

MAINTENANCE TIPS FOR WINDOWS XP COMPUTERS

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DHW

Windows computers seem to deteriorate with time and usage. Heavy usage and lack of maintenance will speed up the deterioration. The deterioration has various causes including hardware failures, and software conflicts, corruption and deliberate attacks in the form of viruses, spyware, and other malware.

The good news is that you can slow down, but probably not stop, the deterioration with regular maintenance. This document discusses many of the common causes, maintenance actions, and includes a number of links which provide additional information. While the author has found the following tips, tools and resources useful in maintaining Windows computers, use this information at your own risk.

HARDWARE MAINTENANCE

Two major contributors to computer hardware failures are power surges and excess heating.

Surge Protection.

Your computer should always be connected through a surge protector. A surge protector can increase the odds of surviving a power line transient that, without protection, would destroy the power supply and perhaps the system board. When you purchase a protector there are several parameters to look for:

- Clamping voltage in volts (lower voltage is better—i.e. 300 is better than 400),
- Energy dissipation (higher number rating in joules is better—i.e. look for more than 1000 rating,
- Response time (shorter number of nanoseconds is better—i.e. look for less than 1),
- An indicator light to show unit condition after a surge (a surge can wipe out the protection but the surge protector will still operate as a power stick—the ability to protect is gone but you don't know it without an indicator).
- Protection for phone line or Ethernet line as well as power line.
- Performance guarantee which pays when protection fails.

You can find more information at <http://electronics.howstuffworks.com/surge-protector.htm>

Keep your computer clean and cool.

As you examine a computer it appears to be in a case that you might expect would protect it from dust. But if you open the case you often will find a considerable amount of dust inside. This is true even if you have a fastidiously clean house or office. Dust inside of a computer reduces the cooling effectiveness and causes the components to operate at a higher temperature. A typical desktop computer may dissipate the same amount of power as a 200 to 400 watt lamp. High temperatures shorten computer life. Some computers

have safety protection features which cause them to shut down or reboot if the internal temperature exceed a certain value. Here are some steps you can take to keep you computer clean and cool.

Blow out the dust.

Every six months disconnect your computer, remove the cover and blow out the dust with your air compressor or a can of air. This will help it run cooler and last longer. When you blow out the dust, keep one hand on the metal case of the computer to avoid static shock to the sensitive components. Also, blow out the dust from floppy and CD/DVD drives.

Locating your computer tower

It makes a difference where you set your computer tower unit. Avoid heating vents, paper shredders, fireplaces, carpets and any location where free air circulation is blocked.

Check the fans

Computers have fans which keep air circulating and help prevent overheating. When you have the case open, check the fans to be sure they spin freely. Often times you can hear fans starting to fail by listening to them. If the fan doesn't appear to be working properly don't continue to operate your computer. Repair or replace the suspect fans.

What about lap tops?

Don't attempt to disassemble a lap top to clean it. You can attempt to blow out what is accessible, including the key pad. As you use your lap top you should make sure that it has free air flow around it. Perhaps you may wish to use a special stand that includes additional fans. Never set an operating unit on a blanket or any surface which blocks air flow.

Videos on cleaning.

<http://www.youtube.com/watch?v=8QZ8j46GB2w&feature=related> Cleaning dust from your computer

<http://videos.howstuffworks.com/labratstv/867-episode-23-clean-your-computer-video.htm> More on cleaning your computer. I don't recommend removing RAM or modules during routine cleaning and remember to keep a hand on the metal case when you are cleaning. Don't disassemble your lap top.

Changing the battery

Your computer has a battery which keeps your clock and some of the components operating when the power is off. The battery is about the size of a quarter. It has an expected life of several years. If you notice that the clock no longer keeps correct time, or the BIOS seems to change settings, without inputs from you, it may be a sign that the battery should be changed.

SOFTWARE MAINTENANCE

Cleaning excess software from your hard drive

As you use your computer you acquire installation files that are used for a time and then are no longer needed. Your computer can also become bloated with temporary files from Internet browsing. Eliminating the excess files can free up space and allow your system to run faster. <http://www.youtube.com/watch?>

[v=4kxeaKTd7rU&feature=channel](http://www.youtube.com/watch?v=4kxeaKTd7rU&feature=channel)

Your Windows operating system has a program called Disk Cleanup that is useful in removing some of these unused files, but the best program I have found is CCleaner. CCleaner is a free program that can be downloaded at http://www.filehippo.com/download_ccleaner/ CCleaner is a very user friendly and non-harmful program. In addition to cleaning your hard drive the program contains some other very useful functions such as Registry cleaner, application uninstall, and start up management.

