Basic PC Maintenance & Upgrading
Using a computer is reason enough to make certain individuals shutter. Many, even after gaining experience using one, will always rely on others to upgrade and maintain their systems. While there are several complex things that shouldn’t be attempted by those unfamiliar with the internal parts of a computer, there are some VERY simple tasks that can be done at home by novice users.

Today I’ll attempt to demystify certain aspects of upgrading and maintaining a computer. We’ll go over upgrading RAM, cleaning out the inside of a computer, doing a system restore, and other things that tend to cause apprehension amongst new users.
Inside your PC

So, if you’re in this class, you probably already know how to use a computer well enough to do basic things like surfing the internet, word processing, and e-mail. But, how many of you are familiar with the inner parts of your PC? The diagram below shows a disassembled computer and indentifies the basic parts.

Now, I’ll give you definitions on what each of the above terms mean.

- **Power Supply** – This, of course, is where your PC draws its power from. You can buy them in several sizes, but, for the average user the one that comes with your computer will be perfectly fine. Should your computer be completely lifeless after hitting the power button then you might need to replace your power supply. Doing this is more involved than upgrading the RAM or adding a video card, so I suggest drafting a computer nerd to help with this should the need arise.

- **Extra Bays** – Most computers will come with a few empty slots to allow for any future disc drives you might want to install. Putting in drives requires a bit more effort that installing a new power supply or memory, so, we’ll leave that alone for today.

- **Hard Drive** – Any time you pull a file from C:, you’re getting it from the hard drive. This is where the majority of the information on your computer is stored. Replacing it is also moderately difficult and should be done by a
professional.

- **Motherboard** – Ah, yes, looking at one of these can indeed cause a migraine. The motherboard is where the central processing unit (CPU, or, the brain of your computer), random access memory (RAM), and several other crucial parts of your computer are located. The motherboard IS essentially your computer.

- **Peripheral/Access Cards** – The slots in the back of your computer are there for future additions. Occasionally computers will have a modem installed in this area, but, they’re empty for the most part. This is where you’d go to add extra universal serial bus (USB) ports, a network card, or upgrade your video. There are other things that can be done here which could help your computer immensely.

  Expansion cards like the ones I described in the last paragraph go in the empty slots to expand your computer. What type of card you need is determined by what kind of motherboard you have. This is also something you should consult with an expert about before attempting an upgrade.

You’ve just been given a VERY basic overview of the internal parts of the computer. Hopefully you feel a bit more comfortable knowing what everything is called. Now, let’s crack open a PC and see what these parts really look like.
Opening a Computer

Doing this depends on the type of case you have. Newer models tend to only have one big screw that you can loosen with your hand. Occasionally, though, you’ll have to unscrew a few before the case is completely opened.

A modern case will require you to remove one of the side panels once you’ve removed your screws. A sure fire way to tell if you’re removing the right one is to look for ventilation slots. Remove that one and you’ll finally be inside your computer.

NOTE: Electro-static discharge, or ESD, can sometimes be a danger when working with internal components of a PC. There is a handout in your packet with tips on avoiding this.

Remove the dust from inside your computer

- Dust, dirt, and pet hair make their way inside your computer case despite how impeccable your house cleaning skills are. This creates a danger of overheating as it can sometimes clog fans meant to keep your system cool. Every few months you should crack open your case and clean out any excess dirt. You can use your hands (keep the aforementioned ESD in mind when doing that) or compressed air (make sure to do short, quick bursts as holding the trigger too long can produce moisture).

Now that we have our demonstration PC opened you’ll notice the dirt and grime within it. This computer has gone quite a while without being cleaned. Now, I’ll demonstrate the proper technique for cleaning it out.

Now, with the dirt removed, we can take a better look at the parts and talk a bit about upgrading. While changing the hard drive and processor is fairly advanced, doing things like installing RAM, putting in a video card or a new power supply can be done with minimal effort.

