



STORAGE & FILE CONCEPTS, UTILITIES

(Pages 6, 150-158 - Discovering Computers & Microsoft Office 2010)

- I. Computer files – data, information or instructions residing on secondary storage are stored in the form of a file.
 - A. Software files are also called program files. Program files (instructions) are created by a computer programmer and generally cannot be modified by a user. It's important that we not move or delete program files because your computer requires them to perform operations. Program files are also referred to as “executables”.
 1. You can identify a program file by its extension: “.EXE”, “.COM”, “.BAT”, “.DLL”, “.SYS”, or “.INI” (there are others)

or a distinct program icon.



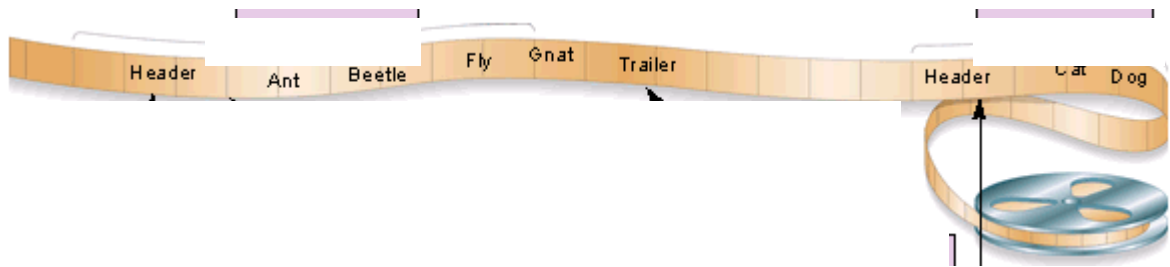
- B. Data files - when you select a “save” option while using an application program, you are in essence creating a data file. Users create data files.
 1. **File naming conventions** refer to the guidelines followed while assigning file names and will vary with the operating system and application in use (see figure 4-1). File names in Windows 7 may be up to 255 characters, you're not allowed to use reserved characters or certain reserved words. File extensions are used to identify the application that was used to create the file and format data in a manner recognized by the source application used to create it.

FIGURE 4-1 File Naming Conventions				
	DOS and Windows 3.1	Windows 95/98/NT/2000	MacOS	UNIX/Linux
Maximum length of filename	8-character filename plus an extension of 3 characters or less	255-character filename including an extension of 3 characters or less	31 characters (no extensions)	14-256 characters (depending on UNIX/Linux version; including an extension of any length)
Spaces allowed	No	Yes	Yes	No
Numbers allowed	Yes	Yes	Yes	Yes
Characters not allowed	/ [] ; = " \ : , * ?	\ ? : " < > * /	None	! @ # \$ % ^ & * { } [] " \ ' ; < >
Filenames not allowed	Aux, Com1, Com2, Com3, Com4, Con,	Aux, Com1, Com2, Com3, Com4, Con,	None	Depends on the version of UNIX/Linux