Cleaning the registry

The registry is one of the main files of your Windows operating system. It is the central coordinator that ties everything together. As you install or modify settings on your computer the registry keeps track. Unnecessary instructions or commands can accumulate in your computer's registry and cause it to function slower. It is desirable to eliminate those unnecessary registry commands, but editing the registry can be tricky. A simple error can result in an operating system that fails to function. CCleaner is a safe way to clean the registry. But still, the first time you use a new tool or application such as CCleaner you might be apprehensive that something will go wrong. If you want to be extra cautious, make a restore point before you install the new software.

<http://www.youtube.com/watch?v=wzBMzVd0H90> Is a video which shows how to download, install and start to use CCleaner. There are also commercially available registry cleaners.

Microsoft Updates

In general it is important to keep your operating system up to date. Some of the updates add features, while others correct problems. But there can also be a down side since sometimes the updates conflict with other programs on your computer. For example, the first time I attempted to install XP service pack 3 on my HP computer, it would no longer boot up. The problem was that HP computers with AMD processors required a special mod from HP before installing SP3.

You can set your computer to automatically update as new changes are available or you can set it to prompt you for your approval before installing. There are conflicting opinions on which setting is best. Most of the time automatic updates are fine, but it is safer to have the prompting selection and make restore points or investigate whether the change has caused other folks problems.

Go to Start-->Windows update or Microsoft update. The Microsoft update site will not only offer operating system updates it will also offer updates for other Microsoft applications that may be installed on your computer, such as Microsoft Office.

When you get to the update website you will have a choice of selecting the **Critical** or **Custom** updates. First install all of the critical updates and then use the **Custom** mode to install any appropriate hardware updates. Review the optional updates and install as appropriate. When a new major update is offered, such as Internet Explorer 8, you might want to wait a few weeks before installing.

Generally when a conflict occurs between the operating system and the applications and several parties are involved there is a period of deciding who needs to make a change, but usually a resolution is reached in a short time. It is sometimes helpful to do a Google search on potential problems with installing a specific change and learn about possible conflicts and the progress toward resolution.

Another way to protect your system from failing because of unforeseen conflicts is to use the system restore function.

System Restore

Windows XP and Vista have a feature called System Restore. The purpose of a restore point is to return your computer to an earlier configuration when it worked okay. Restore points can be established manually as well as automatically. When your computer is working fine it is a good idea to make a restore point and note that everything is working. Do this by going Start—Programs—Accessories—System Tools—System Restore. Select **create a restore point** and click **next**. Restoring your computer to a time when it worked is accomplished by selecting **restore my computer to an earlier time** and clicking **next**.

If you are going to be making major changes to the operating system such as installing a new service pack, it is a good idea to make a restore point first. Here is a video about this feature. http://www.youtube.com/watch?v=exlB_UcZw0w&feature=channel How to create a restore point. <http://www.youtube.com/watch?v=Qr93RV4t4Dw> How to restore to a prior point.

Safe Mode

Safe mode is a feature of the Windows system which is very useful for dealing with some problems. In **safe mode** a minimum number of programs are loaded. This can allow you to avoid some of the conflicts in programs that you might otherwise encounter. Often times when you are unable to boot your computer normally it is possible to boot it in **safe mode** and thus deal with the problem. One of the most common uses of **safe mode** is to restore your computer to a prior time.

Here is a video which discusses **safe mode**. The only disagreement that I have with the nice lady in the video is that you should tap the F8 key instead of holding it down because some computers will recognize holding down the key as a stuck keyboard error. <http://www.youtube.com/watch?v=3Snwv7GXegk&feature=related>

RAM Adequacy

In the past, RAM (Random Access Memory) was an expensive part of the computer and most manufactures installed a minimum amount of RAM in order to keep the purchase price low. As data and applications were added, the lack of RAM became one of the major causes of slow performance. The minimum RAM

for an XP computer is 512 MB, and 1 GB (1000 MB) is better. Operating with 2GB to 3GB can be helpful depending on the applications. If you are using Vista as your operating system at least 3GB is recommended. Higher end computers will use more. It is not difficult to add RAM to your computer. You can start by finding out how much RAM is currently installed and how much RAM your computer will accept. An easy way to do this is to use this web site.

