Digital Media Skills

Donna Eyestone
Smashwords Edition

Digital Media Skills

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Welcome

The first computers were so large that they would not have fit into your house and were certainly not available to the average person. But today they are ubiquitous and they fit on your desk, in your briefcase, or in your hand.

This course is designed to introduce you to everyday functions of using a computer to make digital media. There's probably a lot you already know about using your computer. Computer fluency goes way beyond knowing how to use a mouse and send e-mail. If you are computer fluent, you understand the capabilities and limitations of computers and know how to use them wisely. Being computer fluent also helps you to make informed purchasing decisions, use computers in your career, understand and take advantage of future technologies.

We've arrived at the point where the tools used by the amateur and professionals are basically the same, so there's much to be done even by "novice" computer users who have the confidence to experiment with any of the readily available software. This convergence of different types of technology lets us create even more engaging media -- tell different kinds of stories in new ways.

In short, computers can help you be more efficient with the work you currently create, but also help you learn new skills to make things as of yet unimagined. Let's get started.

If you have some time and want to watch a great movie - try The Machine That Changed the World. This is a multi-part, professionally produced video that documents the history of computing (up until 1992). The above link is to Part One : Great Brains. There is a link at the bottom of that page that takes you to subsequent parts: Inventing the Future, The Paperback Computer, The Thinking Machine, The World at Your Fingertips.

What's Inside Your Computer?

Sometimes it's helpful to get back to basics to help troubleshoot computer issues. When I work in a studio and something isn't working, I used to always ask as my first question "Is everything turned on?" And, when some piece of equipment didn't turn on, the first thing to check was "Is it plugged in?" So often, these simple fixes are overlooked - and they can often save you hours of troubleshooting and frustration.

In a computer lab, it's pretty obvious if a computer is on or off, but if it's not printing, or your application keeps crashing, then you need to know a little more about where to look for solutions. And sometimes this is all a matter of getting back to the basics.

Decimal and Binary Number Systems

The short answer to what's inside your computer is a bunch of zero's and one's. That's it! Your computer can figure out even the most complex problem using electronic pulses that are either ON (1) or OFF (0). See how much smarter you are than your computer? I mean really, you can speak a real language, form sentences, view pictures, enjoy music and so much more.

So why would you ever need (or want) to know this much information about your computer? Well, its a rare day that I need to resort back this far to troubleshoot a problem, but it can be really helpful to try and come up with new ways of using your computer if you recognize that all applications, all data at its core is simply digital information. So when you want to start thinking about adding a still picture to your video, or using audio with your presentation files, or adding video into a PDF document, you'll want to think about the standards that will help you work between different applications, and different systems.

You computer's counting system that only understands 0 and 1 is called the binary number system. People are all used to the decimal system, where we count 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. When we run out of "digits" we sort of circulate around, and the next number is 10, and so on.

But, if you only have 0 and 1 to count in the computer's binary system, what comes next? Hardly seems useful if we can only count from 0 to 1. In other words, how do we get to our decimal number 2?

In decimal (also known as "cardinal" or "whole" numbers), when we run out of space going from 9 to 10, we add a place (digit) and start counting all over again.
0
1
2
3
4
5
6
7
8
9
10
11
12
and so on...

If we try this in the Binary System, let's see what happens.

000 = 0
001 = 1
010 = 2
011 = 3
100 = 4
101 = 5
110 = 6

Do you begin to see the pattern?

Binary Numbers

The binary system is considered base-2 (because there are only two unique numbers between 0-1). Computers store data in binary. As you'll see later when we discuss file sizes, often you'll see numbers that don't seem quite right. Like, instead of 1,000 which is 10*2, (a fine round number that is easy for humans to understand - we're programmed to think in base 10), you'll see computer numbers popping up to be numbers like 1024, which is 2*10.

The binary system is essential in technology. It's how electronic circuits work - they are either on or off. And every sequence of these signals has a certain meaning. Another example of a binary system is Morse code - dots and dashes are used to express letters.

2 to the power of 0 equals 1
2 to the power of 1 equals 2
2 to the power of 2 equals 4
2 to the power of 3 equals 8
2 to the power of 4 equals 16
2 to the power of 5 equals 32
2 to the power of 6 equals 64
2 to the power of 7 equals 128

See the pattern? Now let's take these numbers to use them as a template while remembering that binary numbers are read from right to left:

128 ------- 64 ---------- 32 ----------16 --------- 8 --------- 4 -------- 2 --------- 1

Now let's use this template on that ugly binary number from our earlier example. At the top is our template, at the bottom is our binary number:

128 ------- 64 ---------- 32 ----------16 --------- 8 --------- 4 -------- 2 --------- 1
--1 --------- 0 ---------- 1 ---------- 0 --------- 1 --------- 1 -------- 1 ---------0

Now we use simple multiplication and addition. If the binary number is a 1, it means this digit is "on" or "true" and we add the corresponding number from the template, if it is a 0, it means the digit is "off" or "false", and we do not add the corresponding number from the template.

