Why Doesn't My Floppy Disk Flop?

Why Doesn't My Floppy Disk Flop?

And Other Kids' Computer Questions Answered by the CompuDudes®

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and

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Welcome to Our Book

NO MATTER what you already know about computers, you have something in common with everyone else who uses a computer—you have questions about it! How do we know this? Starting back in 1989 we began appearing on a radio program on WXPN-FM in Philadelphia called *Kid's Corner,* hosted by Kathy O'Connell. Every week kids call us with questions about computers, and we've put many of these questions together in this book.

Say you want to know more about the Internet—just flip to Chapter 3. Have you ever wondered what computers were like in the old days? Some of the answers can be found in the Introduction—plus we have added a bibliography that lists our favorite computer history books. And if you are wondering what the computer world may be like in the future, turn to Chapter 5.

Both of us have been using computers since before the first personal computer was made, and we have used almost every machine at one time or another. We should be able to answer most of your basic questions. If you can, check out our radio show or visit the CompuDudes Web site at `http://www.compududes.com`.

Introduction

Highlights of Computer History

A VARIETY of inventions from many different cultures contributed to the development of your computer. It took many technological leaps over the last several hundred years to develop an electronic computer that can do all the amazing things your computer can do. And the history of future computers is happening now. It all started with . . .

Calculators

While you may think of a calculator as that battery-powered thing that you use to do your math homework, a calculator is actually any tool used for counting numbers. Your hands are a great calculator for adding and subtracting small numbers, but for more complicated calculations, people had to invent calculating machines.

In 1617 John Napier, a Scottish nobleman, invented Napier Rods to make it easier to multiply and divide. These were sticks with four flat sides that had numbers marked on them. To calculate, you aligned the rods in the right order. From Napier's invention, William Oughtred, an Englishman, invented the slide rule in 1621. To calculate using a slide rule, you slide the numbers

printed on it into the correct positions. Twenty-one years later, a Frenchman, Blaise Pascal (for whom the programming language was named), invented an adding machine to help his father, who was a tax collector.

Mechanical Calculators

Two centuries and many inventions later, in 1822, an Englishman named Charles Babbage started to design a mechanical calculator called the "difference engine." Its purpose was to produce mathematical tables to help scientists and businesspeople with their work. Babbage was obsessed with designing the ultimate calculating machine. He put over ten years of work into the design of a huge, complex machine and spent a lot of the British government's money, but he never finished it.

Before this first machine was finished, he was already designing the next one, called the "analytical engine." Neither project was finished when Babbage died. But if you visit London, England, either in person or by way of the Internet, you will find a working difference engine, which was built after Babbage died, at the London Science Museum (you can visit their Web site at `http://www.nmsi.ac.uk/`).

Electric Calculators

One of the most famous electric calculators was designed by Herman Hollerith to help calculate the 1890 United States Census. The Census Bureau collects information about every person living in the United States. In the 1800s processing all the information collected by hand could have taken more than eight years. By that time the information would have been out of date and not very useful.

Hollerith designed a machine that worked with punched cards. Each card contained the answers to all the questions for one person. After all the cards were collected, they were run through the machine and the machine counted all the answers.

The First Electronic Computers

During World War II, the U.S. Army's Ballistic Laboratory, needing help in keeping up with large amounts of calculations, gave the University of Pennsylvania in Philadelphia the task of building the first electronic computer. ENIAC (Electrical Numerical Integrator and Computer) was designed by a graduate student, J. Presper Eckert, and a professor, John Mauchly.

ENIAC wasn't finished until after the war was over in 1945. Although it was used by the military, it was also used to help scientists predict weather and to figure out complex problems in airplane design and nuclear physics.

INSIDE ENIAC

ENIAC was not like your desktop computer. It was eighty feet long and three feet wide. It used eighteen thousand vacuum tubes that had to be changed constantly because they burned out like light bulbs. The Philadelphia newspapers claimed that the computer needed so much electrical power that it dimmed the lights in the city, but that was not true. Parts of ENIAC are on display at the Moore College of Engineering ENIAC Museum at the University of Pennsylvania in Philadelphia, Pennsylvania, and at the Smithsonian Institution's National Museum of American History in Washington, D.C.