We’ll begin with what is possibly the easiest and most powerful of the internal upgrades – The RAM.
Random Access Memory or RAM

Random Access Memory, as the name implies, is a form of memory that can be accessed by the computer randomly. Once you start a program on your computer it is loaded into the RAM, and, it is kept there until you close the program. Since the RAM has no moving parts (the hard drive does) things move along very quickly.

If your computer is roughly 5 years old then you’ll be able to purchase RAM at pretty affordable rates. Anything older than that, though, will be a bit pricey.

There are different types of RAM, but, the most commonly used is called DDR, which stands for double data rate (it is twice as fast as the previous incarnation, thus the “double”). Popular online retailers specializing in selling RAM such as Crucial.com or Kingston.com have tools that will detect what type of RAM your computer takes and the maximum amount you can upgrade too. Then, of course, it suggests what to buy from their site.

Know your system.

- It’s always a good idea to know certain specifications on your system, even if you’re calling tech support. Questions regarding your RAM type, processor type, hard drive size, and more may come up when upgrading or repairing your PC.

There is a great free program called the Belarc Advisor (it’s in the utilities section of the CD in your packet) that scans your system and tells you everything you need to know.

Upgrading RAM is probably the easiest thing you can do yourself to make your computer run better. There are no settings or tweaks that need to be done, you simply have to pull out the old and replace it with the new.
The most difficult task is determining what type of RAM your computer takes which can easily be answered on the sites I mentioned or with the Belarc Advisor.

**NOTE:** If you have a laptop you may still upgrade the RAM, but, it is slightly more expensive. A typical laptop will have a door in the bottom with at least one screw holding it shut. Most will also have a picture of RAM near the door to indicate this is where the RAM is located. Once the door is removed, unhinge the RAM (the removal is more difficult that on a regular PC.), then replace it.

**Peripheral Cards**
Adding peripheral cards is another great way of adding to the stable of things your pc can do. You can improve the video performance (a MUST for avid gamers), add extra USB or Firewire (similar to USB, but faster) ports, add ETHERENET which allows you to join a network, and a slew of others.

You must know what type of slots you have available in your PC prior to purchasing a card. No matter what you’re adding, this fact remains true. There’s PCI, PCI-Express, AGP, and ISA (this one is old and probably won’t be encountered.

Below is a diagram that shows the basic look of a PCI, PCI-Express, and AGP slot.

Confused? Don’t worry! If you don’t wish to delve further in this topic simply take your Belarc printout to your preferred retailer and let them suggest which card
(peripheral cards, cont.)

Typically a card will be held in by one screw at the top. Simply unscrew it and pull up on the card to remove it. Now, to install a card, do that in reverse. Seat the card in the slot and then tighten up the screw. After that, put your case back on and then install whatever driver software came with the card.

One thing to remember when installing a card is that it must be seated properly. Make sure it isn’t loose or wobbly prior to putting your case back on. A loose card could cause it to either function improperly or not function at all.

I’ll now demonstrate for you all and allow all that wish to try their hand at putting it in.

Maintenance
We’ve already covered a good deal of physical maintenance and upgrading, which, you’ve hopefully found beneficial. Now we’ll switch gears and talk about something that isn’t as laborious but frustrating nonetheless – software maintenance.

Everyone connected to the internet will eventually encounter a virus or spyware – it’s inevitable. There are certain measures that can be taken to help fight this but none of them are perfect. Here are a few preventative things you should do:

- **Install an antisyware program** – Windows Vista comes with a program called Windows Defender which is meant to find and eliminate spyware. It’s good, but, there are others I like. You’ll find AVG Anti-Spyware, Spybot Search & Destroy, SuperANTISpyware, and AdAware on the disc included in your packet in the folder marked Anti Spyware. These are my favorites, but, AVG is probably the king of the freebies.