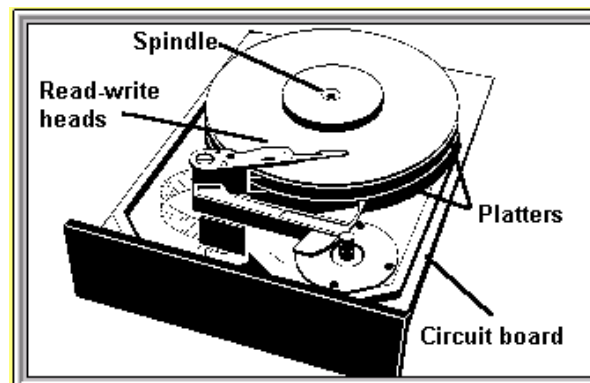
II. Selecting secondary storage media

- A. There are three type of technologies for storage devices: magnetic, optical, & solid state, there are advantages & disadvantages between them. When selecting a secondary storage device, certain factors should be considered:
1. Capacity - the capacity of computer storage is expressed in bytes. Hard disks provide the greatest storage capacity of any medium. Flash drives & DVD disks provide the greatest capacity of portable or mobile disks. Least capacity? Floppy diskettes (legacy) Common byte units are as follows:
 - a. Kilobyte (KB) - one thousand bytes
 - b. Megabyte (MB) - one million bytes
 - c. Gigabyte (GB) - one billion bytes
 - d. Terabyte (TB) - one trillion bytes
 - e. Petabyte (PB) – one quadrillion bytes
 - f. Exabyte (EB) - one quintillion bytes
 2. Access time – The time it takes the CPU to access storage or recorded information is measured in fractions of seconds:
 - a. millisecond – 1/1000 of a second
 - b. microsecond – 1 millionth of a second
 - c. nanosecond – 1 billionth of a second
 - d. picosecond – 1 trillionth of a second
 - e. solid state devices provide the quickest access, magnetic tape the slowest
 3. Cost – Like anything else, storage devices differ in price. Magnetic floppies and tape are the most affordable, hard drives are the most expensive simply because they have the greatest capacity. Byte for byte though, Solid State media is more expensive.
 4. Durability – optical and solid state storage devices are considered more durable when compared to magnetic storage. Data is considered more secure on non-magnetic devices
 5. Versatility – DVD drives can read all or any form of optical disks, this is the only device that can support multiple media types
- B. Magnetic storage - Magnetic devices are comprised of disks and tape. The surface of the magnetic media records data in the form of magnetic particles, the surface uses a special magnetic oxide coating which is used to retain the particles. The magnetic oxide coating functions as a magnet to retain information. A key component in magnetic storage is the “read and write” head (see illustration on next page) which is what records and reads data. Magnetic storage is permanent but modifiable, normal life expectancy typically does not exceed 3 years. The following are examples of magnetic storage media:

1. Magnetic tape – is comprised of strands of plastic Mylar. (much like a cassette tape) Magnetic tape is used primarily as a backup system because the access to information is very slow. Characteristics of tape include the following:



- a. Inexpensive, portable, large volume storage capacity
 - b. Data is stored & retrieved sequentially (one record after another) / slow access to information
 - c. Requires a tape unit or drive containing a “read and write” head
 - d. Most PC tape units are external
2. Hard disk – By far the most common secondary storage device for a personal computer. A hard drive (disk) is comprised of one or more metallic platters varying in size and capacity. A hard disk may be fixed (internal) or removable (external). Some other hard disk characteristics include the following:



- a. The disk surface is more durable than tape or floppies, therefore data is considered more secure when compared to recorded information on tape or floppies
- b. Direct access storage device (DASD) – files may be accessed directly, unlike tape where access is sequential. This is why access to information on disk is much quicker because the “read and write” head does not have to read any preceding record information before it locates the one you are attempting to retrieve. The hard drive uses a directory called the "FAT" to identify a file's location
- c. Requires a disk drive containing a “read and write” head. The faster the drive's disk platter spins the faster the computer can access and record data. The speed of the drive is measured in “revolutions per minute” (rpm)

- d. External drives come in different varieties and capacities, they serve many purposes, they can allow a computer to function with different operating systems or the drive can serve as a backup device.
- e. A head crash can result in serious loss of data. Most disk drives are guaranteed for no more than three years. Disk drives contain mechanical parts that over time simply fail (wear & tear). When the parts fail there is no way to retrieve data so you lose everything on your hard drive.

A head crash can also occur when contaminants (like smoke, dust, hair, etc.) enter your disk drive and come in contact with the “read and write” head. The contaminants can cause a scratch to be placed on an area of disk where information is recorded. Because of the damage to the disk the data in that area can no longer be read which results in the data being lost. Fluctuations in electrical power can also contribute to a head crash.

- 3. Floppy diskettes (legacy device) – Floppies consist of a round piece of plastic protected by an outer covering. Floppies vary in size and storage capacity. Before CDs & flash drives, everybody used floppies, most computers had 2 floppy drives (A: & B:).



- a. 5.25 Double sided double density (DS/DD) can store up to 360 KB
- b. 5.25 Double sided high density (DS/HD) can store up to 1.2 MB
- c. 3.5 Double sided double density (DS/DD) can store up to 720 KB
- d. 3.5 Double sided high density (DS/HD) can store up to 1.44 MB
- e. Very inexpensive but provide very low storage capacity
- f. Provide direct access to data (DASD)
- g. Portable or mobile
- h. A variation of the floppy is the “zip disk” which is like a “super” floppy capable of storing data in capacities of 100 MB, 250 MB, and 750 MB. Special drives are required for “zip” disks. This device is also considered legacy and never really caught on, it was expensive and not universally accepted, better technology followed

- C. Optical storage – Information recorded on an optical disk is written with lasers, not magnetically. Lasers in essence “burn” information onto the storage disk. Data recorded on optical media is considered less susceptible to environmental damage (dust, hair, smoke, etc.). Optical storage has far greater storage capacity than removable magnetic media (floppies). A typical CD ROM can store approximately 700 MB while a DVD has gigabyte capacity. Data on optical storage can be retained for over 30 years. Advances in technology provide an even greater capacity for optical media, as in the case of Blu-Ray DVDs. The different types of optical disks are mentioned below.



