

Computer Basics

Computer Safety and Maintenance



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How do I keep my computer healthy?

Computers are expensive, and with all big purchases you probably want to **protect your investment**. Luckily, it is not difficult to **keep your computer healthy** and in good working order. Maintaining a computer involves three things: keeping it **physically clean**, protecting it from **malware**, and **backing up** your important files.

Watch the video to learn how to keep a computer healthy.



Keep your computer physically clean

When dealing with computers, dust isn't just unattractive—it can potentially destroy parts of your computer. By cleaning your computer regularly, you can help to **keep it working properly** and **avoid expensive repairs**.

Cleaning the keyboard

A dirty keyboard doesn't look nice and can cause your **keyboard to not work properly**. Dust, food, liquid, and other particles can get stuck underneath the keys, which can prevent them from working properly. Check your owner's manual to see if the manufacturer has provided you with instructions for your specific keyboard. If so, follow them. If not, the following steps are **basic cleaning tips** that can help keep your keyboard clean:

1. **Unplug** the keyboard from the USB or PS/2 port. If the keyboard is plugged into the PS/2 port, you will need to shut down the computer before **unplugging** it.
2. Turn the keyboard **upside down**, and gently shake it to remove dirt and dust.
3. Use a can of **compressed air** to clean between the keys.
4. Moisten a **cotton cloth** or **paper towel** with rubbing alcohol, and use it to clean the tops of the keys. Do not pour alcohol (or any other liquid) directly onto the keys.
5. **Reconnect** the keyboard to the computer once it is dry. If you are connecting it to a PS/2 port, you will need to connect it **before** turning the computer on.



Dealing with liquids

If you **spill liquid** on the keyboard, quickly shut down the computer and disconnect and turn the keyboard upside down to allow the liquid to drain.

If the liquid is sticky, you will need to hold the keyboard on its side under running **water** to **rinse** the sticky liquid away. Then turn the keyboard upside down to drain for two days before reconnecting it. The keyboard may not be repairable at this point, but rinsing the sticky liquid off of it is the only chance for it to be usable again. The best way to avoid this situation is to keep drinks away from the computer area.

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Cleaning the mouse

There are two main types of mice: **optical** and **mechanical**. Each is cleaned in basically the same way, although the mechanical mouse requires a bit more work.

- **Optical mice** require **no internal cleaning** since there aren't any rotating parts; however, they can get **sticky** over time as dust collects near the light emitter. This can cause erratic cursor movement or prevent the mouse from working.



- **Mechanical mice** are especially susceptible to **dust and particles** that can accumulate inside the mouse, which can make it difficult to track—or move—properly. If the mouse pointer does not move smoothly, the mouse may need to be cleaned.



Before you clean your mouse, check the owner's manual to see if the manufacturer has provided you with instructions for your specific mouse. If so, follow those instructions. If not, the following steps are **basic cleaning tips** that will help keep your mouse clean.

1. **Unplug** the mouse from the USB or PS/2 port. If the mouse is plugged into the PS/2 port, you will need to shut down the computer before unplugging it.
2. Moisten a **cotton cloth** with rubbing alcohol, and use it to clean the top and bottom of the mouse.
3. If you have a **mechanical mouse**, remove the **tracking ball** by turning the **ball-cover ring** counterclockwise. Then clean the tracking ball and the inside of the mouse with a **cotton cloth** moistened with rubbing alcohol.



4. Let **all of the parts dry** before reassembling and reconnecting the mouse. If you are connecting it to a PS/2 port, you will need to connect it **before** turning the computer on.

If you just want to give the mouse a quick cleaning, place it on a **clean, white sheet of paper** and move the mouse back and forth. Some of the dust and particles should rub off onto the paper.

Cleaning the monitor

Dirt, fingerprints, and dust can make your computer screen difficult to read; however, it's easy to **clean your screen** when needed. Although there are monitor-cleaning kits you can buy, they may damage your monitor if they are designed for a different type of monitor. For example, a monitor cleaner that is designed for **glass screens** may not work with some **nonglass LCD screens**. The safest method is simply to use a **soft, clean cloth** moistened with **water**.

Do not use glass cleaner to clean a monitor. Many screens have anti-glare coatings that can be damaged by glass cleaner.

