For this project I'm going to be talking about the hardware and software side of computers.

## **Hardware**

Hardware constitutes the internal components of a computer system. It is divided into various parts:



1) Motherboard: Sometimes abbreviated as Mobo. This is where everything in a computer is connected or put into. For example: the hard drive has to be connected here with a cable, the graphics card has to be inserted into a slot in it, the Internet cable is plugged into a port it has that can be seen from the outside.

Without the motherboard you would have a collection of pieces but nothing to do with them.

**2)** Hard Drive: Also referred to as **H**ard **D**isk **D**rive (HDD). It's needed to get the computer to do anything and to obviously store your files. Drives are divided into RPM (Revolutions per minute). The higher the digits for the RPM, the faster files can be accessed in the drive, which means programs load faster.

Currently there are 5000 and 7200 RPM drives available, with the most common these days being the latter. There's newer versions which have 10,000 and 15,000 RPM, but these are relatively newer to the market and as a result more expensive.

Storage these days comes in gigabytes (GB). A gigabyte in a hard drive is 1000 megabytes (MB). The gigabytes a disc has are a way of telling you how much space there is to store files. The number

of files a HDD will hold depends on the type of data which is being used, for example. One GB will roughly contain 1,000 - 5,000 songs or 5,000 - 10,000 pictures.

**3)** RAM: **R**andom Access Memory. Unlike the hard drive that stores information permanently, RAM is a computer's short-term memory that's often used to store programs while they are running. Whether the information is transferred to the hard-drive for permanent storage or erased after use depends on the program.

Usually, the more RAM a computer has then the faster it is, as it's capable of having more programs running at once.

Similar to hard drives, RAM comes in gigabytes these days, though in the case of RAM a gigabyte is 1024 megabytes rather than the definite 1000 it is in a hard drive.

Before continuing I would like to talk for a while about mega/giga/kilo bytes.

The list of most common bytes from lowest to highest in size or speed as used in computers is as follows: byte, kilobyte, megabyte, gigabyte, and terabyte. However there are also **bits** which are different from **bytes**. A **byte consists of 8 bits**.

Bytes are used to determine the speed at which data is transferred between two locations, such as copying or transferring files between different hard drives or downloading files from a website to your computer. The higher the byte type the faster it is.

**4)** Graphics Card: The video card is also known as the GPU, which stands for Graphical Processing Unit. It can also be called a Video Card.

These are required for the rendering of complex 3D graphics, such as computer games or if you happen to be in a profession that includes working with 3D shapes of any sort.

Depending on the card it may also have ports for multiple monitors, giving the user (the person using the computer) the ability to have two monitors connected to their computer at the same time. Some motherboards support up to two graphic cards installed at the same time (at the cost of needing a higher Power Supply Unit), giving you the possibility to have four monitors for one computer.

Motherboards include integrated graphic cards, but these are less powerful than stand-alone (separate) ones.

Stand-alone graphic cards also contain what is called video memory that assists the GPU in handling information. On the other hand, integrated graphic cards do not have this and use the system's RAM as a substitute.

**5)** CPU: Central **P**rocessing Unit. It controls every basic action of programs in the computer. When an action is done by the user in any program, the CPU receives the order and processes it for the program to respond with the action that follows.

While processors used to have one core, these days they can have up to four. Four cores means that the CPU can take care of multiple actions at the same time.

After being installed in the computer a substance called thermal paste has to be applied on them, followed by attaching a heat sink, which is a fan the airs out the heat generated by the processor. The thermal paste helps with the heat transfer between both components.

6) Power Supply Unit: Like the ones above, it also has an acronym: PSU. It's installed inside the computer at the upper corner and has a socket at the exterior of the computer case where a cable is plugged in to provide power to the system. It's what's needed to make the computer turn on to begin with as it's what provides power to all the parts. It has other cables that are hidden inside the computer case that are connected to specific components, such as the graphics card or processor. Power Supplies are divided into Watts, the more and also more demanding components you want, then the higher the Wattage has to be. So, for example, assuming you were building a computer with over 8GB of RAM, a hard drive, a top of the line GPU, and a quad core CPU you'd need a

PSU with around 700 Watts for the computer to run correctly. Without a proper power supply the computer won't start or there will be a high risk of components frying from struggling due to the underpowered power supply.

These are the necessary components to get a computer up and running. There's plenty of parts that are optional that I didn't mention, such as sound cards (that increase the quality of the sound and recommended for home theater set-ups) and DVD players, whose use seems to have become less frequent due to the increase of digital distribution for movies, music and games and the use of portable drives to carry information. Of course, I didn't mention the more inexpensive pieces of equipment that come after the main parts have been obtained, such as the keyboard, speakers, mouse and monitor whose purposes are obvious to most people.