In our example, the digits for 128, 32, 8, 4 and 2 are true, so we add

128 + 32 + 8 + 4 + 2 = 174

You could also express it as

128*1 + 64*0 + 32*1 + 16*0 + 8*1 + 4*1 + 2*1 + 1*0 = 174

This means our binary number 10101110 is the number 174 in the decimal system.

It's good to remember that all your computer can do is add a bunch of ones and zeros. So if you're not a mathematical genius, it's okay. It's especially useful when you wonder why it takes you so many steps to do what seems like a simple task. The computer is basically stupid, it takes your smarts to really make it do anything useful. Or, conversely, when you're sitting in front of the monitor wondering why it's taking your computer so long to compress your video file, you'll soon learn just how many numbers it's busy crunching behind your back.

Try this video to see the math in action: http://www.youtube.com/watch?v=ETsfylK7kzM

Bits and Bytes (and Megs and Gigs)

So now that you know the computer can only speak in binary, how can it make sense of everything you want to make it do?

Think of it this way. When you write a letter, do you think about first writing "D" and then "e" "a" "r" "M" "o" "m", one character at a time? Probably not. Sure, maybe when you have to remember how to spell a complex word, you think one letter at a time (or if you have to hunt and peck for the keys on the keyboard). In general, you "chunk" the letters together and start right in with "Dear Mom" as two complete words. (Here's my plug - learning to type is possibly the single most useful skill you could acquire for an easier digital media life.)

In a way, the computer can do this kind of "chunking" or grouping together too.

With one digit, we can only represent either the number 0 or 1. This single digit is called a bit. This is short for "binary digit". A bit is the smallest unit of measure of data in a computer. You can think of it like a single letter in "Dear Mom".

(You'll learn, and perhaps care more about this later when we learn about sending information over the Internet)

Below, you'll see binary numbers again, but this time you'll see them represented with a lot of digits or positions in the number. Unlike the single bit, that uses one position, the following numbers use 8 positions to represent numbers (data).

00000000
00000001
00000010
…….
11111111

In our earlier example, we used the binary number 10101110. This number has 8 binary digits, or 8 bits. This is not a coincidence, because if you take a group of 8 bits, you have a byte. The reason computers group bits together into bytes is that when they are being fed a continuous stream of bits they have no idea where one piece of information ends and the next one starts. But if you receive groups of defined length, e.g. a byte containing 8 bits, it's easy to interpret them.

A good example is how ASCII code (American Standard Code for Information Interchange) works. Any character you type on your keyboard is interpreted by your computer as a byte, an 8 digit binary number. For example, the letter "A" is expressed as the ASCII code 65. But 65 is a decimal number, so if you convert it to a binary number, you get 01000001. These 8 digits, or one byte, are known to your computer as the letter "A". (More on this later.)

Nowadays, you don't hear people talking much about bits and bytes. Chances are, you hear K, Megabytes, Gigabytes or even Terabytes. For our purposes now, these all refer to amounts of stored data - on your hard disk, flash drive, camera chip, etc.

KB is short for Kilobyte. A Kilobyte is 1024 bytes. This is two to the tenth power or 2^10.

MB is short for Megabyte. A Megabyte is roughly "a million bytes", or 1,048,576 bytes. A MB holds one thousand KB. This is two to the twentieth power or 2^20.

GB is short for Gigabyte. A Gigabyte is approximately "a billion bytes", or 1,073,741,824 bytes to be exact. A GB holds one thousand MB. Today when we talk about Gigabytes, we are talking hard disk storage, or USB Flash drives. This is two to the thirtieth power or 2^30.

TB is short for Terabyte. A Terabyte is approximately "a trillion bytes" or 2^40. Maybe suffice it to say a big hard drive that holds about 300 hours of good quality video.

What's next? Petabytes, Exabytes, Zettabytes, Yottabytes, Brontobytes - but you don't hear of these very often (at least yet!)

It's important to know "the order of magnitude" that your digital media will require to store the documents and files you create on the hard disk in your computer. You'll get a feel for this as you begin to make some media. Even small media projects can take up a lot of storage.

Why a GB doesn't always equal a GB

Here's another situation where you can look really smart if you paid attention and know the difference between the binary and the decimal system. This question is asked over and over again:

"I bought a 8.4GB hard drive, but when I formatted it, Windows tells me that I have only 7.82 GB available. Did they sell me the wrong drive?"