1. **Turn off** the computer.
2. **Unplug** the monitor from the power. If you are using a laptop, unplug the laptop.
3. Use a **soft, clean cloth** moistened with **water** to wipe the screen clean.



Do not spray any liquids directly onto the screen. The liquid could leak into the monitor and damage the internal components.

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Tips for cleaning other computer surfaces

From time to time, you should clean your computer case and the sides and back of the monitor to avoid buildup of dust and dirt. Here are a few tips you can use when cleaning these surfaces:

Dust is your computer's main enemy. Use an **anti-static wipe** to lightly dust your computer casing. **Don't use** furniture cleaners or strong solvents.

Use a can of **compressed air** with a narrow nozzle to blow out debris from the air intake slots.

Spray cleaning solution (such as diluted ammonia cleaner or glass cleaner) on a **paper towel or anti-static wipe**. Clean the **monitor housing and case (not the monitor screen)** by wiping in a downward motion.

A safe cleaning solution for **computer surfaces** (not computer screens) is **ammonia diluted with water**, or **glass cleaner** comprised mostly of ammonia and water (check the label). Remember, the milder the solution, the better.



Keep it cool

Don't restrict airflow around your computer. A computer can generate a lot of heat, so the casing has **fans** that keep it from overheating. Avoid stacking papers, books, or other items around your computer.

Many computer desks have an **enclosed compartment** for the computer case. If you have this type of desk, you may want to position the case so it is not against the back side of the desk. If the compartment has a door, you may want to leave it open to improve airflow.

Protecting your computer

Watch the video to learn how to protect your computer from viruses, as well as how to back up your files.



Safeguarding against malware

Malware is any type of software that is designed to **damage your computer** or gain **unauthorized access** to your personal information. It includes **viruses, worms, Trojan horses, spyware**, and other types. Most malware is distributed over the **Internet**, often bundled with other software.

The best way to guard against malware is to install antivirus software such as **Bitdefender, Norton, or Kaspersky**. Antivirus software helps to **prevent** malware from being installed, and it can also **remove** malware from your computer. New malware is being created all the time, so it's important to **update** your antivirus software frequently. Most antivirus programs can do this automatically, but you'll need to make sure this feature is **enabled**.

It's also important to **stay smart** when you're browsing the Web or using email. If a website or email attachment looks suspicious, trust your instincts. Keep in mind that your antivirus program **may not catch everything**, so it's best to avoid downloading anything that might contain malware.



To learn more about protecting your computer from malware, check out [Protecting Your Computer from Internet Threats](#) in our [Internet Safety](#) tutorial.

Backing up your computer

Imagine what would happen if your computer suddenly stopped working. Would you lose any important documents, photos, or other files? It may be possible to repair your computer, but your files may be **lost forever**. Luckily, you can prevent this by creating **backup** copies of all of your files (or just the important ones) on an **external hard drive** or an **online backup service**.

External hard drives

You can purchase an **external hard drive** and copy the contents of your computer to it. The **initial backup could take several hours**, so you will need to select a period of time when you do not need access to your computer. Running the backup overnight usually works best. Follow-up backups should be conducted on a regular basis, but will not take as long because the drive will only need to copy your most recent files.

Western Digital, Iomega, and Seagate produce popular external hard drives. Conduct some research on which product best suits your storage needs, or ask a computer sales representative for recommendations.

One drawback, compared to online backup services, is that your external hard drive can be lost, damaged, or stolen just as your computer might be. Therefore, it is important to keep your drive in a **secure location** when not in use.



Online backup services

You can also back up your files to one of the **online backup services** like **Mozy, Carbonite** or **Box**, and your files will always be accessible to you. The amount of storage space provided by these sites varies, and you may have to pay a monthly or yearly fee for adequate storage. Again, do your research, as these services are constantly changing and offer varying features.

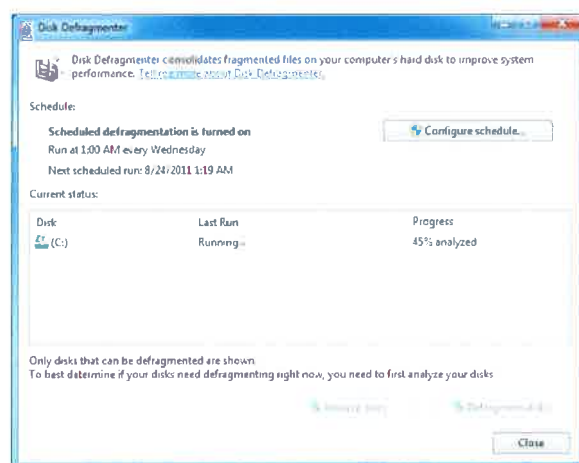
One drawback to online backup services is that the **initial backup can be slow** and may even take days to upload if you have a large amount of files. However, subsequent backups should not take as long.

