

Introduction to Home Computing

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Introduction

Goals of this class

- To relieve fear of computers as they become more a part of 21st Century living
- To give basic knowledge of common uses of computers and familiarity in these uses
- To assist students in using the computer as a tool to accomplish personal goals more efficiently
- To allow the student to set new goals that would not be possible without a computer
- To familiarize the student with the meaning of common computer terms, such as those used by the media, tech support personnel, and 10-year-olds

A note about illustrations used

This class is being taught by a Christian congregation, and as such, in explaining various computer terms and processes, Biblical examples will often be used. Familiarity with the Bible will not be necessary, nor is belief in or commitment to the teachings of the Bible. This class is offered to all, regardless of your background or beliefs, and while we make neither excuses nor apologies for our beliefs, we will not force them on anyone.

A note about computer platform

This class will be taught using Apple Macintosh® computers. As only roughly 5% of computers in use are Macintosh, you may be curious why we are using this platform for this class

- Macintosh computers are much easier to maintain than Windows®-based PCs. They are easier to troubleshoot, and suffer less “down time”. Since we have many computers for this class and no professional support employees, Macintosh computers were chosen for the savings in cost and time.
- Macintosh computers have less than 1% of the number of viruses that Wintel machines suffer, again saving considerable costs in time and money.
- Each new version of Microsoft Windows is more and more “Mac-like,” so most of the concepts we’ll be covering will work identically on a Windows-based PC. Those that are different will be noted, and the Windows equivalent, if it exists, will be explained and/or demonstrated.
- Since the Macintosh platform was developed to be “user-friendly” from the outset, it is easier to learn from the outset than Windows and is thus more convenient for a class such as this.
- Most common applications such as Microsoft Office, web browsers, and e-mail clients are available for both platforms with very minor differences, those differences usually being additional features in the Macintosh versions.

Lesson One: RAM, Mouse, and other hardware beastsies

Goals of this lesson

- To have a basic familiarity with common hardware in a computer and how it functions
- To be familiar with common hardware peripherals
- To be familiar with common hardware terminology (Like “hardware” and “peripheral”!)
- To be aware of safe computer maintenance
- To recognize hardware problems and know what to do with them
- To develop an understanding of upgrade paths

Lesson

What is that beige box?

Like Christianity, computers seem really complicated and difficult to understand at first, but you don’t need to understand everything about it to benefit from it and get what you need. But every new subject has an associated set of terms. Christianity uses terms like Savior, Justification, and Born Again. To understand computers, you’ll need to understand some basic terms, too.

Just as we were originally created in God’s image, so we tend to create things in our image. That doesn’t mean computers look like people (like C-3PO in *Star Wars*), but that they operate with the same principles. Mankind was designed with authority and morality (which sin has since corrupted), and computers have been designed to reflect our nature.

Hardware

Hardware does not refer to hammers and wrenches. Hardware refers to the actual physical objects used: the computer, its guts (all those chips and things inside it), and the things attached to it. The monitor, keyboard, mouse, printer, modem, and the computer itself are all hardware.

Peripheral

A peripheral is something you attach to a computer to make it more useful. Printers, scanners, mice, and anything else you plug into a computer (besides the power cord) are peripherals. If computers were houses, a porch or deck would be its peripheral.

CPU

The CPU, or “Central Processing Unit,” is the actual computer itself. It is made up of a motherboard (the main circuitry connecting everything), processor (the brains of the outfit), RAM (memory), drives (see below), and case, including the ports (places to plug in peripherals).

RAM

RAM (“Random Access Memory”) is the “thinking memory” of your computer. The more things you want your computer to do at once (“Multitasking”) and the more complex things you want your computer to do, the more RAM you need.

Byte

A bit (b) is one unit of information in binary, either 0 or 1. A byte (B) is 8 bits, enough information to remember 1 letter or number. A kilobyte (KB or just K) is 1024 bytes (not 1000 because computers use exponents of 2). A megabyte (MB), 1024K, a gigabyte (GB or gig), 1024MB, and a terabyte (TB--rarely abbreviated, since only huge institutions use drives this size), 1024 GB. Most computers are currently shipping with hard drives of 20 GB or more. CD-ROM's can store either 650 or 800 MB, and a floppy disk can hold 1.44 MB.