No, they sold you the correct drive, but it was not labeled quite correctly. The marketing department of the drive manufacturer doesn't know too much about bits and bytes and the binary system. To make it easier to calculate, they assume that 1 KB is 1000 Bytes, 1 MB is 1000 KB, etc. which is wrong. So when they have a drive that can hold 8,400,000,000 Bytes, they just call it 8.4 GB and say that's close enough for government work. Not so.The multiplication factor is not 1000 since we're not using the decimal system, it is 1024 instead (2 to the power of 10).

Are bits used anymore?

It's important to know the difference between a bit and a byte because these two can get easily confused. One good example is monitoring data transfer speed. When you download a file from the Internet, you may have noticed that your browser indicates the transfer rate in KBps. Please note that the letter "B" is capitalized. This means the transfer rate is shown in Kilo Bytes per second. For example, your download might arrive at a rate of 3.5 KBps. Now, if you are using a 56K modem, why is that rate so low, shouldn't you see something closer to 56? No, because 56K is short for 56 Kbps. Note the lower case "b", it means Kilo Bits per second. And since we know that 8 bits equal one byte, we divide 56 by 8 and get a theoretical maximum of 7 Kilo Bytes per second.

Processors and Megahertz

Types of computers

Chances are you're using either a PC, running some version of Microsoft Windows (XP, Vista, Windows 7) as your operating system. Or you're using a Mac, running some version of Mac OS X. Are you using a desktop computer, a laptop, a tablet, or something even smaller?

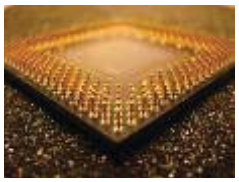
Often desktop computers are more powerful and offer more upgrade options than portable computers. But, what laptops may lack in options or expansion capabilities, they more than make up for in convenience. Imagine being able to take a computer with you everywhere you go? You could write your next script at the coffee shop. Or edit video right after your shoot, from the field. With the convenience of portability usually comes higher prices for laptop computers.

Tablet computers are typically even smaller than laptops, and will have a touchscreen or graphics tablet that allows you to operate the computer with a stylus or digital pen, or a fingertip, instead of a keyboard or mouse. Are you reading this on your iPad?

Ultra portable computers (sometimes called sub notebooks) are systems that are generally less than 4 pounds in weight and are around 1-inch thick. They can be as thin as a spiral bound notebook or a paperback book. They sometimes sacrifice features for portability, and are often more expensive than larger laptops.

Smart phones, like the iPhone or Blackberry devices are even smaller than ultra portables, but don't have nearly the same functionality as a typical computer. They are useful for specific tasks, but in general are not replacements (yet) for a full-featured computer.

Processors



No matter what kind of computer you use, its main component is called the Central Processing Unit, or CPU for short. The CPU is a tiny silicon chip that acts as the brain of your computer. Right now, Intel is the most popular CPU manufacturer.

On the Mac side, things are fairly simple - because you don't get to "choose" your processor. The new Macs (circa 2006) are using the same Intel chip that PCs use. This means that the Mac hardware can run both Mac OS or Windows - all from the same computer. The older Macs (before 2006) had G3, G4, or G5 Motorola chips. These Mac processors run at a variety of different speeds (called Megahertz or Gigahertz).

For the PC side of the computer world, there are more CPU choices. You could be using an Intel, some kind of Pentium processor, or AMD or others. Depending on how you purchase you computer, you can often highly customize PCs. So you get to choose the type of processor you'd like.

The brands of processors will change, as some get faster they are more widely adopted than others, so what's "most popular" today may not be so tomorrow. Perhaps more important for digital media makers to know is the speed at which your computer processors runs. It can make or break your computing experience.

Processor Speeds

An important second feature impacting your computer's performance is the speed of the processor’s internal clock - sometimes known as "clock rate". These clock rates are measured in millions of cycles per second or megahertz (MHz), or gigahertz (GHz). The typical range is 2 to 4 GHz, with faster chips being introduced everyday.

Processor clock speeds are pretty easy to understand. The higher the megahertz, the faster the computing speed. Clock "ticks" are how often your computer can read the data and process it. In computing, speed equates to time. A slow computer will make you wait while a screen redraws, or while it computes data (especially if its processing your video). This is usually only a matter of a few seconds of lag time, and often you won't even be impacted by it. But, if you use your computer for several hours each day, those few seconds of waiting time can become frustrating.