Big Mainframe Computers

After World War II Eckert and Mauchly went into business and started the Eckert-Mauchly Computer Corporation in 1948. Their first computer, designed for an aircraft company, was called BINAC (Binary Automatic Computer).

Their most famous computer was the UNIVAC I (Universal Automatic Computer). It weighed sixteen thousand pounds, had five thousand vacuum tubes, and could make about a thousand calculations per second (fast for its day, but computers these days can compute a lot faster). The UNIVAC became famous in 1952 as the first computer to appear on television, when it was used to predict who would win the presidential election between Dwight Eisenhower and Adlai Stevenson. As the computer predicted, Eisenhower was the winner.

Around the same time, IBM (International Business Machines) got into the business of making large computers.

Modern Personal Computers

The microprocessor, or computer chip, is what made the personal computer possible. In 1974 the Intel Corporation created the first central processor chip, known as the "8080," which was used in the first personal computer, the Altair. Since then, Intel has created lots of chips, each one faster than the last one. If you want to see what they look like, stop by the Intel Museum Web site at `http://www.intel.com/intel/intelis/museum`.

Other early personal computers were the Apple II, the Osborne portable computer, the Radio Shack Model I, and the Texas Instruments 99A. They were made in the late 1970s for use at home.

Since then, personal computers have been getting faster, smaller, and more powerful every year, and companies are always making innovations. Some new ideas catch on and others don't last more than a few months. The future home computer will be shaped by what you, as the computer user, decide is a good feature.

People in Modern Computing

The most famous names in modern computing are Bill Gates and Steve Jobs. Bill Gates, along with his college friend Paul Allen, founded the Microsoft Corporation. Bill Gates left Harvard University before he graduated to start the company and develop Microsoft DOS, the first computer operating system for the first IBM personal computer. Bill Gates is one of the richest men in the world. Microsoft makes software that is used on most computers, including Microsoft Windows, Word, Excel, and Microsoft Internet Explorer.

Steve Jobs and Steve Wozniak founded the Apple Computer Company and built one of the first personal computers, the Apple II, in 1977. In 1984 Steve Jobs introduced the Macintosh, which instantly became one of the most popular computers.

Faster and Faster

Every year computers get faster and faster, but did you know that someone predicted this already? His name is George Moore, and his law is called, naturally, Moore's Law. The law says that every two years the speed of the central processor will double.

What Is the Toughest Thing a Computer Ever Did?

A computer doesn't know the difference between hard and easy because it doesn't think. A computer simply does the tasks you give it. But computers do things that humans would find very tough. For example, launching a space shuttle is all done by computer. The computer has to keep all four parts of the shuttle (two booster rockets, fuel tank, and shuttle) plus the five rocket engines working together. Computers also do difficult calculations quickly that would take humans a very long time. For example, ten years before the launch of a spacecraft to Uranus, scientists used a computer to figure out how long it would take the spacecraft to get there. The computer correctly calculated the exact day and time the spacecraft would arrive.

HARDWARE

EVERYONE has a general idea of what a computer is, but not many *really* know what's going on inside that beige box on the desk. But don't worry, it's not as complicated as you may think.

From the largest computer that NASA uses to keep the space shuttle flying to the smallest computer chip inside your microwave oven, all computers do the same three basic things. First, they get information from the outside world. For the space shuttle, that information includes how fast it is going, how high it is, and so on. For the microwave oven, the information might relate to the kind of food you are putting in it. Next, computers do something with that information, like decide how much fuel to burn to move the shuttle, or how long to cook your popcorn. Once that is decided, they send out signals to make the engines burn or the microwaves bounce around in the oven.

The Basics

What are hardware and software?

Hardware refers to all of the parts of the computer, from the computer box to the computer monitor to the printer. **Software** refers to all of the programs that go into your computer.

What are the basic parts of a computer?

The monitor is the big screen that you look at. The computer box is what holds its guts—all the chips, circuit boards, and so on. The **central processing unit (CPU),** the chip that carries the basic instructions about how the computer works, is in this box, so people sometimes refer to the box as the CPU even though it contains much more than just the CPU. The box also includes one or more slots, or disk drives. The keyboard is what you use to type words and commands. The mouse is the little box with a rolling ball inside that you use to move the cursor around the screen.