Network

A network allows two or more computers to communicate with each other, allowing the transfer of information between them, either copying files or using data on another computer. The largest network is the Internet, and when you connect to the Internet, you become part of that network.

Software

Software is a set of instructions telling the computer to do certain things. These sets of instructions are called "programs" or "applications" ("apps" for short). Software is stored on some kind of *media*, like music on a tape or CD.

Disk/Disc

The most common media for storing software are CD ROM discs. They are just like music CDs, but they contain computer code instead of music. ROM ("Read-Only Memory") means that they cannot normally be "written" or changed, again, like a music CD, so they are normally only useful for storing information that you won't want to change, like back-ups of software, family pictures, etc.

In the early days of home computers, "Floppy Disks" were used to transfer information ("Data") and store it. "Floppies" have the advantage of being "writable", like a cassette tape, but a CD-ROM can hold 450-550 times as much data as a floppy, and they last longer. Most software that you'd buy today comes on CD-ROM's, and many computers do not even include floppy drives any more.

Inside the computer (and sometimes outside, as a peripheral), is a Hard Drive, which is like a giant floppy disk, able to hold varying amounts of data. Most new computers now include hard drives that can hold many times what one CD ROM can. Hard drives, like floppies, are writable.

Drive

A Drive is a peripheral that allows a computer to read media, like a CD Player or tape player. Hard Drives have the "player" and the "Hard Disk" all in one mechanism, so even though the data is actually on the Hard Disk, the terms are usually used interchangeably.

Driver

A Driver is a program that allows a computer to communicate with a peripheral. Think of it as a translator. The Driver is what "makes the peripheral go," thus the name.

User

You are the user. The person using the computer is called the "User." So if there's a "user error," it's blaming you.

Program/Application

A program, as mentioned before, is a series of commands to the computer to carry out a task. Programs are what allow you to use computers to do what you want. Word Processors (which allow you to write letters and publish articles), Web Browsers (which allow you to see the information on the Internet), and paint programs (which allow you to draw pictures or remove red-eye from a photograph) are all programs.

Document

A Document is a *file* (separate set of code) that is used by an application. Documents can be used to store settings for the program, additional code used by the program, or something produced by a program, like a picture or report.

Basic Setup: How to plug it in

Jesus said, I am the vine. You are the branches. He who remains in Me, and I in him, the same bears much fruit, for apart from Me you can do nothing. (John 15:5, WEB).

So it is with computers: if they're not hooked up, they can do nothing. Computer setup varies from computer to computer, and most include detailed setup instructions when you buy them. Following are the most common:

Laptops

Laptops are what sit in front of you, so named because they can sit on your lap. Laptops are small and portable, and usually, all you need to do to connect them is plug them in (or use their batteries). If you want to use the Internet with them, you'll also need to connect them to a phone line. Turn it on, and you're done.

Desktop "All-in-One"

The "All-In-One" design of desktop computers made popular by Apple, such as the original Macintosh and the iMac, are so called because the computer and monitor are all one piece. They're not as portable as a laptop, since the keyboard and mouse are still separate, but much of the "cord chaos" is gone. These are typically designed for the casual user and generally lack the expandability options of professional models. Generally, setup is just like a laptop, except you need a place to put it.

Desktop "Tower"

Tower desktop models are by far the most popular design. They are so called because they are rectangular, designed to stand tall like a tower. Typically, the tower is stored under the desk, out of the way, leaving more space on your desk. The disadvantage of these is that you typically need a desk specifically designed for a tower (readily available), and that, if you hide the tower, getting at it to access *removable disks* (like CDs or floppies) can be annoying. Once you've found a spot to put it (Do *not* set them directly on carpeting, as static electricity can seriously harm it.), plug it in and connect the monitor, keyboard, and mouse to the (usually) labeled ports (slots with holes to plug in peripherals). Not only are these ports usually labeled with little pictures of monitors, mice, etc., but also only rarely will a cord plug into a port where it doesn't belong. You don't have to worry about plugging it into the wrong port. The ports are usually on the back of the CPU.