<http://www.crucial.com/systemscanner/index.aspx>

This link will allow you to download and run a scan on your computer that will result in recommendations. Note that as a supplier of RAM, this site may be inclined to promote installing a lot of memory. Of course you can also purchase RAM locally but be sure that you get the correct RAM for your computer. The **Crucial** link will provide a detailed description of the RAM that is correct for your computer. Be sure to install RAM that is fast enough.

RAM is sensitive to static shock so when you handle and install RAM use appropriate discipline. One way to do this is on a concrete floor with a wrist strap to ground to the computer chassis and work area.

<http://www.youtube.com/watch?v=60yv1jY6T-4&feature=related> Tiger Direct instructions for installing memory. This provides some general information about RAM, perhaps more detail than you need to know especially if you use the **Crucial** scanner.

Defragmenting your hard drive

You should defragment your hard drive every month. Increase or decrease the frequency depending on the number of fragmented files shown during the analysis. This will help your computer to run faster. Be sure to run CCleaner before you defragment. Windows has a built in defragmentation capability. To use it Click on Start—Programs—Accessories—System tools—Disk Defragment—Analysis. Then select defragment as recommended. It doesn't hurt to defragment even if the analysis says it is unnecessary.

<http://www.youtube.com/watch?v=2105clMRPuc&feature=related> Is a general discussion of defragmenting the hard drive.

If a hard drive is badly fragmented there are programs which do a better job than the one in Windows. One of the programs that I like is Defraggler which is available free at http://www.filehippo.com/download_defraggler/ This program does a fine job but it takes much longer than the built in Windows tool. So run it when your computer has a couple hours of down time.

Hard Drive Maintenance

The hard drive on your computer is an electro-mechanical device with moving parts that are subject to wear and failure. There are magnetic disks inside a hard drive and these are in a constant spinning motion. There are heads which read and write data to the disks. If you could see the speed of the heads as they move you would be amazed that hard drives ever work. Over time hard drives are

vulnerable to wear out and fail. You can perform some maintenance actions to help extend the life of your hard drive and you can also recognize that your hard drive is likely to fail sometime and prepare for that event.

In addition to the maintenance steps we have already identified you should occasionally run Check Disk. To run Check Disk open My Computer—Right Click on the Hard Drive (C)—left click on Properties—left click on Tools—Select Check Now—select automatically fix errors and scan for and fix bad sectors. This will allow Check Disk to run the next time that you reboot your computer. Running Check Disk will go through a series of stages and will take a fairly long time. Here is a general discussion of using Check Disk.

<http://www.youtube.com/watch?v=MHJji9GZzc4&feature=channel>

Another maintenance action that you can take is to run disk clean up. You can find this under system tools. I do not advise compressing files on the hard drive. If you decide to remove the old restore files, be sure everything is working and make a final restore point. All but the last restore point will be erased.

You need to watch the free space on the hard drive. As the free space is reduced the drive will appear to operate slower. If the free space becomes too limited the antivirus will usually fail to protect and the defragmentation will cease to function. So always keep plenty of free space even if it becomes necessary to add a second hard drive.

There are various tests for helping to determine the health of a hard drive. Some computer suppliers include health applications. Dr. Watson is a program that is often included. There are also free download packages available.

<http://www.hitachigst.com/hdd/support/download.htm> This site offers a free download called Drive Fitness Test, for testing hard drives. The test can be run without affecting any data on the drive. The download includes a quick test as well as an extensive test.

You can also listen to the hard drive. If it starts to run louder that may be a sign of impending failure. Once the hard drive fails, it is very costly to recover any data.

Manage start up programs.

When you turn on or reboot your computer, many programs, in addition to the Windows operating system, may start up and run in the background. Background programs use some of the resources of your computer and slow it down. You can control which programs you want running in the background at start up. Click on Start—Run—type in *msconfig* and select OK--Start up. Items that are checked will run at start up. You can uncheck them. You should always be sure that you don't uncheck your antivirus program. Note that before you start you need to be signed on the computer as a user with authority to make changes. The default

setting will probably allow changes, if it doesn't you will need to sign on as an administrator.