What is a motherboard?

If you look inside a computer, you will see a huge circuit board that fills one side of the case. Circuit boards, computer chips, and wires are all connected together on the motherboard, or the main circuit board, of the computer. The motherboard (there isn't a fatherboard) is where you find the basic circuits like the central processing unit and RAM memory chips. The parts like the sound card, the floppy disk drive, and the CD-ROM player are all connected and controlled by the motherboard.

What is a computer chip?

A computer chip is a tiny group of millions of electronic components and circuits in your computer that make it work. These days computer chips are made of silicon and metals like tin, gold, and copper.

What's the point of making things in a computer so incredibly tiny?

There are two reasons why circuits in computers are so tiny. First, if the parts were larger, and they could be, your desktop computer would be the size of your house and you couldn't have laptops or palmtops. The second reason is that the smaller you make computers, the faster they can go. By reducing the length of the wires and the distance between computer chips you actually speed up the computer.

Can you make a computer so small it can fit in your brain?

Not yet, but in April 1998 two doctors from Emory University, Dr. Bakay and Dr. Kennedy, connected a human brain to an electronic device that amplifies brain signals. The signals are transmitted from an antenna connected to the device to a laptop computer. The patient, who is completely paralyzed, is able to move the computer cursor around a screen and communicate with the doctors.

What does "Intel Inside" mean?

Intel is a company that makes computer chips for most of the computers sold in the last twenty years. The Pentium and the Pentium II are very powerful chips that contain your central processing unit or CPU.

Bits and Bytes

What's a computer bit?

A computer **bit** is the smallest unit of data handled by a computer. It represents either 0 or 1. This is known as a **binary** number system. A computer actually works by using on and off switches. If a switch is off, it means 0; if it's on, it means 1. There are millions of microscopic switches within a computer's microchips.

Ones and Zeros

Not only can your computer only count from 0 to 1, it is also only able to add or subtract. Even though you can do complex math on a computer, deep down inside, the computer is really only adding and subtracting 1s and 0s.

How many bits does a computer use at once?

Your computer works in 8-bit chunks called **bytes.** It also works with 16 bits at a time (called a word) or 32 bits at a time (called a long word). The number of bits that a computer works with depends on what you ask it to do. If you are working with letters, your computer is moving bytes at a time, because one byte can store one character (one letter, or space, or punctuation mark). If you are painting with an art program, your computer will usually work with long words, because 32 bits is enough data to record all of the colors that you can see.

BUYER BEWARE

When you see ads for video game systems saying that a new 64-bit game system is better than a 32-bit system, remember that it is the software—the games themselves—not the number of bits that the system can process that makes the difference. A poorly programmed game written for a new 64- or even 128-bit game system may not be any faster or better than a well-written game on a 32-bit game system.

Memory

What is memory?

Memory in a computer is a lot like an address book that the computer uses to keep track of numbers and other information. For a program to run, the computer must load it into memory; then it starts following the instructions one at a time. If the program tells the computer to add two numbers and then multiply that answer by another number, the computer will first do the addition and then store the answer in memory and use it to multiply.

Computer memory is organized as a bunch of addresses, one per byte. The computer can read or write to any address in memory without going through every address before and after it. This is called **random access.**

What is the difference between RAM and ROM?

The most important type of memory is usually called random access memory, or RAM. The name *random access* means that you can get to any storage location that you want in any order. Actually all computer memory is random access. The important thing about data stored in RAM is that it will hang around only while the power is on. If you turn the power off without saving your work somewhere else, you will lose any data that you have been working on.

The other type of memory that you will find in a computer is called read-only memory, or ROM. Like RAM, ROM is random access, but unlike RAM, anything stored in ROM is going to be stored in the computer chip forever. In addition, *read-only* means that you cannot change the data that is stored in ROM; you can only use it. The instructions that tell the computer how to start up and read the hard drive are stored in ROM.

Off to a Slow Start

The earliest computers did not have ROM. Instead, when you turned your computer on, it would just sit there and do nothing until you entered the commands to start up, using a row of switches on the front of the computer. It could take an hour of slow switch flipping to get your computer started. And if you made a mistake, you had to start all over again.