There's even old hardware that isn't used anymore, such as diskette readers or diskettes themselves, which have been mostly replaced by newer technology such as external hard disk drives, USB flash drives and the like which can carry significantly more information than floppy disks and, in some cases, are even smaller.

## **Software**

Software is the term used for programs or applications in a computer. For example, Microsoft Word, which is what I'm using to write this, would be considered a piece of software. Internet Explorer or its competitors (such as Mozilla Firefox or Opera) are programs designed to browse the Internet.

The compatibility of software with a computer depends on the operating system, depending on which one it is it may or may not function.

In the last paragraph of the hardware section I talked about digital distribution. What I meant by this is software where one can purchase material such as films, movies, games or e-books (books in scanned form) then download them directly to your computer after paying. This is something that's been on the rise for the past seven years or so. These days there's programs like Apple's iTunes available that can be used to buy then download music albums, individual songs, movies or even rent movies, in which case you pay a lower sum than purchasing them and can keep it in your computer for the quantity of days you paid for, after that amount has passed they can't be watched again as the file that contains the movie tells the software through the Internet that your license is up. Other programs like these are Steam, which until two months ago used to be almost exclusive to the market of video games but has been slowly expanding to applications such as 3D crafting programs or photo editing software.

## **Operating System**

An Operating System (also known as an **OS**) is the most important part of a computer after the hardware I mentioned above. Without an operating system, the software cannot run.

These days they are divided in 32-bit and 64-bit versions, with 64-bit being better but more demanding. Their limitations vary depending on the operating system. For example, Windows XP 32-bit can only handle up to 3GB of RAM, adding more simply causes the system to ignore anything past that number and act as if it's not there. Meanwhile, a 64-bit system can handle up to 128 GB, and the more RAM a computer has the faster it will perform.

Under 32-bit architecture Windows is limited to assigning 2GB of memory to an application. Games, video and photo editing applications crave large chunks of memory, for example. Under 64bit systems they can have, in theory, up to 8TB (terabytes, which would translate to 8000GB) of memory to be assigned to them by the computer.

The downside to all this is that there's software that may not be compatible with 64-bit systems, though this was more of an issue when it had just been released to the market than it is today.

Operating Systems can be both free or commercial – the most well-known one in the former category is Ubuntu which can be gotten for free on the Internet through their website, downloaded, burned (recorded) on a DVD and installed in a blank hard drive.

In the commercial category is Windows and its many iterations (e.g Windows 98, Windows XP, Windows Vista, Windows 7) developed by Microsoft. Mac OS X created by Apple is another example of a commercial one.

Some commercial ones are divided in tiers upon purchase. Windows 7 for example is divided into various editions, each with a higher price tag but with more functions as a result. Each edition is made with a different customer base in mind:

	Windows 7 Home Premium	Windows 7 Professional	Windows 7 Windows 7 Ultimate
	From \$119.99 Microsoft Windows 7 Home Premium makes it easy to create a home network on your PC and share all of your favorite photos, videos, and music.	From \$199.99 Microsoft Windows 7 Professional includes all the Home Premium features you love and the business features your work demands.	From \$219.99 Windows 7 Ultimate gives you everything Home Premium and Professional offers – plus added security features and the flexibility to work in multiple languages.
Makes the things you do every day easier with improved desktop navigation		•	•
Start programs faster and more easily, and quickly find the documents you use most often	•	•	•
Make your web experience faster, easier and safer than ever with Internet Explorer 8	•	•	•
Easy to create a home network and connect your PCs to a printer with HomeGroup	•	•	•
Watch, pause, rewind, and record TV on your $\ensuremath{PC}$	•	•	•
Run many Windows XP productivity programs in Windows XP Mode		•	•
Connect to company networks easily and more securely with Domain Join		•	•
In addition to full-system Backup and Restore found in all editions, you can back up to a home or business network		•	•
Help protect your data on your PC and portable storage devices against loss or theft with BitLocker			•
Work in the language of your choice or switch between any of 35 languages			•

Usually the higher tiers are, as shown in this image, reserved for business or dedicated use.

As mentioned in the Software section of this writing, the compatibility of a program with your computer will most of the time depend on your operating system. The reason Windows is so widespread is because most programs are made to work on it due to the larger user base.

This is all I can think of to write about these topics. Hopefully it wasn't too horrendously boring to read.