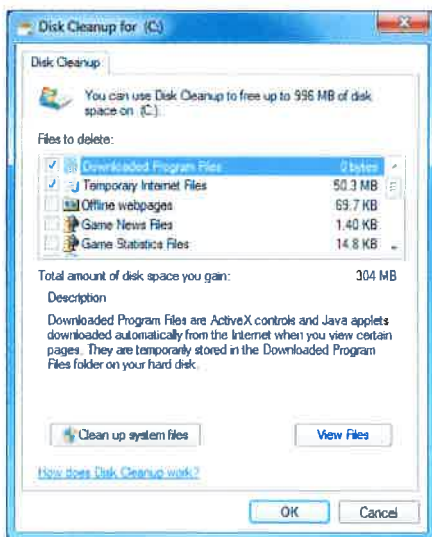
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Other maintenance techniques

To keep your computer running smoothly, it's important to keep files and folders **uncluttered**. Cluttered or unorganized folders make it more difficult to find the files you need. Additionally, **unwanted files** can eventually fill up your **hard drive**, which will make your computer slower and more difficult to use. Here are a few things you can do to delete unwanted files and improve your computer's performance:

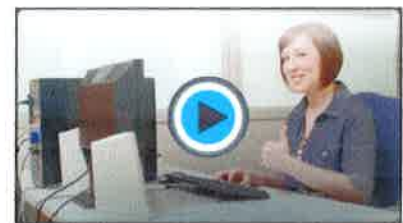
- **Delete files:** If you have any unwanted files, you can delete them manually. To do this, simply drag them into the **Recycle Bin** (or **Trash**), then empty the Recycle Bin.
- **Disk Defragmenter:** Windows includes a **Disk Defragmenter** program in the Control Panel. It **scans** the files on your hard drive and **rearranges** them so it can read them faster. If your computer is running slowly, running Disk Defragmenter can help to speed it up.
- **Disk Cleanup:** Windows also includes a **Disk Cleanup** program in the Control Panel. It scans your computer for **temporary files** and other files that can be deleted. You can then delete the files to free up space on your hard drive.





Creating a safe workspace

Watch the video to learn more about arranging your workspace to avoid strain and injury.



Avoiding strain and injury

In addition to keeping your computer healthy, it's important to think about **your own health**. Using a computer involves a lot of repetitive motions such as **typing** and using the **mouse**. Over time, these motions can begin to take their toll on your body, especially your **wrists, neck, and back**. Staring at a monitor for long periods of time can also cause **eye strain**. To minimize this, you should take a few moments to make sure your workspace is arranged in a comfortable and healthy way.

Computer ergonomics is the science of equipment design and how specific equipment usage and placement can reduce a user's discomfort and increase productivity. Some equipment is designed with special attention to ergonomics, such as **ergonomic keyboards** or **ergonomic chairs**.

Here are a few tips to help you avoid injury in your workspace:

- **Adjust your chair:** Make sure your chair is adjusted to allow you to sit in a natural, comfortable position. Many office chairs are specially designed to **support the lower back** and promote good posture.
- **Keep the keyboard at a comfortable height:** Try to place the keyboard in a position that allows you to keep your wrists straight and relaxed to avoid wrist strain. Many desks have a keyboard tray that can keep the keyboard at a better height. You can also buy an **ergonomic keyboard** that is designed to minimize wrist strain.
- **Keep the mouse close to the keyboard:** If possible, place the mouse right next to the keyboard. If the mouse is **too far away**, it may be uncomfortable or awkward to reach for the mouse.