1. CD-ROM - contains permanent, unalterable information - what does the acronym stand for?
 2. CD-R - data can be written to the disk in wholly or in increments but cannot be deleted or modified - what does the acronym stand for?
 3. CD-RW - allows the user to record, erase, and modify the disk several times, in that sense, functions like magnetic media - what does the acronym stand for?
 4. DVD – contains gigabyte capacity. A DVD drive can read CDs but a CD drive cannot read DVDs. DVDs can be either “read only” or “recordable”. Many new technologies exist providing greater capacities (HD-DVD, Blu-Ray DVD) DVD drives can recognize any type of optical disk - what does the acronym stand for?
 5. Disadvantage: Slow read and write time. The read and write speed of optical media is measured at 150 KB per second. If a drive is 6X, that means the speed is 900 KB per second (150 KB x 6) - Slow when compared to most magnetic media & solid state
- D. Solid state storage (flash memory) – a relatively new concept in storage which offers several advantages. Faster, durable, compact, and portable. Dollar per byte is more expensive than most other mediums. USB or flash drives are popular solid state devices. PDAs, cell phones, and cameras also use solid state devices. Completely electronic with no moving parts. Flash drives can hold up to 8 GB of data and again, require no investment in a storage drive nor do they occupy a drive bay. You must properly eject or remove a flash drive to avoid damage to the drive's contents.



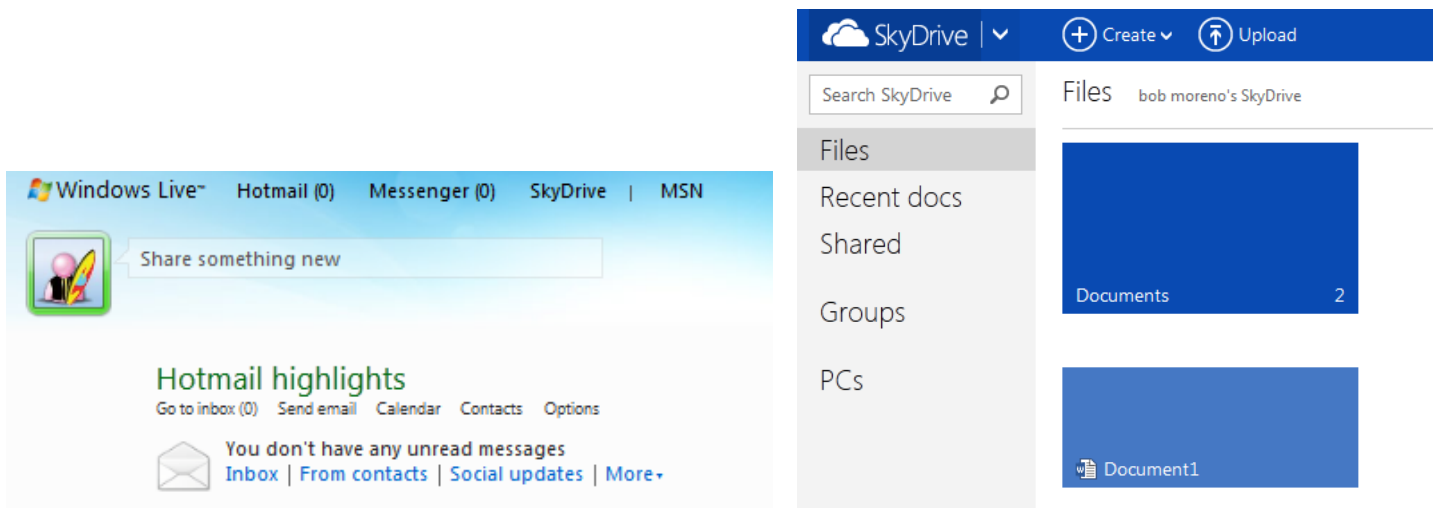
Compact flash (CF) & secure digital (SD) cards, a Sony memory stick, and a USB memory key.