How much memory do I really need?

The amount of memory that you have in your computer is very important. When we talk about memory, we mean RAM, or random access memory. If you do not have enough, your computer may run very slowly, or it may not run some programs at all. Figuring out how much memory you need is not an exact science.

As of this writing, most computers have 32 megabytes of memory installed. Computers that people use to create professional three-dimensional graphics have 64 megabytes. The amount of memory that people need has been increasing constantly, and we can only say that sometime in the future you will probably need more RAM.

It's always a good idea to read the side of the box when you buy a new game or other software. All software boxes list how much RAM each program needs to run on a computer. Make sure your computer has enough memory left to run that program.

If your computer's hard drive makes a lot of noise and the little hard drive light on the front of the computer flashes a lot while you are using programs, then it is a good idea to put more RAM in your computer. You will first have to find out how much RAM you have. This can be done by clicking on your computer's control panel and clicking on the Memory area for a Mac or the Device Manager on the Windows PC. Next, if you plan to add more memory, ask your parents to take the computer to a computer store to have new RAM chips installed.

Disks, Drives, and Monitors

What are disks?

Since RAM forgets everything that is stored when the power goes away, you need somewhere to put your data when you want to turn the computer off. The place where data is stored is called a **disk.** Disks can be floppy disks, hard drive disks, recordable CDs, or backup storage disks like Iomega Zip disks or Imation Super Disks. A floppy disk can hold 1.44 megabytes of information. Storage disks can hold 100 megabytes or more; recordable CDs can hold as much as 650 megabytes; and the disks in hard drives have several gigabytes of storage space.

Hard Drive

CD-ROM

3½ inch Floppy Disk

Floppy disks, recordable CDs, and Iomega Zip disks are all portable. They can be inserted into a disk drive in your computer or attached to your computer to collect information, then given to someone to use on another computer. The hard drive uses a hard disk that stays inside your computer.

Floppy disks are the least expensive, but they are not good for permanently storing data. The thin, floppy plastic can wear out and lose data over many years.

Iomega Zip Drive Disk

Why doesn't my floppy disk flop?

The 3½-inch-wide "floppy" disk you have is covered by a hard plastic case. Inside the protective hard case is a thin piece of plastic that is actually floppy, or flexible. The first portable disks, in the early 1980s, were larger and were enclosed in floppy plastic cases. They could easily be damaged if they were accidentally bent. After people switched to hard plastic cases, the name "floppy" just stuck.

KILOBYTES, MEGABYTES, GIGABYTES, AND TERABYTES

Information stored on a computer's hard drive, on floppy disks, and on backup tapes and disks is measured in bytes. Computer graphics and computer-animated movies like Disney's *Toy Story* can take up hundreds of terabytes. A kilobyte is one thousand bytes, a megabyte is one million bytes, a gigabyte is one billion bytes, and a terabyte is one trillion bytes. Remember that one character takes up one byte of space.

Is there any difference between a hard drive and a floppy drive?

There is one big difference: speed. In a floppy drive the recording head actually touches the disk, but in a hard drive the head flies over the disk. So saving to your hard drive is faster than saving to a floppy disk. To give you a good idea of the speed of your hard drive and how fast the head flies over the hard drive disk, imagine a jet airplane flying along at about 600 miles per hour only 10 inches above the ground. The head of a hard drive flies over the hard drive platter that quickly.

Take Care of Your Floppy

One of the things that will always be damaging to a floppy disk, even if it is in a hard plastic case, is a magnetic field. Information is recorded onto a floppy disk using magnets. If you get a floppy disk near a magnet, you can lose the information stored on that floppy disk.

Why does my computer make funny noises when I turn it on?

When you turn your computer on, the hard drive has to start up. The first thing that it does is start spinning the platters inside. This is what makes the whining sound that you hear at first. The next thing that happens is a clicking sound as the hard drive moves the read/write heads back to the outer parts of the platter. These sounds are normal, and you should hear them the same way every time you start up your computer. If these sounds change, you may need to have a service person check things out to make sure that your hard drive is okay and not getting ready to break. You can't see any of this because the hard drive is sealed inside a case. The sealed case keeps out dirt and dust and protects the hard drive platters.