- **Place the monitor at a comfortable distance:** The ideal position for a monitor is **20 to 40 inches** away from your eyes. It should also be **at eye level** or **slightly lower**.
- **Avoid clutter:** The computer area can quickly become **cluttered** with papers, computer accessories, and other items. By keeping this area as uncluttered as possible, you can improve your productivity and prevent strain or injury.
- **Take frequent breaks:** It's important to take breaks **while** you're working at your computer. To avoid eye strain, you should **look away from the monitor** every once in a while. You can also **stand up and walk around** to avoid sitting in the same position for long periods of time. Programs such as [Eyes Relax](#) and [Workrave](#) can automatically remind you to take breaks.

For more information on setting up a computer workspace, visit the [Computer Workstations eTool](#) from the Occupational Safety & Health Administration.

Challenge!

- Take a look at your computer. Does it need to be **cleaned**?
- **Clean your monitor** following the steps in the lesson. Be sure not to use glass cleaner or any harsh chemicals.
- Based on the type of mouse you have, **clean your mouse** following the steps in the lesson. Do you have an **optical** or **mechanical** mouse?
- What do you do if you **spill liquids** on your keyboard?
- Does your computer have **antivirus** software installed? If not, research some of the different antivirus programs that are available.
- What are two ways of **backing up** the data on your computer?
- To minimize **eye strain**, how far should your monitor be from your eyes?

Computer Basics

Basic Troubleshooting Techniques



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Basic troubleshooting techniques

The computer goes blank before the Word document was saved. The browser window freezes for no reason. You can't hear anything from your speakers.

Most people have at one time or another experienced a **computer problem** like the situations just described, and if you haven't, chances are you will at some point. When a problem occurs, don't panic! Instead, work your way through some **basic troubleshooting techniques** to try and solve the problem.

General tips to keep in mind

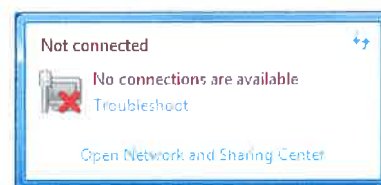
There are many devices, parts, cords, and connections on a computer, which means there are many possible problems that could arise. In addition, your computer uses a variety of software, which can also cause problems. However, no matter what the problem is, you can use the **following tips** to help you find a solution:

Always check the cables: Many computer problems are related to an issue with the cables and connections. The easiest first step you can take to troubleshoot most problems is to check all related cables and connections.

Isolate the problem: If possible, try to isolate the problem. For example, if you can't get the cursor to move on the screen, try to determine if the issue is with the mouse. If you have an extra mouse, you can alternate devices to see if the one plugged in is the issue, or use the arrow keys on the keyboard to help determine if the mouse is the source of the problem. When trying to isolate the problem, only make one change at a time.

Take notes about error messages: If your computer gives you **error messages**, be sure to write down as much information as possible. If the basic troubleshooting steps don't work, you may need the information.

Remember the steps you've taken, or write them down: Once you start troubleshooting, you will want to remember what you have done so you don't repeat yourself. If you can't remember it, write it down. If you end up asking people for help, it will be much easier if they know exactly which steps you've taken.



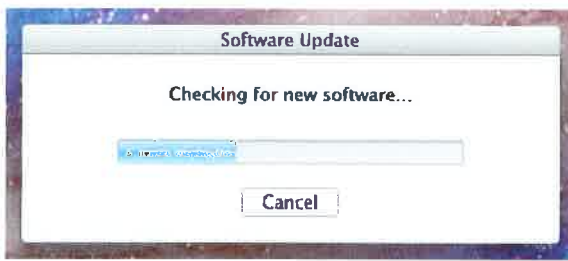
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Simple solutions to common problems

Most of the time, problems can be fixed by using simple troubleshooting techniques, like **closing** and **reopening** the program. It's important to try these simple solutions before resorting to more extreme measures. If the problem still isn't fixed, you can try other troubleshooting techniques, like reinstalling the software.