1. Solid state Hard drives provide the best of 2 worlds, large volume capacity and speed



E. Cloud Storage?

1. SkyDrive – Microsoft & Hotmail provide free cloud storage – SkyDrive (Check Appendix C in your textbook)



2. Dropbox - Dropbox is a free service that lets you bring your photos, docs, and videos anywhere and share them easily. Never email yourself a file again



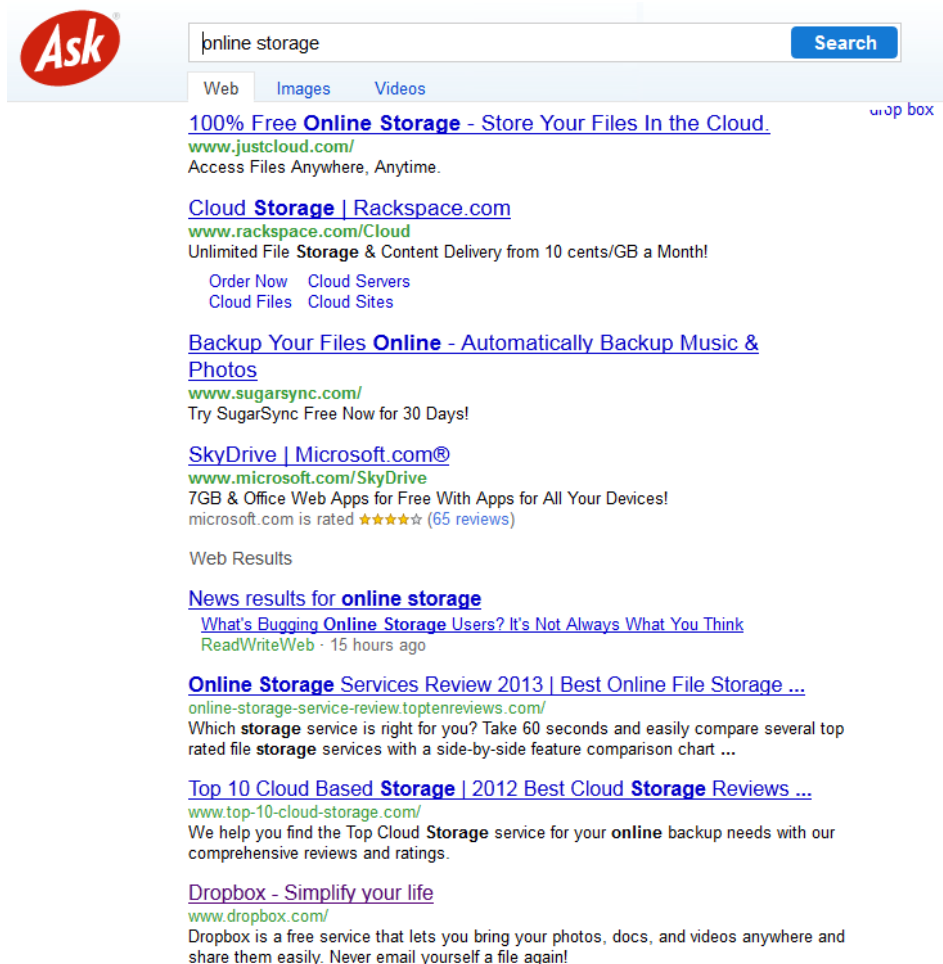
Welcome to Dropbox!

Bring your photos, docs and videos anywhere. [Take a tour.](#)

☐ I agree to [Dropbox Terms](#)

Create account

3. Others – A search of “online storage” will yield many results



The image shows a screenshot of a search engine results page from Ask.com. The search query is "online storage". The results are categorized into "Web", "Images", and "Videos". The "Web" results are listed below. The first result is "100% Free Online Storage - Store Your Files In the Cloud." from justcloud.com. The second result is "Cloud Storage | Rackspace.com" from rackspace.com. The third result is "Backup Your Files Online - Automatically Backup Music & Photos" from sugarsync.com. The fourth result is "SkyDrive | Microsoft.com" from microsoft.com. The "Web Results" section is followed by "News results for online storage", which includes a link to "What's Bugging Online Storage Users? It's Not Always What You Think" from ReadWriteWeb. Below that is a link to "Online Storage Services Review 2013 | Best Online File Storage ..." from toptenreviews.com. The next result is "Top 10 Cloud Based Storage | 2012 Best Cloud Storage Reviews ..." from top-10-cloud-storage.com. The final result is "Dropbox - Simplify your life" from dropbox.com.