Desktop “Pizza Box”

The less popular “Pizza Box” design is like a tower laid flat on its side. These are designed to sit on your desk with the monitor resting on top of computer. Hook-up is identical to a tower, except the monitor is usually set on top of the CPU.

Palmtop

Palmtop computers, or PDA’s (Personal Digital Assistants), are growing in popularity. The first was Apple’s Newton, and now, you can find them built into cell phones and wristwatches. The scope of this class does not allow for covering such devices, but we will look at their use briefly in Lesson 5.

Peripherals

The eye can’t tell the hand, “I have no need for you,” or again the head to the feet, “I have no need for you.” No, much rather, those members of the body which seem to be weaker are necessary. Those parts of the body which we think to be less honorable, on those we bestow more abundant honor; and our unrepresentable parts have more abundant propriety; whereas our presentable parts have no such need. But God composed the body together, giving more abundant honor to the inferior part, that there should be no division in the body, but that the members should have the same care for one another. When one member suffers, all the members suffer with it. Or when one member is honored, all the members rejoice with it. (1 Corinthians 12:21-26, WEB)

Just as God uses different people to accomplish different goals, so on computers, you need different tools to accomplish different goals. Below are descriptions of the most common peripherals:

Essentials

Monitor

The monitor looks like a TV (and in fact, some computers in the early 80’s used small TVs for monitors), without buttons to change channel and volume. Monitors are the main *output* device on a computer and allow you to see what the computer is doing.

Keyboard

Designed after the QWERTY typewriter design, keyboards come in many sizes and shapes, but they key layout is nearly identical on all of them. Keyboards are the primary *input* devices on a computer.

Mouse

Mice act as pointers and greatly speed up certain kinds of activities. They allow you to point at things, pick things up, move them around, and drop them. They are essential to graphics programs and most modern GUI (“Graphical User Interface”) operating systems like Macintosh and Windows. Laptops typically have a trackball or trackpad, which is essentially an upside-down mouse. PC’s ship with 2-button mice. Macs ship with 1-button mice, which are simpler for new users. 2-button mice are available for Macs as well.

Printer

Printers allow you to take what you see on the monitor and transfer it to paper. The two main types of printers are inkjet and laser.

Inkjet

Inkjet printers are most commonly used in homes and very small businesses. Inkjet printers can produce photo-quality colors using a combination of tiny dots of ink (sometimes over 1000 per inch!). Inkjet printers are cheaper than laser printers, but the ink is generally more expensive in the long run. Also, most inkjet inks are not waterproof, so a small drop of water will ruin an inkjet-printed page. Still, for home use, inkjet printers are generally the most practical.

Laser

Laser printers work using toner (dry ink) instead of wet ink, very similar to a copier. They can produce sharper lines, ideal for *text* (letters and numbers), but color laser printers are *very* expensive. Laser printers are much more expensive than inkjet printers, but their cost per page is usually less. Laser printers tend to be used more by businesses.

Connections

Peripherals connect to the computer through various *interfaces*. Different kinds of connections are used for different kinds of peripherals.

Serial & Parallel

These are older methods of connecting printers and modems and some old digital cameras. They are rarely used any more, but if you buy a used computer, you may run into these. Serial and parallel connections can be “hot-plugged” (connected and disconnected while the computer is on).

SCSI & IDE

These are used for connecting drives to the computer, as well as older peripherals which need to be controlled by the computer and send a lot of data back and forth. Most older scanners use SCSI (although some use parallel). SCSI is a bit faster than IDE, but IDE (or ATA) is cheaper. The internal Hard Drives of most modern computers are IDE. SCSI devices should only be plugged into or unplugged from a computer when the computer is turned off.

ADB

ADB is used on older Apple mice, keyboards, and other input devices. It has the disadvantage that you could theoretically short out your computer by plugging in an ADB device when the computer is on.

USB

USB is much more user-friendly than and has all but replaced SCSI, ADB, serial, and parallel. Any USB device can be plugged into any USB port. Most consumer peripherals now use USB. USB is hot-pluggable.