Multiple Processors

More and more computers are coming with "dual-core" or "quad-core" or even "8-core" options. A dual-core computer has two CPUs that can work in tandem. A quad-core has four CPUs. An 8-core has eight. These multiple processors might be on one chip, or on different chips, but they work together to speed up your computing. It's almost like have multiple "brains" in your computer.

Bus Speeds and Sizes

A bus is a connection between the motherboard (or CPU) and other parts of your computer, such as the processor, memory, expansion cards, etc. Each bus has two parts, the data bus, which transfers the actual data, and the address bus, which transfers information about where the data is supposed to be sent. Every bus runs at a particular clock speed, expressed in MegaHertz (MHz).

Each bus also has a certain width expressed in bits, indicating how many bits can be transferred simultaneously over the bus. Physically, this means how many wires are in the bus. The wider the bus, the more data can be transferred at the same time, the faster the bus is.

FAT stands for File Allocation Table. This FAT centralizes the information about which areas of your hard drive belong to files, which areas are free or possibly unusable, and where each file is stored on the disk. To limit the size of the table, disk space is allocated to files in contiguous groups of hardware sectors called clusters. As disk drives got bigger, the maximum number of clusters has dramatically increased, and so the number of bits to identify a cluster needed to grow also.

When you partition a new, clean hard drive, one of the things you do is decide what file system to use. Until recently, FAT16 was the main file system for home computers. It's being replaced by FAT32, which allows you to store larger files. In contrast to that, FAT 32 uses a 32-bit number, and therefore can handle up to 2 Terabytes

Random Access Memory

Your computer stores data in two places: long-term memory (such as your hard drive) and short-term memory called Random Access Memory, or RAM for short. The more you have, the faster your computer will run.

RAM (often just referred to as memory) in your computer holds its contents only when the computer is turned on. Unlike your hard drive that saves data for a long time - and it continues to store all your important documents even after you turn the computer off - RAM is the temporary memory that applications use to process your tasks as quickly as possible.

Every time you start your computer, launch a program, or open a file, data gets loaded into RAM. That's why RAM is listed in the system requirements when you purchase new software. And, as applications get more and more complex, they require more and more RAM. More RAM means you can have more applications or documents open at the same time.

RAM is sold by the megabyte or gigabyte and is typically more expensive (on a megabyte for megabyte basis) than hard drive space. If your computer is getting a little old, but you can't afford to buy a new one, installing more RAM can often give you a noticeable performance increase.

Depending on your specific computer and its hardware configuration, you can add more RAM as needed. For example, you may have slots for 2 RAM chips, or maybe 4 slots. Each "chip" occupies a slot in your system, so you could fill the two RAM slots with 1GB RAM chips in each (for a total of 2GB) or you could put 512MB chips in each slot for a total of 1GB of RAM.

How much RAM do you have in your computer?

Windows: To find out what OS and how much RAM you currently have, go to Start / Settings / Control Panel / System / General. The amount of memory will be indicated in KiloBytes (KB), so you'll need to divide that number by 1024 to get the amount of MegaBytes (MB) since one MB equals 1024 KB.A typical computer will ship with anywhere from 512MB to 4GB (sometimes more).

Mac: Go to the Apple menu and choose About this Mac. You'll see both your processor speed (and type) and Memory (amount, speed, and type)

If you purchase additional RAM for your computer, you want to make sure you get the right kind for your particular computer. There are a bunch of different kinds - each its own sort of alphabet soup! DRAM, SDRAM, DIMM, SIMM, EDO, DDR.

RAM is something you can install in your computer yourself if you have the courage to open it up. It's easier to get to the RAM in some computers than others - easier on desktops, harder on laptops. The RAM chips plug right into your computer's motherboard.

As with most parts of your computer, more RAM is better. When you start working with large graphics files, or capturing a lot of video, you'll want to get the most RAM you can afford - or the most that your computer's motherboard will allow. Having more RAM will mean your computer doesn't need to access its hard drive as often, and will make your work go faster.

Understanding Cache and Virtual Memory

You might also hear people referring to cache, or even cache RAM. Cache memory is extremely fast, and is built right into the motherboard of your computer. It's not replaceable or upgradable, unless you upgrade your entire processor. It is small and typically stores the most commonly used instructions - the ones your computer will need to access again and again.

Virtual memory is a part of your hard disk that the operating system uses like physical RAM (it sees no difference between the two). Because it is actually your hard drive and not RAM, it is substantially slower than physical memory (speeds measured in milliseconds, as opposed to nanoseconds). It is a good "workaround" solution to not having enough RAM to run a particular application.

Operating Systems

Your computer needs special software on it so that you don't have to talk in only one's and zero's. The operating system is your interface to your computer. Without an operating system, your computer wouldn't

be very useful. The main purpose of an operating system is to organize and control hardware and software on your computer so it behaves in a flexible, but predictable way. It behaves in a consistent way for applications to deal with the hardware without having to know all the details of the hardware.