Ask

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7GB & Office Web Apps for Free With Apps for All Your Devices!
microsoft.com is rated ★★★★★ (65 reviews)

Web Results

[News results for online storage](#)
[What's Bugging Online Storage Users? It's Not Always What You Think](#)
ReadWriteWeb · 15 hours ago

[Online Storage Services Review 2013 | Best Online File Storage ...](#)
online-storage-service-review.toptenreviews.com/
Which storage service is right for you? Take 60 seconds and easily compare several top rated file storage services with a side-by-side feature comparison chart ...

[Top 10 Cloud Based Storage | 2012 Best Cloud Storage Reviews ...](#)
www.top-10-cloud-storage.com/
We help you find the Top Cloud Storage service for your online backup needs with our comprehensive reviews and ratings.

[Dropbox - Simplify your life](#)
www.dropbox.com/
Dropbox is a free service that lets you bring your photos, docs, and videos anywhere and share them easily. Never email yourself a file again!

- F. A system unit contains several drive bays used to install internal storage drives. The drive bays are located at the front of the system unit.



The significance of drive bays has been diminished with the advent of USB technology, we now have practically every type of external storage device that can be connected to your computer through a USB port, no drive bay is needed.

- F. A file specification or DOS path identifies the exact location of a stored file.

`C:\WORD FILES FOLDER \ PROJECT 1 \ GRAND PRIX ANNOUNCEMENT.DOC`

In the example above “C:” identifies the storage drive (hard drive). The first “\” is a symbol used to represent the “root” directory or table of contents. This table of contents is created when you format and is used to keep track of all the objects (files & folders) on this device. The additional “\”s are called “path separators” and identify each new object within the file specification.

“Word Files Folder” is the primary folder and “Project 1” is the subfolder. Finally, “Grand Prix Announcement” is the name of the file and “.doc” is the file extension identifying this file as a Microsoft WORD file.

Windows Vista introduced the concept of “Bread Crumb Navigation” whereby each entry in a path can be utilized as a link that will place you at that location by a mere click of the mouse.

- III. Windows includes system maintenance utilities that allow you to keep your storage drives operating optimally:
- A. Scan disk (Error Checking) – identifies and marks damaged areas on disk to assist the operating system in avoiding placing data at these locations. When you run Scan Disk, data recorded in a damaged area can sometimes be relocated to an undamaged area to allow access to the file, otherwise the file would be lost
 - B. Defragmentation – reverses the effects of fragmentation. Fragmentation occurs when gaps lie between files or when file segments are scattered throughout different areas on disk. Fragmentation delays the retrieval of a file and makes a disk drive work harder thus expediting a possible head crash. When you run the disk defragmenter it will attempt to regroup scattered files to allow for optimal access
 - C. Disk cleanup – identifies expendable files and provides an option to remove them, this utility expedites the removal of expendable files. How does it know if a file is expendable? It makes the assumption based on the last time the file was accessed.

- D. Backup – is a utility that allows you to back up the entire contents of a drive or just select content. You select the origin and destination drives and then run the program. The backup utility can be scheduled to run as an automated task at selected time intervals.
- E. System Restore – restores a malfunctioning system to a previous working state. Restore points are created periodically and archived. If after making a system change your computer begins to malfunction, you can go back in time to one of these restore points and return your computer to an earlier functional state.
- F. Task Scheduler – just like the name implies, you schedule a utility to be performed at a time of convenience and the task in essence becomes automated and completed by the scheduler. The scheduler is a tool for having many of these time consuming utilities execute automatically without user intervention
- G. Some non-Windows utilities allow you to restore deleted files, from any drive or even after you've emptied the contents of the recycle bin. The key is to immediately attempt to restore the deleted file before you save another file. Check the bottom of page 150 for more details.
- H. File manager utilities – programs like “Window's Explorer” or “Computer” help to identify the location of files and also to perform file management tasks. (remember the Windows assignments?)