Firewire

Firewire is similar to USB, but it tends to be faster (although the new USB2 runs about as fast). Firewire is used for peripherals that need to transfer large amounts of data to and from the computer quickly and is used mainly for external drives and high-end digital cameras. By plugging a Firewire digital camcorder to a computer, you can edit the video right on the camera without copying it to the computer first. Firewire drives are also the first ever to be able to connect to two computers at once. Firewire is hot-pluggable.

Ethernet

Ethernet is the standard method of connecting computers together on a network. DSL and Cable Internet uses Ethernet.

Wireless

Wireless refers to connecting a device without a physical connection. The most common methods are IR (like a TV remote control) and using radio waves (AirPort, Bluetooth, Rendezvous, etc.), similar to a cordless phone. Wireless can be used for networking (AirPort allows you to sit out on your deck or in bed with a laptop and use the internet without any wires connected to the laptop.) or peripherals (wireless mice—not for those who often lose their remote controls).

Extras: The toys

Drives

Disk/Disc drives:

External drives allow you to take your data to share with another computer or make a back-up copy. None of the original copies of the books that make up the Bible still exist, but we have copies that we can carry around and share with others.

Card Readers

Card readers are like drives, except the information is saved to a microchip. These are used most commonly with digital cameras and other small digital devices, and they tend to hold less data than a CD or Hard Drive, but much more than a floppy.

Scanner

A scanner works like a copier, but instead of printing out the picture it takes, it converts it to a graphic file you can edit on your computer.

Modem

A modem is a network device most commonly used to connect to the Internet. The three most common types of modems are dial-up, Cable, and DSL. The latter two are considerably faster (“Broadband”), but broadband Internet accounts tend to be more expensive than dial-up, and broadband is not available in all areas.

Multimedia devices

Digital cameras, camcorders, and other A/V devices greatly expand the uses of computers. With the right hardware and software, you can easily edit home movies or even connect your computer to your cable or satellite connection and record and edit your favorite movies.

Tips

Care and cleaning

Dust to dust

Because we live in world cursed by sin, things decay and turn to dust. The fans and static electricity in computers cause them to attract dust horribly. When dust gets inside computers, it insulates them and can cause them to overheat. Occasionally (every month or 2), all desktop

computers should get dusted by blowing compressed air through the vents. DO *not* blow with your mouth—microscopic drops of saliva can short out the computer.

Mice, trackballs, and other items exposed to dust should be cleaned as needed as well, cleaning the ball and rollers with an alcohol pad.

Water can wash away sin, but sugar is a whole different story

Peter said to them, “Repent, and be baptized, everyone of you, in the name of Jesus Christ for the forgiveness of sins, and you will receive the gift of the Holy Spirit. (Acts 2:38, WEB). Water is amazing stuff. With the promise of God, it can even wash away your sin. Washing away sugar is a whole different story, though.

Don’t eat or drink near computers. If you *must*, food should be non-crumbling, and drinks should be sugar-free, like diet pop, black coffee, or tea. If you spill on your keyboard, you can rinse most off with warm tap water (Don’t do this with a laptop!), followed by isopropyl alcohol to speed drying. It’ll still take several days to dry completely, during which you’ll need a loaner. If you spill a sugared substance on it, you may need to run it through a dishwasher to get it clean, but check with a professional for advice on your specific model.

Surge Protectors: The cheapest insurance you can buy

Never connect a computer directly to a wall. Always run it through a surge protector. Which one you buy is up to you. More expensive ones will even guarantee against a set dollar amount of damage. You should still unplug it during a lightning storm, though, if you believe there’s a remote possibility of your house or connected power lines being struck.

Troubleshooting

How do I know whether my problem is a hardware problem?

Sometimes, it’s hard to tell, but certain signs can alert you to a hardware problem. If the computer drives make a regular loud clicking sound, it’s hardware. If the computer or peripheral will not power up, it’s hardware. *Utilities* (programs that fix or improve something on your computer or give you additional—usually technical—information about your computer) like Norton Utilities, TechTool Pro, and Disk Warrior can help locate and fix drive-related problems, and one of these should be used quarterly or more, especially if you’re having frequent *crashes*.

How do I fix a monitor?

Quick answer: you don’t, at least not CRT (TV-like) ones. Even monitors that have sat for years can hold a large electrical charge, so if you don’t want to buy a new one (and you don’t want to “buy the farm”), pay a professional to look at it.