An Operating System (often shortened to OS) is the program that manages all the other programs in your computer. Typically, a user doesn't actually "see" the operating system, but rather, they interact through a user interface (Finder on the Mac, or Windows on the PC). Other common operating systems are Linux and Unix.

Operating systems are responsible for everything from starting up the computer when you push the "on" button, to high level system security. The type of operating system a computer has also determines what types of software you can run.

And, you'll even find operating systems on your favorite portable devices, like cell phones! In fact, the computer in a typical modern cell phone is now more powerful than a desktop computer was 20 years ago.

Both the Mac and Windows operating systems use a software update feature that allows you to get security upgrades, system patches, and even application updates.

Macintosh Operating Systems

Apple Macintosh computers use some version of the Mac OS. The current system software is Mac OS X (pronounced Ten). Apple took technology they had collected over the years, along with technology that had flourished in the open source world, and pulled it together as Mac OS X. Since its original release in 2001, a new version has been released approximately every year.

There are lots of applications that come with Mac OS X including:

- iLife - iMovie, iDVD, iPhoto, iTunes, GarageBand
- Quicktime
- Safari (web browser)
- iChat AV (instant messaging)
- Mail (email client)
- iCal (calendar)
- Time Machine (backup software)
- Preview (PDF creator/reader)
- Spotlight (file searching)

Perhaps most important to media makers is Mac OS X's ability to multitask, and its protected memory. If one application crashes, it won't take your whole computer down with it. So, if you have your email application open in the background, and you're also editing your latest graphic, you won't loose your graphics work if your email application crashes for any reason. And, being able to compress video "in the background" while you continue to refine your graphics or write a new script is crucial.

Mac OS X also includes some very nice accessibility features including speech recognition, windows and text zooming.

Windows Operating System

If you are using a PC, chances are you're running some flavor of Microsoft Windows. In 1985 Microsoft created Windows, a graphical extension to the MS-DOS operating system. In the day, Microsoft called Windows 1.0 "a new software environment for developing and running applications that uses bitmap displays and mouse pointing devices". Until Windows came around, you needed to know MS-DOS, and type fairly non-intuitive commands to run your PC computer.

Obviously, there have been many, many versions of Windows since 1985. Most Windows users are running anything from Windows 95/98, Windows NT, Windows Me, 2000 Professional, or Windows XP (the letters "XP" stand for eXPerience and was released in 2001). In 2007 Microsoft introduced Windows Vista but adoption was slow. Windows 7 was released in 2009.

XP is installed on over 400 million computers - so there's a good chance you either are or were running it! If you've taken the leap to Vista or Windows 7, you'll find an updated interface, better searching features, new applications, and easier to configure networking.

Included with your Windows OS are lots of applications like:

- Internet Explorer (web browser)
- Movie Maker
- Windows Media Center
- Photo Gallery
- Windows DVD Maker
- Windows Calendar
- Tablet PC support
- Windows Media Player
- Snipping Tool

In General

Whether you use a Mac or a PC, you should be able to take the general skills you know about using one system, and translate them to the other operating system. This is a really important skill to have, because sometimes you'll be in an office that uses all Macs, but you have a PC in your home, or the other way around. Go into a graphics, video, or audio studio and you'll often find a mix of different types of computers. Wouldn't it be great if you knew enough to simply switch between them without worrying?

I often use this analogy - I know how to drive a car. When someone let's me borrow their car, or I have to rent one, I don't ever have to say "oh, no, I don't know how to drive a Ford!" I translate the general knowledge I have about driving cars to whatever car I'm driving at the time.

Application? Document? or System?

You just read that a computer has an **operating system**. The operating system performs services for applications. Without an operating system, you couldn't use your computer.

Everything else on your computer is a file of one kind or another.

Applications (short for application program) are the programs that you use on your computer - like MS Word, Internet Explorer, Photoshop, or iMovie. More generally, applications include word processors, web browsers, image editing, or video editing software. Typically, applications are written to perform one specific function really well.

As you've seen, some applications come "packaged" with your operating system, and others are available for free from the Internet, and others available for purchase. Not every application available runs on every operating system, so be sure to check the system requirements before you buy or install any new software. Make sure it is designed for your operating system, that you have enough RAM, and enough available hard drive space to install the application.

On your Mac, you should store all your applications in the Applications folder on your hard drive. (It's also available in the Sidebar of any Finder window.)

On your PC, you'll want to store applications in the Programs folder, found in your Start menu.