<http://www.youtube.com/watch?v=atTUWMdzHxA&feature=related>

If you have CCleaner installed it also allows you to see and disable the programs that run at start up. I prefer using CCleaner instead of *msconfig* because it provides a better screen picture.

In order to make a disable decision, it is useful to get some information as to what the item does and if it is necessary at start up. You can do a Google search on the command or I use a web site that explains most all of the files and provides a recommendation as to their necessity at start up. The web site is <http://www.bleepingcomputer.com/>. At this web site select start up list. This list contains information on over 19,000 common start up items. The list contains recommendations as to whether the file is necessary, unnecessary, optional, or should be avoided at start up. You will also notice that some harmful software such as viruses and trojans are listed. Hopefully you will not find any of those in your start up files. When you have finished making changes, click **Apply** near the bottom of the system configuration window. You will get a message that it is necessary to restart Windows. Close any open windows and click okay. When the system restarts you will see a message that shows you have started the system in a trouble shooting mode. Click OK and operate Windows normally. See if everything seems to work okay and hopefully your computer starts up faster. If there appears to be something important missing or working improperly go back to system configuration and recheck the items that you unchecked and go through the process of unchecking and rechecking until you achieve the desired results. When you are satisfied there is a little square in the troubleshooting message so that you won't see that message again.

Safe Download Sites

Never download from any unfamiliar sites and be careful following any links that you receive in emails. Never allow a download from, or provide information to, any site that you have not selected. If something starts downloading without your permission stop it immediately by clicking it off or shutting off the power to your computer. Some safe download sites that I like to use include: <http://www.filehippo.com/> and <http://www.komando.com/> Remember, even on the safe sites, there are some programs, such as **Limewire** that you should avoid.

Antivirus Programs and firewall

You need to have anti virus and anti spyware programs and a firewall if you use the Internet. ***Caution, you should only have one anti virus program installed.*** If more than one anti virus program is installed the two programs will conflict and your computer will usually be very slow and lock up frequently. Sometimes your **(ISP)** Internet Service Provider, will offer a free anti virus program as part of the service. There are a number of anti virus programs available. McAfee and Norton are two programs frequently installed on new computers for a free trial period

with an option to subscribe to follow-on service for a price. There are also free anti virus programs. AVG, and AVAST are programs that I have used with satisfaction. In order to assure protection be sure that your program updates and scans automatically. Here is a video on downloading and installing AVG.

<http://videos.howstuffworks.com/harvard-extension-schools-computer-science-e-1-understand/2738-disinfecting-a-pc-avg-anti-virus-video.htm>

You absolutely should be protected by a firewall. Firewalls are used to prevent data from coming into your computer or from going out of your computer without your permission. Windows XP has a built in inbound firewall and some antivirus programs offer an inbound/outbound alternative. Here is a discussion of firewalls. <http://videos.howstuffworks.com/harvard-extension-schools-computer-science-e-1-understand/2736-desktop-firewalls-video.htm> Some of the firewalls that I have used show a history of attempted entries that the firewall blocked. I have been surprised at the number of times the firewall has stopped entries.

System Recovery

There are some conditions such as a hard drive failure, a malware infection, or a major corruption of files where it is necessary to completely replace the software in your computer and to restore it in the same condition as when it was new. Of course, reprogramming the hard drive usually means that all information, including existing programs and data, is lost unless it has been saved on external devices such as memory stick, external drives or CD/DVD. So save your data frequently and save your application CD/DVD's.

Many of the computer manufacturers no longer include recovery CD's with new computers. Instead they partition the hard drive and put the recovery software in a separate partition. The result is that if the recovery software has not been saved on an external device it will not be available if the hard drive fails. You should back up the recovery partition on CD's or DVD's whenever you get a new computer. Here is an example using this feature on an HP computer.

<http://www.youtube.com/watch?v=HbwoVq7y5Rk&feature=related> This video shows how to make recovery disks for an HP computer. Of course the procedure will vary with computer types.

Reformatting and reinstalling software on your hard drive

The ultimate maintenance action for your computer is to wipe all of the software from the hard drive and reinstall software. This is not difficult if the installation tools (CD's and DVD's) and data have been saved. It can however, be a fairly time consuming activity. If the original CD's have not been saved it may be necessary to load a basic operating system and add applications. This will most likely require some driver installations.