HEAD CRASH!

If you bump your computer while the hard drive is saving something, and the recording head in the hard drive hits the disk itself, you will experience something called a "head crash." This is not something that you ever want to happen to you. If your hard drive head crashes, the head will scrape up the iron coating on the disk and destroy the head and the disk. All of your programs and the stuff you create and store on the hard drive are in that iron coating, so if you damage the iron coating, you will lose everything.

There is no good way to fix a drive after a head crash, but there is an easy way to prevent one in the first place. First, make sure your computer is on a sturdy desk or table, and be sure that it is sitting flat on the desk, not propped against something that might move and let the computer fall.

Also, if you have to move the computer, be sure to wait a few seconds after you turn the power off before you do it. Hard drives can spin for a while after you turn the power off. You want to be sure that everything has stopped before you move the computer.

And finally, if your computer has been in a cold place, let it warm up inside the house for a half hour before you turn it on. The metal and plastic parts in your computer can bend or break if they go from cold to hot too fast.

My hard drive is full. What can I do?

There are three things you can do. First, start cleaning up. Get rid of all those old programs that you never use, clean up temporary files (files that programs use while they run, and are supposed to clean up afterwards, but don't always), and move things like old schoolwork to floppy disks and delete them from the hard drive. Just make sure you know what you are deleting from the hard drive and that you have your parents' permission. You don't want to end up deleting any important instructions to the system or your dad's manuscript!

Second, if you have Windows you can adjust the size of the Recycle Bin, which is located on your computer desktop. The Recycle Bin is where you toss files you want to delete from the computer's hard drive. Place your mouse cursor over the Recycle Bin, and click the right mouse button once. In the little window that appears, click on "Properties," and another window will pop up called "Recycle Bin Properties." In the middle of the window is a slider that selects the percentage size of your hard drive that is reserved for the Recycle Bin. When you buy a new PC, the slider is always set at 10%. This means that if you have a 6.4-gigabyte hard drive, 640 megabytes are set aside for the Recycle Bin. Reset the slider to 1%. You will free up a lot of megabytes this way. You can always change it back if you have to get rid of a huge file.

The third way to get more space is to buy a bigger hard drive. You can replace your small hard drive or even add a second hard drive to most computers. However, a new hard drive costs at least $200, and you would have to pay someone to install it.

What is my computer doing when I first turn it on?

As the computer powers up, you will see information displayed on your monitor. On a PC, numbers and words will fly by. On a Mac, you will not see the numbers during the startup of the computer—you see words that say "Welcome to MacOS," referring to the Macintosh operating system. The computer will check the RAM as well as information about drives and whatever other things are in, or attached to, your computer. A memory

chip in your computer called the BIOS (Basic Input/Output System) chip stores all of this information. Once your computer has checked to make sure everything is working, it will display your desktop screen.

This process of starting up is called "booting up," and it comes from the old expression "pulling yourself up by your bootstraps."

Your computer has a lot of work to do before it is ready to do what you want it to. Once the computer is sure that all systems are going, it will look for instructions about what to do next. These instructions are usually part of the **operating system,** a software program that tells your computer how to organize information. The more advanced your operating system is, the longer it will take to start.

How does my monitor work?

Your monitor's screen, like most TV screens, is actually a really big vacuum tube. A **vacuum tube** is a sealed glass container that has all of the air removed from it. In the back of the tube, which is also called a cathode ray tube, or CRT, is a device called an electron gun. This gun fires a stream of electrons at the inside of the front of the CRT. The inside of the glass is coated with special chemicals called **phosphors,** which glow when the electrons hit them. If you have anything that glows in the dark, it has phosphors in it.

But how does the computer control what the electron gun draws on the screen? It's done with magnets. One magnet moves the electron beam stream left and right, and a second magnet moves it up and down, sort of like an Etch-A-Sketch toy drawing screen. When the electrons hit a spot on the screen, the spot glows. That small spot is called a **pixel.** The computer screen can have as many as 1,024 pixels across and 768 pixels up and down. That's a total of 786,432 pixels covering the entire screen.

