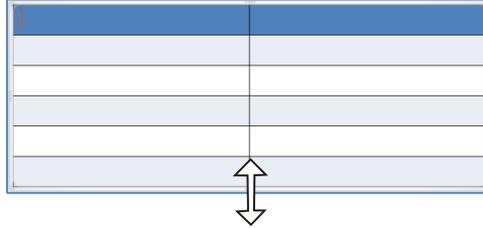You need to add the headings **Storage Device** and **Storage Capacity** to the top row of the table. You will then change the alignment of the cells to make the headings look great.

- Click inside the top left cell. Type **Storage Device.**

- Press TAB. Type **Storage Capacity**.

- Place the mouse pointer beside the top row. When the mouse pointer changes to a black arrow, click the mouse to select the row.

Storage Device	Storage Capacity

- Click the *Table Tools Layout* tab, find the *Alignment* group. Try each command to change the alignment of the words in the cell. After using the command put a checkmark in the box. ☑

- ☐ Align the words to the left side of the cell.

- ☐ Align the words in between the left and right side of the cell.

- ☐ Align the words to the right side of the cell.

- ☐ Align the words to the top of the cell.

- ☐ Align the words in between the top and bottom of the cell.

- ☐ Align the words to the bottom of the cell.

- **Use your skills to align the words in the cells.**

Add Information About the Storage Devices to the Table

You need to add the storage devices to the table.

⌨ In the LEFT column under the *Storage Device* heading add:

- o **Floppy Disk**
- o **CD**
- o **DVD**
- o **Flash Drive**
- o **Hard Drive**

⌨ In the RIGHT column under the *Storage Capacity* heading, add the amount of information stored by each device.

⌨ Use your skills to change the alignment of the words in the cells.

> You can resize the width of columns. Place the mouse pointer over the center borderline. When it changes to a two-way arrow, click and drag to the left or right.

Complete the Storage Device Comparison Slide

⌨ Use your skills to finish the slide. Complete the checklist:

- ☐ Does the slide title say *Comparison of Storage Capacity*?
- ☐ Does the table have headings that are easy to read?
- ☐ Does the slide have a list of storage devices?
- ☐ Is the storage capacity for each storage device accurate?
- ☐ Does the table have a style that makes the information easy to read?
- ☐ Is the information aligned in the table cells?

Save Changes to the Information Package and Exit Microsoft PowerPoint

⌨ Click *Save* on the Quick Access Toolbar.

⌨ Click the *Close* button.

Session 2 Review: Data Storage

What storage medium is right for the job?

☐ DVD   ☐ flash drive   ☐ CD

1. Kyle works for a company that needs to create a back up of important files. They need to back up 3.5 GB of data. What storage medium is right for the job? Why?

2. Cheryl is working on the school year book. She needs to share the photos and articles with a friend. There are many files and they take 8 GB of storage space. What storage medium is right for the job? Why?

3. Alex wants to install a program. Where should he store the program on his computer? Why?

/6

Match each term with the correct description.

_____ 4. MB   a. A language used by the computer that uses 1's or 0's.

_____ 5. Sectors   b. The smallest unit of data a computer can understand.

_____ 6. Bit   c. Eight bits.

_____ 7. Binary Code   d. Short form for megabyte.

_____ 8. Byte   e. A location where data is stored on a disk.

/5