Documents are the files you create when you use an application program. If you've ever used a word processing application to type a paper, the file you created is a document. Each of the digital media types have their own kind of documents, and standards for saving these documents. For example, you save text as a different kind of document than a movie or graphic. But each document is a file stored somewhere on your computer's hard drive.

On your Mac, you'll want to save your text documents in the Documents folder, which you can find in your 'home' folder from the sidebar of any Finder window.

On your PC, you should store text documents in the Documents folder, found in your Start menu.

It could be said that to make multimedia, you need to know how to use many different applications, and then figure out how make all the documents work together in a single presentation.

Using Your Desktop

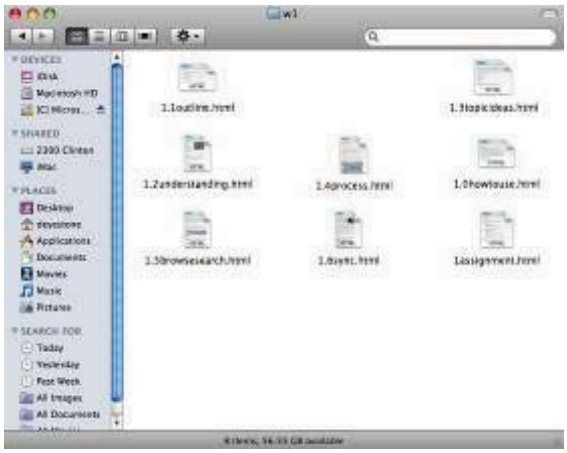
Whether you're using a Mac or a PC, you'll notice some similarities between the two operating systems. It's these similarities that we are most interested in. Ideally, you should be able to walk up to a computer, and figure out how to get around.

Each system uses a metaphor (some call this a "mental model") to help set a context to best explain the different parts of the graphical user interface. Once your computer has fully booted and loaded its operating system, what you see is your Desktop. It is what's running underneath your browser window right now. IT is always available. You can think of the desktop of your computer just like the desktop of your real-world desk. You place items on the desktop (but hopefully not everything!), and you sort files into folders to keep things organized. You'll see an icon for your hard disk (where all your documents, applications and the system are stored), probably a trash/recycle bin, probably some files, shortcuts to applications, etc.

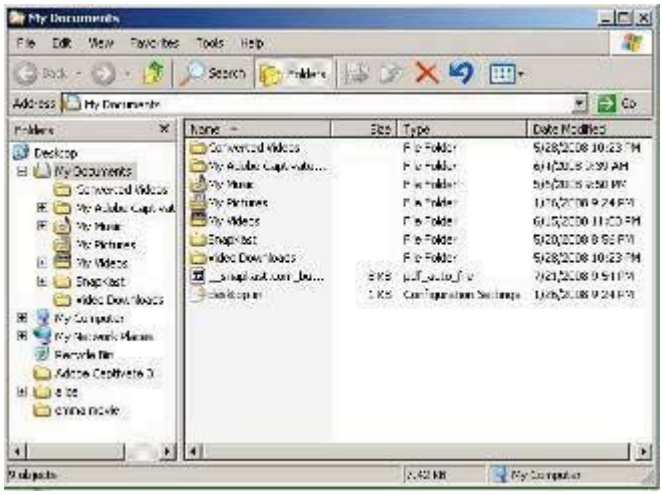
To "open" an icon, just double-click it with your mouse cursor.

When you double-click an icon you'll see a window (see image below). On a Mac these are called Finder windows. On a PC it is the Explorer window (not to be confused with Internet Explorer - which is a browser). Inside a window you may see other folders, documents, or application programs. To open a folder, just double-click its icon. You can store your documents inside folders-just like you might if you had real-world folders. You might consider placing similar items together in a folder. It's not such a good

idea to just stuff a bunch of random documents into one folder -it makes it harder for you to find the documents you need, when you need them.



Mac OS X Finder window open. The main part of the window is known as the "pane" shown above in Icon view. The left part of the window is known as the "sidebar" that holds shortcuts to folders, etc.



Windows XP Explorer window open. Shown in icon view showing the file manager with Folders visible on the left, and a status bar at the bottom. Not shown above, but may contain a "task pane" on the left side of the window.

To close a window, you use the icons located at the top of your window. The Mac places these colored buttons in the upper-left of a window. Windows places the window control icons in the upper-right of the window.

Mac

Windows

To open an application, you'll just double-click its icon - just like opening a window. Each application has its own set of menus. Click and hold on the menu headings at the top of your screen to see what you can do from each menu.

The menus are places you'll go to perform specific tasks. Each program has it own set of tasks that it can complete, but there are standards across software developers that have been implemented to make it easier on you, the end-user of the software. For example, you can always find Print in a File menu. Or Copy in the Edit menu.