The license for the Windows operating system is on the case. If a different Windows operating system is reinstalled some resolutions with Microsoft will likely be required.

<http://videos.howstuffworks.com/labratstv/873-episode-28-reinstall-and-reformat-video.htm>

<http://support.dell.com/support/topics/global.aspx/support/dsn/en/document?journalid=6B31BF31A4DD6BD5E040AE0AB5E12397&docid=339949>

Drivers

Software drivers are small programs that connect the hardware in a computer. Without the correct drivers parts of your computer and the connecting equipment will not operate properly. Finding the correct drivers can often be a challenge.

Here are some articles on this subject.

<http://h30434.www3.hp.com/psg/board/message?board.id=OSandSW&thread.id=4018> 9.2

<http://www.bleepingcomputer.com/tutorials/tutorial119.html>

One program that I have used to help back up drivers is CSharp. I downloaded it from <http://davehope.co.uk/projects/driver-backup/>. There are a variety of other programs available.

Reinstall or System Recovery

Either process can be used to load the operating system. By adding the updates the computer performance should be equivalent or better than when the computer was new. If there is a choice, the easiest path is probably to do a system recovery. This will include the drivers and will probably also include some additional application programs.

Viruses, Worms, Malware, Spyware

Viruses, worms, malware and spyware are unwanted programs that can get on your computer from the Internet or from disks and other shared items. The most common sources are Internet browsing and opening Emails and their attachments. You can attempt to avoid having your computer infected by using security programs and by using caution in operating your computer. Here is some general information about safe computing. <http://videos.howstuffworks.com/harvard-extension-schools-computer-science-e-1-understand/2741-dans-soapbox-safe-computing-video.htm>

Here is a web site that offers some general information on this topic.

<http://www.howstuffworks.com/virus.htm> This explains Trojans and BotNet infections.

Here is a Dell video on this subject. <http://videos.howstuffworks.com/dell/676-dell-keeps-your-system-secure-video.htm>

Viruses are unwanted and usually program damaging software programs that piggybacks to other desired programs. They are usually put on your computer by downloading something with the virus attached. They usually cause your machine to either not work or work improperly. There are many many types of viruses.

Email Viruses-This is the type of virus that comes in on email and frequently looks at your address book and mails something to everyone in your address book making it look as though it comes from you. Usually the virus comes as an attachment to an Email, often a Word document. Once you open it, your computer is infected. There are some techniques that can help avoid infestation. One is to accept and open documents in RTF (Rich Text Format). This type of document is far less likely to contain a virus. Another technique is to save the attachment to a place where you can use your anti virus to check it before you open it. You can do this by right clicking on the attachment. Some ISP's scan email and attachments. It is safer to avoid using the preview window on your email.

Worms-This is a type of program that gets into your computer and replicates itself and could plug up your computer operating system. It really spreads if your computer is used in a network. This gets into your system through security holes. This is stopped by an up-to-date firewall.

Trojan Horses-These are programs that promise one thing but do another and usually cause damage. They may tell you to check your files and if you have ___ file, you should immediately delete it as it is a virus. When you delete it, your operating system no longer works.

<http://videos.howstuffworks.com/harvard-extension-schools-computer-science-e-1-understand/2739-disinfecting-a-pc-spybot-video.htm>

Spyware or Malware-It is possible for someone to install a key logger program on your computer and thus have access to everything you type out including passwords to your banking accounts and private information. Usually most spyware programs are not that malicious and only track sites you visit to report back on your interests for future spam. There are free programs to remove spyware such as Ad-Aware, Spy Bot and Superantispyware. You can find these programs at <http://www.filehippo.com/>

Unlike virus and firewall program where you should only have one active program, you can run multiple anti spyware programs as long as you don't try to do it at the same time.

Portable memory such as flash drives, CD's, DVD's, and external drives, can also be infected. Be careful when you connect items to your computer. When in doubt scan before you open files.

You want all of your security programs to update automatically. That can be a shortcoming with some of the free versions so if you are using a freebie, keep it updated manually if it doesn't have automatic update.

Most anti virus programs can be scheduled to run daily or weekly at a time when you are not using the computer. Be sure your automatic update and scan are working. Music sharing software such as Limewire, is a frequent source of getting infected because it often bypasses some of your protection software.