- **Install an antivirus program** – Most computers come with Norton’s Anti-Virus, which, while secure, slows your system down to a crawl. There are much better programs out there that work without the aforementioned
slowness. My personal favorite is AVG Antivirus. Grisoft, the makers of AVG, produce both a free and paid version of this program. I’ve used the free version of this program for years without trouble. It’s lightening fast and updated almost every day, too.

- **Keep a firewall running** – A broadband (DSL, Cable) internet connection is always on which means your computer is a juicy target for hackers. A firewall is either a piece of software or hardware that sets between your computer and the internet. It will limit what can connect with your machine. Windows has a built in firewall which I recommend keeping on at all times. You might be given a warning occasionally about one of your programs wanting to access the internet, or, something on the internet trying to access your machine. Look at these to verify whatever is trying to happen is something that YOU asked for. If not, deny the request for access and it’ll keep blocking it.

A router is a device used to share broadband internet between several computers. You can get wireless routers which allows for any computer with a wireless peripheral card or adaptor to access the internet without being plugged in. Routers are good to have even if you’re not sharing your connection as they all have great firewalls built in to them.

**Clean up unnecessary files** – Web browsers will save an assortment of temporary files to your system to speed up browsing. For instance, when you visit a page a copy of it is kept, or cached, in your system memory. So, instead of downloading the images from the internet you’ll actually be getting them from your hard drive. This saves a lot of time, especially if you’re on dial-up internet. There are cookies, images, and loads of other things added to your machine that you don’t need. Thankfully, they make programs that will remove these junk files and free up hard drive space. CCleaner, in my opinion, is the best program in this area. It offers a cleaner, registry scrubber (we’ll discuss this later), uninstaller
(great for pesky programs that make themselves difficult to uninstall), and it also gives you the ability to easily remove

(maintenance, cont.)

programs from Windows Startup. This is a VERY useful program that I also put on the disc in your packet under the cleaner folder.

- **Practice safe browsing!** – No matter how many preemptive measures you take to fight viruses and spyware, the best thing you can do is be mindful of where you browse. It’s easy to fall into a trap and get hacked or infected when surfing random sites. The best advice I can give is to tread carefully online.

- **Windows Update** – No matter how annoyed you may be when Windows tries to force you to update, you MUST do this. When patches and updates are released hackers will get them and take them apart to see what they are fixing. Once that’s done then they produce viruses and programs to take advantage of the things the updates are trying to fix. Then, they sell them to the highest bidder. A patch can sometimes cause minor problems with your system but they’re usually remedied quickly. Keeping automatic updating on is highly recommended.

Occasionally viruses attach themselves to the address books located on infected machines. They do this and then they fabricate a message and send themselves out as attachments to the contacts found in the address books. This is why it’s good to verify someone sent you an e-mail attachment by talking to them. It’s very easy to download first and ask questions later.

**NOTE:** If you wish to try another antivirus program you must go through a few extra hoops to uninstall the one you have. Norton’s, for instance, offers a removal tool for any version of Norton’s Antivirus you have on your system. This
supposedly uninstalls everything related to the product on your machine. Simply taking an antivirus off through a typical Windows uninstall will sometimes leave parts of the program on your system.

(maintenance, cont.)

I’d suggest doing an internet search for the name of your antivirus program and removal tool to see if anything extra is needed to be done to remove it. Be sure to immediately put your new antivirus program back on the computer and update it prior to resuming full-time use.

**Defragging, Checking For Errors**

Most of you have probably heard of defragmenting the hard drive, but, some may not know what it exactly means.

Think of your computer’s hard drive as a giant filing cabinet. Hundreds of files are pulled on and off throughout the day, but most of them don’t return to their proper place in the cabinet. Pieces of the files sometimes end up outside the folder, too. Now when someone opens the cabinet to look for a specific file it takes quite a while to find the one they want.

This is a pretty good example of what happens to your files after your computer is used for a while. Bits of files get scattered all over your drive which makes it take longer to access them. Defragmenting will take the scattered pieces of the files, or fragments, and put them back together.