Upgrading

Unlike the Bible, which is still useful and needs no modification almost 3500 years after the first parts were written, computers get outdated quickly. New technologies replace old, and speed doubles every two years, but if your computer works for you, there’s no reason to throw it away. This was written on a 7-year-old computer using 11-year-old software. That said, when you’re ready to upgrade, you have several options that may be more practical than buying a whole new computer, saving you several hundred dollars.

Daughter cards

Daughter cards connect to the motherboard (get the “connection”?) to replace or expand the functions of the computer. Daughter cards will require you to open the computer case, but most include detailed installation instructions to make the process fairly easy.

Processor upgrades

A processor upgrade card has a faster processor than the one on the motherboard and thus speeds up the computer. Think of it as a replacement brain. If you’re tired of waiting for it, staring at the rotating clock, you might want to look into a processor upgrade.

Video cards

If you want to play the latest games on your computer, you’ll want a good video card. These enhance the graphics by allowing more movement on the screen and additional special effects in games that were designed with the card in mind.

Network cards

Most modern computers include ethernet built-in, but a few PCs still do not. They can be found cheaply, so if you’re interested in connecting your computers, get an ethernet card.

AV Capture cards

If you can’t afford a Firewire camcorder, you can connect your VCR or camcorder to your computer with an AV capture card. If you want to transfer VHS home movies to DVD (if you have a DVD “burner”) or VCD (a poor man’s DVD), this is essential.

Faster components

Sometimes, the answer to more speed is not a faster processor, but a faster drive. No matter how quick a reader you are, if the pages of a book stick together, you can’t speed read. Before you buy a faster processor, find out whether your hard drive is the bottleneck.

More RAM

Buy RAM and buy lots of it. The more RAM you have, the more information your computer can handle at a time, the less it needs to write information temporarily to your hard drive to remember it, the faster your computer will be. On the most recent computers, 256 MB RAM is the minimum.

Interesting Tidbits

The MegaHertz Myth

Probably the most common misconception in the world, second only to, “If I’m good, I go to heaven,” is that a computer’s speed is measured in MegaHertz (MHz). Wrong on both counts. The first sentence should read, “Because Jesus was good in my place, I go to heaven,” and the second should read, “a *processor’s* speed is measured in MegaHertz.” As we’ve discussed, processor speed is only one (though one of the most important) factor in a computer’s speed. There are many other factors, like *bus speed* (basically the size of the pipe through which information runs—you can only squeeze so much through a pipe, no matter how much it’s being produced on one end), RAM speed, drive speed, and the efficiency of the processor itself [a Pentium III chip (processor) is generally faster than a Celeron chip, and a G4 chip is faster than either of those, even if all three have the same “Clock speed” (MHz)]. Processor speed is a bit like horsepower—it’s a factor in the speed of a vehicle, but not the only factor. The best

determination, though not perfect, is “Benchmarking,” comparing computer speed in real-world tasks. Most computer magazines will give you benchmark comparisons.

The most important part of an old laptop is its battery

Old laptop batteries can often cost \$100 or more, depending on the battery. If you buy a used laptop, make sure it has a good battery, able to run for an hour or more from a full charge.

RAM is cheap. Buy lots.

With any computer, you want to put as much RAM in it as you can afford, and most reputable dealers will give you a lifetime warranty on it. Don’t settle for less.

Resources

Books

The ...*For Dummies* series from IDG Books. These books are written assuming you know *absolutely nothing* about the subject at hand. They are entertaining and informative. Frankly, anyone that can write a technical manual that is so enjoyable that you often “can’t put it down” has my vote.

Websites

Yes, I realize that, at this point, you may not be ready for “web surfing,” but these are here for future reference.

lowendmac.com: If you’re interested in buying a used Macintosh, here’s a good place to start. This is *by far* the most comprehensive and informative site for Macintosh purchasing information.

shopper.com: Run by Cnet, one of the largest internet companies in the world, this site gives you comparison pricing of all things computer-related.

ramseeker.com: Gives comparison pricing when it’s time to buy RAM.

Computer magazine websites. Most Computer magazines have websites with articles from old issues, benchmarks, etc. These are an excellent resource not to be ignored.