If your anti virus program indicates that you have a virus, it will often tell you the name of the virus. Sometimes the anti virus program will be able to quarantine the infected files. There are often some special skills involved in removing viruses and you may wish to get help. You will also need to do some work with your restore files since most anti virus cleaners can't get into the restore files. There are ways to eliminate the infected restore files. Sometimes the best solution is to clean all information off the hard drive and reload all the programs.

Saving and Backing up Information

As you save more and more information on your computer, you will find that it is important to save the information in a location where you can quickly find it. You will also learn that it is very important to prevent information from accidentally being destroyed or lost. Too many of us learn the important lesson of saving and backing up through the personal experience of a loss.

Always be sure to save all of your data under **My Documents**. If you have data distributed in various place on your hard drive it more than likely will be lost. It is very important that any data worth saving is located under My Documents or in a location where it can easily be found.

When you first start using a computer and saving data, it may not seem important to consider how you want to organize your data. Of course you can save your data in one folder but when you get thousands of documents, and photos on your computer it becomes increasingly important to organize it carefully. You don't want to waste time searching.

Your computer offers a great deal of flexibility in organizing how you save your data. Here's a link which provides some detail on organizing data.
<http://www.wonderhowto.com/how-to/video/how-to-organize-the-my-documents-folder-in-windows-xp-226362/>

Backing up data, operating systems and applications

Data can be lost in various such as a virus attack, a power surge, a hard drive failure, a flood, a fire, or a theft. Businesses recognize the importance and value of preserving data and the associated cost. They set up procedures and processes to protect information from loss. Home computer users often have no plan or

procedure for protecting data until they experience a loss. Then it may be too late. It is not especially difficult or costly to safeguard the data on home computers...but you do need a process and procedure and you need to follow it.

Here are some ideas to get started in developing a strategy for saving data on our home computer. <http://www.youtube.com/watch?v=T8PsO-NRJEo>

There are various options for saving information in a way that allows it to be recovered. Here are some likely choices.

Full hard drive back ups, also known as imaging.

- Copies all hard drive information present at the time of imaging
- Many external location choices, (external hard drive, DVD's, server, on-line)
- Includes operating system, applications, and personal data
- Various commercial programs provide this service, some for monthly/annual fees
- Usually accomplished by full back ups with incremental update of changes
- Important to test system by occasional trial restoration
- This method often used by businesses, upside advantage includes
 - Does not require special attention by individual computer user
 - Includes updates and added applications as well as data
 - Allows rapid recovery from most problems
 - Provides good protection of data

Possible down side of this method includes:

Back up may include problems such as viruses, corrupted files and excess junk

Individual files usually not visible until restored

Once a back up application is selected it can be difficult to change to another

A variation on this method might be to save certain files and data. Here's a typical program for making an image back up using Acronis.

<http://www.youtube.com/watch?v=wFdAL7hpYvo&feature=related>

Manual copy of data

Computer user makes decision to copy **My Documents** data and save it to external location (external hard drive, DVD's, flash drive)

Advantages of this method include:

Simple to use

No special applications are required

Individual saved files are visible

Since only data is saved, it is less likely to save virus or corrupted files

Possible down side of this method includes:

Requires an action by user to keep saved data up to date

May require special action to save email and favorite sites
May not be compatible with commercial off site methods

Given these two typical methods here is my recommendation for a home computer.

- Be sure your computer has a CD/DVD burner—install as necessary
- Obtain an external hard drive—cost is probably less than \$100 for 250 GB
- Keep all application/installation disks that came with your computer.
- If your computer uses a partitioned hard drive, make a set of recovery disks
- Keep disks of all software that you added to your computer.
- If you download purchased application programs, keep a copy of the download or ask for a disk.
- Don't use disk imaging software as your primary back up practice—all Windows system deteriorate with time and usage. A fresh reload is a better option.
- Save all of your data under **My Documents** instead of various places on your hard drive
- Establish your own back up plan and follow it. Here's an example:
- Back up all items under **My Documents** to an external hard drive twice each month.
- Don't use back up software, instead use the simple copy and paste functions
- Go to **My Documents** and select all, then copy
- Make a new folder on the external hard drive and name it “back up of (date)”
- Use the paste function—this may take several minutes depending upon the amount of data
- If you develop special data between regular back ups, such as trip photos or income tax information, make a special back up to your external hard drive.
- Always do a full back up—hard drive space is cheap
- If you are working on a file that changes frequently such as a grad school paper, back it up frequently on a flash drive or CD.
- Every three months make a complete back up of all items under My Documents on DVD's or CD's and keep it off site, perhaps in your safety deposit box.
- Whenever you have completed a back up to your hard drive be sure to open a few files to assure the integrity of your back up
- You should delete some of the old back ups from your external hard drive, if it becomes more than half full.