Since Windows file systems have improved a great deal defragging isn’t as necessary as it once was. But, it is worth doing should your computer be slowing down. Defragging can be accessed by going to My Computer, right clicking, selecting properties, and then going to the tools tab. You can have Windows analyze your hard drive and tell you if it needs to be defragged.

Checking for errors is also good to do occasionally. It can be accessed from the same area as defragging. It will scan your hard drive, find errors, and attempt to fix them. This can occasionally fix a frustrating problem.
So, you got infected ... now what?
Occasionally you can recover an infected system with the use of the above tools I mentioned. But, if things get bad enough, the best thing to do is completely wipe out your hard drive and reinstall everything. This sounds much, much harder than it actually is.

(so, you got infected ... now what?, cont.)
Several years ago almost every computer came with something called System Recovery (or Restore) discs. Booting your computer with these discs in your computer would walk you through deleting everything on your machine and reinstalling Microsoft Windows and the applications that came with your PC. This essentially made your computer exactly as it was when you brought it home. The process is almost completely automated, but, you occasionally have to answer questions.

Nowadays, PC manufactures have gotten cheap and not included these with new machines; you have to make your own. This is something that should be done as soon as you hook up your PC. The process of doing this differs depending on your type of computer, but, it’s not too difficult.

This is something that you should keep up with. Several years ago, my friend had some difficulty with her computer. Her mother took it to a store, and, all they did was restore it with the recovery discs. After this, they billed her $75.00. I was appalled upon hearing this story as this is something even novice users would have no trouble doing.

NOTE: This will wipe EVERYTHING from your hard drive. Windows and the programs that came with your system will be all that’s restored. You’ll have to download all Windows updates again, too.
Cleaning instead of recovering
If you’re brave, you can attempt to clean your computer in lieu of an all-out restore. Doing this can sometimes prove successful; however, the only way to assure yourself the virus is gone is to completely restore your system. Here are a few tips for doing this:

• **Turn off system restore** – System Restore is a part of Windows that takes snapshots of your system, saving system files and settings, and allows you to rollback to older snapshots should problems arise from installing a new program or becoming infected with a virus.
  If you’re infected with a virus when a snapshot is taken then the virus can become part of it. An antivirus program cannot touch the system restore files so it makes it more difficult to remove.
  To turn off system restore, simply right click My Computer and visit the System Restore tab. Check the box that says Turn off system restore. Now it’s off. When you think you’ve got the virus cleaned then you may re-enable it.
  This is done through System Properties in Windows Vista.

• **Safe Mode** – Some viruses begin running as soon as you start Windows which makes removing the difficult. If you have trouble getting one to go away, try safe mode. This is a way of starting up Windows with only the bare minimum of things running in the background. If a nasty bit of spyware or a virus is starting with your system this will not allow that.
  Hold the F8 key while booting and you’ll be prompted to enter safe mode. There are two versions, with networking and without, that you should be aware of. The “with networking” one keeps your internet connection active in case you need to do an online scan or download.

• **Registry Cleaning** – The registry is a crucial part of Windows that should only be modified by those with experience. It instructs your machine on how to run specific programs. It can become full of problems should your machine be infected with a virus. Some folks are so skilled that they can pick through a registry and manually delete entries from a virus. This is tedious and time consuming.
  There are products called registry cleaners that could help, but, some could create more problems. The CCleaner program on your disc has a good registry
cleaner that’s fairly straight forward, but, I recommend using it as a last resort.

(cleaning instead of recovering, cont.)
As I mentioned, the only sure way to rid your computer of infection is by doing a complete restore. It’s easy and effective. The above measures are for those who enjoy solving difficult problems only.

In closing
There are many difficult aspects of fixing a computer that I couldn’t fit in the guide, but, I hope the ones I present you with will help you keep your machines running. If you avoid visiting questionable sites, keep an antivirus I’ll now take any questions you may have