The menu bar is available to you while you are using an application - often called the "active" application. You can have more than one application running at a time, but only one can be active - whichever is the top-most window.

Any menu item that has a right-facing arrow indicates a hierarchical menu is available. In other words, there are more choice available in the Open Recent option (shown above in Photoshop), or the Dock (shown below in the Apple menu).

On a Mac, the menu bar is always positioned at the top of the screen. The Mac includes an Apple menu that is always available as the left-most menu option. It contains items that pertain to your entire computer, not just the specific application you are using.

On a PC, menus are usually "attached" to the application window.

Menu items in black letters are available for use, while items listed in gray are not currently available. In the menu below, some items are not available. I can't Undo or Redo for example (because I hadn't done anything to change the document at the time this screenshot was taken).

Navigation

With Windows and Mac OS X, you use a graphical user interface (GUI) to interact with your computer (rather than typing commands, like in the old days with DOS). And with a GUI, you need to learn how to navigate the system with a keyboard and mouse. That's a whole lot easier than typing commands that are not even in English!

Using your Keyboard

If you plan to use a computer for many hours a day, every day, my best advice is to learn how to type! It's one of the most valuable skills that I ever learned. Imagine being able to type your thoughts as quickly as you think them. (Now spelling or typos, that's an entirely different story!) Don't let the keyboard be a barrier to efficiently using your computer.

All computer keyboards are basically the same. Most offer all the standard keys you'd expect to need (you know, a, A, b, B, c, C, etc.) and then some additional keys that can perform special functions, such as the CTRL key (control), the ALT key (or Option key on a Mac), and on a Mac, there's the Apple key (or command key on the PC).

Fkeys are typically located at the top of your keyboard. These are function keys that let you customize shortcuts. There are often 12 of them, labeled F1 through F12. You may never use them, but at least you know what they are.

Whether you're using a Mac or a PC, you can always press the Return (or Enter) key to "accept the default action". So if you see a dialog box like the one below, pressing Return will Save your file.

Pressing Return in cases like this can be a real time saver since you don't need to take your hands off your keyboard to get to your mouse.

The Control Key (CTRL) and Command Key

The Ctrl key is only used in conjunction with another key - sort of like how the Shift Key alone does nothing, but in combination with a letter, you get an uppercase letter. Holding down Ctrl while pressing another key will initiate a certain action. Ctrl key combinations are defined by the running application, so they can change depending on what application you're using. Some, however, have become standards that most applications follow. For example, in a lot of programs Ctrl+S will save the current file or document, and Ctrl+P will print the current file or document.

These "shortcut" or "key commands" can really help save you a lot of time. And, most applications retain the same keyboard commands even as versions change - so you learn them once and you can continue using them forever (in most applications). I recently heard a story from an Accessibility specialist who said that not only will you save yourself from lots of wrist problems, but you'll be over twice as fast if you can learn to use keyboard commands rather than mousing to everything.

Macintosh keyboards have a Control key that is used only sparingly in Mac programs. On the Mac, the Command Key is also known as the Apple key. You'll use Command+S to save a file, and Command +P to print a file.

The ALT key and Option Key

On a PC, you'll find an ALT key. On a Mac, the Option key performs the same functions.

I've only given you a few "keyboard shortcuts" above. There are hundreds of them that you'll get familiar with as you master programs that you use daily. To learn more keyboard shortcuts for menu options, just look to the right of a menu. In the image below you'll see examples of using the Apple Key (shows up like

a curly in the menu below, some people call this the "flower" key), and Shift-Apple key combinations.

Using A Mouse

Mac desktops typically come with a mouse with a single button, while PCs typically come with a mouse with two, three or more buttons. Both can accomplish the same tasks, just a little differently. And, you can use single button mice on a PC, or multi-button mice on a Mac - its up to your personal taste.

The mouse provides the ability to point to, select, and move items on the computer screen. To select items, all you need to do is "point and click" the button of your mouse. If you run out of room on you table, but you still need to move the cursor further, just pick up your mouse (or finger if you're using a trackpad) and put it back down away from the edge of your mouse surface.

Clicking can be more involved than just pressing down on the mouse button. A single-click (often referred to just as "click") means to press and release mouse button. If your mouse has more than one button, it means click the left button. You click to open a menu. Or you click a web link in your browser to go to a new web page.

To double-click is to press twice in quick succession, and then release the mouse button. You'll double-click to open documents, files, or applications.