On-line Back up

Another choice for saving important data is on-line back up. Here is a link for an evaluation of several on line back up services that was prepared by PC Mag.com.

<http://www.pcmag.com/article2/0,2817,2288755,00.asp>

More advise about record keeping

When you purchase your computer it is important to establish a container (perhaps a box or dedicated cabinet drawer where you keep all of the important material that came with your computer. This includes the booklets, the software disks, the cables, purchase receipts and warranty information. Add information whenever you get additional material such as printers, scanners, displays etc.

Be sure to save all of the installation CD's. Note that often times the CD jackets contain important serial and registration numbers, be sure to save them as well.

In addition to having a physical storage container and location for your computer materials it is very important that you maintain a computer log book. The log book should be located close enough to your computer so that you can easily reach it when you are working on your computer. In your computer log book you need to enter dates and all of the significant data associated with using your computer, starting with when you purchase and first used it. Always include screen names and passwords.

If you encounter problems and need to take your computer in for help, record that information as well. If you keep a physical storage container for computer materials and a careful computer log book it will save a great deal of searching through drawers and papers.

Boot Disk

A boot disks is a tool that can be used in place of the Windows operating system for limited access to the information stored on the computer. There are a variety of boot disks available or makeable. There are boot disks that use an abbreviated version of Windows or other operating systems such as Linux.

Google Search

When you encounter questions or problems with your computer it is most likely that others also have experienced the same problems before you. Don't hesitate to try searching using error codes or problem descriptions.

Some additional tools of interest

<http://www.ubcd4win.com/> This is the web site for Ultimate Boot Disk for Windows. This boot disk is very useful for booting a computer without using the Windows operating system.

<http://www.youtube.com/watch?v=actmNY31sKw> This video describes how to make the Ultimate Boot Disk for Windows.

Some favorite free programs and other useful sites including links.

http://www.filehippo.com/download_openoffice/ This office set will do about everything that the expensive Microsoft Office package does, and it is free.

http://www.filehippo.com/download_firefox/ This is a browser similar to Windows Explorer except that it seems to be the target of far fewer virus and malware attacks. I like it.

http://www.filehippo.com/download_picasa/ This is a program that will find and organize all of the images on your hard drive. It also allows you to crop and modify your images.

<http://earth.google.com/> This is a very interesting program that offers a satellite view of the earth with fine enough detail to see individual houses.

<http://computer.howstuffworks.com/> This is a good site for learning more about computers. It has some useful videos.

<http://www.pcstats.com/articleview.cfm?articleID=1720> This is an interesting site that discusses how computers typically fail and how to prevent these problems.

http://pcsupport.about.com/od/maintenance/u/maintain_your_computer.htm This gives some interesting and useful information about maintaining and repairing a PC. It includes how to use an operating system disk to do a repair when your computer won't boot, even in safe mode. You will need to look around on this site to find the process.

<http://www.thefreecountry.com/> This is a site that offers links and information to many open source programs including those for utilities, security and web masters.

<http://www.youtube.com/watch?v=WJO4Muh8sbU> This is an interesting video about how some repair shops treated customers with computer problems.

<http://videos.howstuffworks.com/labratstv/880-episode-35-registry-101-video.htm> This is a video about the registry in Windows systems.

<http://videos.howstuffworks.com/labratstv/2841-episode-65-home-network-basics-video.htm> This is a video about the basics of home networking.

<http://www.bleepingcomputer.com/> Bleeping Computer provides free information including computer help and tutorials. It is understandable by beginning computer users.

<http://support.microsoft.com/> This can be a useful site. It leads to the Microsoft Knowledge base. It also leads to an automated fixit capability.

<http://linux.softpedia.com/> This site has downloads for many different operating systems. In addition it has interesting news and articles.