In a color monitor, instead of a single coating of phosphors, the inside of the screen is printed in a pattern of three phosphors, one each for red, green, and blue. Instead of one electron gun, there are three guns, one for each color. Using different combinations of these three primary colors, your monitor can display up to sixteen million colors.

What is a modem?

A modem is a device that allows your computer to communicate with other computers through a telephone line. An internal modem fits into a special slot inside your computer. An external modem plugs into a socket on the back of your computer. A telephone wire is attached from the modem to a

telephone jack. The modem changes your data into sounds to send it through the telephone wires, and then another modem on the other end changes the sounds back into data.

Accessories

How do I get to hear sound on my computer?

Your computer may already have speakers and a **sound card** (hardware that sends sounds to the speakers), or you can have them added. The sound card connects to the motherboard inside your computer. The speakers connect to the sound card through a cable in the back of the computer.

I have three speakers attached to my computer—why?

If you have three speakers and one of them looks like a big box, you have a great sound system. The big box is called a **sub woofer**—no, it doesn't bark like a dog. The sub woofer is designed to play the deep bass sounds of explosions, booms, and deep bass voices. The other two speakers send out the high- and middle-range sounds. When you set them up, put the sub woofer on the floor under your computer desk, and place the other two speakers to the left and right of the desk.

What is a CD-ROM drive?

CD-ROM stands for compact disc—read-only memory. The computer CD drive works the same way as the compact disc player attached to your family stereo. Information in the form of sound, graphics, words, and video is stored on the disc—up to 650 megabytes!

The information is read off the disc in a unique way. If you looked at the bottom of the disc (the side without pictures or words) with a very powerful microscope, you would see little pits and scratches in the compact disc. Those pits are information. When the disc spins in the CD-ROM drive, a laser beam flashes on the pits and the computer reads the information off the disc. Be careful not to scratch the bottom of the disc, because that will make the laser beam skip over information.

What is a trackball?

A trackball is an upside-down mouse. The ball and the buttons and sometimes a scrolling wheel are located on top. The trackball device stays still while you roll the ball with the palm of your hand or your thumb.

What is a touchpad?

Like a mouse and a trackball, a touchpad is a way to move the cursor around. It looks like a small flat piece of plastic and is sometimes part of a keyboard. Touchpads are often used on laptop computers. All you do is touch the pad with your finger and slide your finger to move the cursor on the screen. On some touchpads you can even tap the pad to open and close folders and files.

What is a track point?

Built into some laptop computers, almost always between the *G* and *H* keys, is a small rubber stick called a **track point**. When you move it around with your index finger, it moves the cursor.

My parents said there are also pointing devices called a hamster and a rat—are they kidding me?

A **hamster** is really a mouse without a cord. Most hamsters, also known as wireless mice, use radio signals to transmit to the computer where the cursor is. A rat is a mouse that you move on the floor with your foot. They are not often used anymore because they are difficult to handle.

What is a joystick?

A **joystick,** which is sometimes plugged into the sound card, is made for playing games. It lets you move something on the screen very

quickly in many directions, so it's great for things like flight simulation. A joystick usually has a plastic grip and is attached to a plastic base. Some joysticks have buttons on the stick and on the base that do different things depending on what game you are playing. It might even have a sliding switch that can control speed in something like a car-racing game.

What is a graphics tablet?

If you like drawing pictures on your computer, you can use a mouse or you can use a **graphics tablet.** The tablet comes in sizes from twelve inches wide to nearly three feet wide and it plugs into the computer. You draw on the pad with a pen without ink. As you move the pen across the pad, you will see what you are drawing on the screen. You have to use special graphics software with the pad to create pictures. Some software lets you change what the pen can do. With a simple click, the pen can print a black line or even paint like a brush.

What is a scanner?

A **scanner** is a piece of hardware that lets you electronically transmit printed pictures into a computer. In addition to plugging the scanner into the computer, you will need to load the software that comes with the scanner and allows your computer to reproduce the scanned image. There are two basic types of scanners: A **flatbed scanner** works like a copy

Flatbed Scanner

machine. You lift the lid and place a picture on the glass surface. After the picture is scanned, it appears on your screen. A **handheld scanner** has to be dragged across the picture by hand. A scanner can be very useful for creating a computer family album and also for getting photographs onto your Web site.