Right-click

Right-click means to press and release the right mouse button. Be adventurous; right-click on everything. You really can't do any damage with the right mouse button in Windows (or on the Mac if you've got a multi-button mouse attached) because it's designed to show only a contextual menu (a list of options appropriate for the selected object). One of the options is usually Properties, which gives you access to lots of settings and information about a specific file.

You'll want to know what to do when someone says "right click" and you only have one button on your mouse! On a Mac with only a single button mouse, you can access this contextual message window by holding down the CTRL key while you click (since there's only one button). So, right click on a single button mouse is CTRL-click.

Dragging

To drag your mouse, place the pointer over an object, then press and hold down the left mouse button. While you're holding the button down, move the mouse to reposition the object on the screen. When the object you moved is where you want, release the button. For example, you'll need to drag to make selections in your documents. You'll drag to make selections in your image files, or in your audio, or even in your video.

Scroll Bars

A good place to practice your dragging skill is on a scroll bar. Sometimes a window is too long to fit in the window on the computer screen (like this window to the right, for example). Do you see a scroll bar running up and down the right hand side of your window? Click the small box and, while holding down your left mouse button, drag the box towards the bottom of the screen to see additional areas of the window. You can drag the scroll bar up or down at any time.

To accomplish the same task, you can also click the up and down arrows on the top or bottom of the scroll

bar; this moves the scroll box up or down one line at a time. If you're scrolling up or down multiple screens, dragging the scroll box is a much faster way of moving than clicking the up and down arrows one line at a time.

You can get a mouse that has a scroll wheel right on the mouse itself. You can use this scroll wheel instead of the scroll bars on the edges of the windows. This can save you some time.

There is another scroll bar for horizontal movement. If a window is too wide to be fully visible, you may also see a scroll bar on the bottom of the screen that you can use to scroll both right and left (see image above). As a designer putting text, images, and possibly video on the web, it is fine to make people scroll down through a long page (like this one), but in general, people don't like to have to scroll right and left.

So you've got four basic ways to click:

1. single-click (to select or click an icon to change views for example)
2. double-click (to open a file for example)
3. press (to get a menu to open for example)
4. press-and-drag (to move an item for example)

You can also "hover" over an icon. This is like an anti-click. Just move the mouse cursor over an item and hold it there. Often you'll see a tool tip appear which can help you learn how to use an unfamiliar application.

All these principles will hold true if your using a trackpad on a laptop computer. I find a trackpad can slow me down a bit, but you can experiment to find what works best for you. You can attach an external mouse to your laptop computer if you want. But, go wild, know that you have options, and with all the choices out there (including wireless and Bluetooth mouse devices), you're sure to find one that works great for you.

There are also a few other ways you can use your mouse to interact with your computer. Common ones you might hear are:

- shift-click
- command-click
- option-click
- control-click

What is mean here is that you hold down the referenced key on your keyboard while you are clicking.

Managing multiple applications

Whether you're using a Mac or Windows computer, you'll find yourself using more than one application at a time. Both systems have an easy way for you to seamlessly switch between running applications, or launch new applications.

The Dock (Mac)

The Dock is a row of icons that typically runs across the bottom of the screen containing shortcuts (aliases) to applications, folders, or documents you frequently use. You can customize the Dock to your own tastes, including moving it to the left or right side of your screen, creating magnification so that icons appear larger as you move your cursor over them, or even hiding it so its not visible until you hover your cursor over it. You'll find your Trash in the right-most position on the Dock (not shown above). The blue dot underneath an icon indicates it is running. You can use the Dock to quickly switch between open applications and documents.

Any application can be added to the Dock simply by dragging its icon to it. You can also remove an item from the Dock just by dragging it up and off the Dock. Any running application appears in the Dock, whether or not you decide to permanently add it there. Each application has different Dock menu options - actions you can take right from the Dock, whether or not that application is the active application.

The Taskbar (Windows)

In Windows, the default location for the taskbar is at the bottom of the screen, though you can move it to the edge of any screen. By default it contains the Start menu button, Quick Launch bar, taskbar buttons and notification area (shown right).

You can use the Quick Launch area to place shortcuts to commonly used applications. Taskbar buttons are created for each document window you have open, so it's a good way to quickly switch between multiple open windows. The active window appears lighter than other open windows or applications in the taskbar.

ASCII - or how your computer learned English

We talked a little bit about ASCII (pronounced "ask-key") when discussing binary numbers. ASCII is a character set that consists of 128 numbers (0-127) assigned to letters, numbers, punctuation marks, and other commonly used characters.

Check out this chart below learn how it works.

In the right-most (white) column:
letter a=Decimal (light yellow column) 97, b=98, etc...(notice these are lower case letters).

In the third column:
letter A=decimal number 65, B=66, etc (these are upper case letters)