Handheld Scanner

What is the difference between inkjet and dot matrix printers?

These days most people use an inkjet printer that prints in color as well as black and white. An **inkjet printer** sprays a fine mist of ink on the paper where the computer tells it to.

A **dot matrix printer** is an older kind of printer that works by printing dots to create the shapes of letters. Small pins hit an ink ribbon, and the

SILICON VALLEY

Silicon Valley is located in Santa Clara County, California, about fifty miles south of San Francisco. The valley is a place where hundreds of computer companies have offices and hundreds more have been started in home garages and basements. So many computer companies started there that by 1972 it was nicknamed "Silicon Valley" by electronics writer Don Hoeffler.

In New York City, computer companies call their part of the city "Silicon Alley." In Scotland you can find "Silicon Glen." And across the Midwest, you will find places called the "Silicon Prairie."

dots of ink stick to the paper behind the ribbon. If you look very closely at anything printed on a dot matrix printer, you can see the tiny dots.

What is a laptop computer?

A laptop computer can do the same things as your desktop computer, but it is small enough to fit on your lap, or about the size of a small briefcase. Many people use laptops because they are so easy to carry from one place to another that you can use them almost anywhere. Some laptop cases are made of supertough metal so that even if you accidentally drop them, the laptop will still work. Laptops are usually more expensive than desktop computers because it costs more money to make the smaller parts.

What is a palmtop computer?

A palmtop computer fits in the palm of your hand, and you can carry it around in your pocket. Some palmtop computers can even read your handwriting. A palmtop is so small that a hard drive or a floppy disk drive can't fit inside it. One of the cool things you can do now is check your email by simply plugging a palmtop into a telephone jack.

Why don't they make computers in colors?

Nearly every computer comes in boring colors like white, black, or beige. But now there are some companies like Nokia that make monitors with red, yellow, blue, and green cases. Apple Computer's iMac also comes in several colors. You can also decorate your computer case with stickers, but make sure you don't cover up the floppy disk drive, the CD-ROM drive, or any of the holes or buttons on the case. Also, a few companies, like Nickelodeon, sell cardboard frames that you can attach to your monitor. The frames can be anything from the shape of a TV set to a border of tropical fish to characters from your favorite TV show.

ACTIVITY

Fun with CD-ROM Discs

You can make your own crafts with CD-ROMs. But first make sure to use CD-ROMs that are demonstration copies or CD-ROMs you get in the mail for online services like CompuServe or America Online. Check with your parents first to make sure that the CDs are never *going to be used again.*

CD-ROM Mobile

MATERIALS

- String
- Scissors
- 2 metal coat hangers
- Even number of CD-ROMs—4 or 6 (or more)

DIRECTIONS

1. Cut two 12-inch and four 6-inch pieces of string.
2. Attach one end of a 12-inch piece of string to the top of a hanger.
3. Tie a 6-inch piece of string to each corner at the bottom of the hanger.
4. Attach one CD to each 6-inch string.

5. Repeat steps 2, 3, and 4 with the second hanger.
6. Tie the second hanger to the first, and hang the mobile near your window so that light bounces off the CDs.

This is just one simple design—see how big and complex you can make your mobile as you collect old CD-ROMs.

ACTIVITY

CD-ROM Coasters

Here's a gift for your parents or a friend. Coasters are placed under beverage glasses so they don't stain or leave a water ring on the table. If your parents ask you not to put a glass or a soda can down on their favorite table, here's a solution that is fun and works.

MATERIALS

- Some old CD-ROMs (Remember to make sure your parents will never want to use them again.)
- Adhesive felt sheets (Look for these in craft stores. One side is felt and the other side is very sticky.)
- Scissors

DIRECTIONS

1. Peel off the backing of the felt sheet. Carefully place the CD-ROM with the picture side up on the sticky side of the felt sheet.
2. Trim away the felt around the CD-ROM.

You now have a CD-ROM coaster with a felt surface underneath. The felt will keep the coaster from sliding on the table.