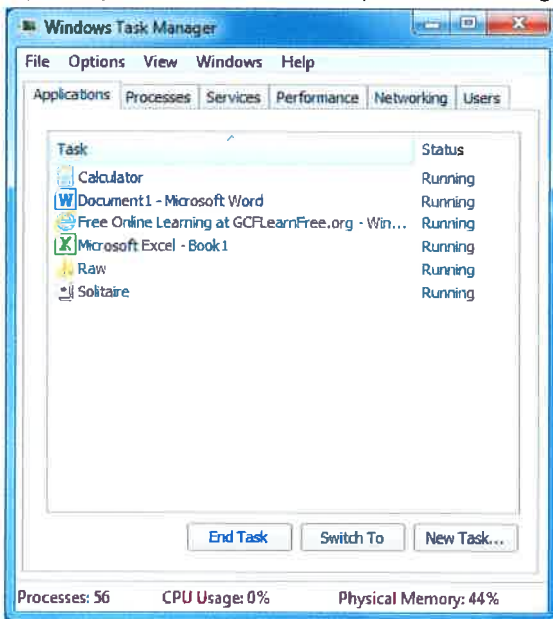
Program runs slowly or isn't working properly

- If a program is running slowly or otherwise isn't working right, the first thing you should try is **closing** the program and **reopening** it.
- You can also **shut down** your computer, wait a few seconds, and **boot it up** again. Some minor problems will work themselves out when you do this.
- Check with the company for any known problems or **updates** to the software.



Program is completely unresponsive

- If a program has become **completely unresponsive**, you can press (and hold) **Control+Alt+Delete** on your keyboard to open the **Task Manager**. You can then select the program that isn't working and click **End Task**. If you are using a **Mac**, you can press **Option+Command+Esc** to open a similar dialog box.



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Problems starting or shutting down the computer

Power button will not start computer

If your computer **does not start**, begin by checking the power cord to confirm that it is **plugged** securely into the back of the computer case and the power outlet.

If it is plugged into an outlet, make sure it is a **working outlet**. Often, this will require you to plug a lamp or other electrical device into the outlet to make sure it is receiving power.

If the computer is plugged in to a **surge protector**, verify that it is turned on. You may have to **reset** the surge protector by turning it off and then back on. You can also plug a lamp or other device into the surge protector to verify that it is on.

If you are using a **laptop**, the **battery** may not be charged. Plug the **AC adapter** into the wall, then try to turn on the laptop. If it still doesn't start up, you may need to wait a few minutes and try again.



"Non-system disk or disk error" Message

- If you get this message when you boot up your computer, it usually means there is a **CD, DVD, USB flash drive, or floppy disk** in your computer, which is interfering with your computer's booting process. Remove the disk from the drive, then **restart** the computer.



Windows shutting down message will not disappear

- Sometimes Windows will freeze during the shutdown process. If this happens, the **Windows is Shutting Down** message screen will stay active on your screen. To finish shutting down the computer, press and hold the power button for about 10 seconds, or until the computer turns off.



Computer begins randomly rebooting or crashing

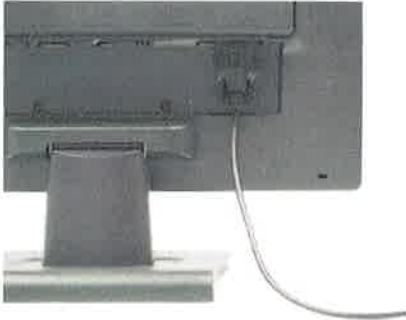
- Check for **overheating**. Make sure the vents in the case are not blocked. Confirm that there is good air flow around the computer.
- Update your **antivirus software** and **scan** for viruses.



Problems with the monitor and speakers

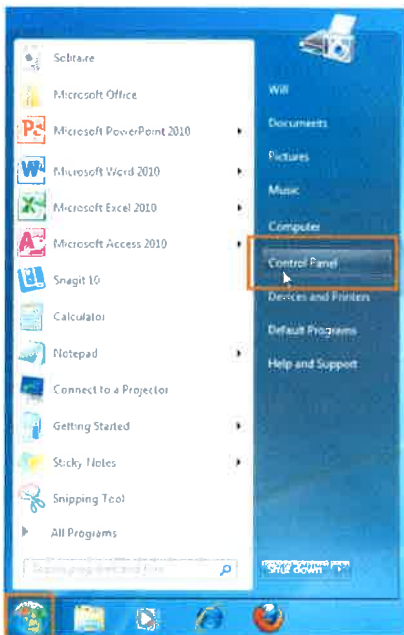
No picture on the monitor

- Confirm that the computer is turned **on**.
- Check the **brightness control**, located on your monitor or your keyboard, and make sure it is not set too low.
- Check the connections for the **monitor** and **surge protector**, and make sure the surge protector is turned on.



Monitor goes blank periodically

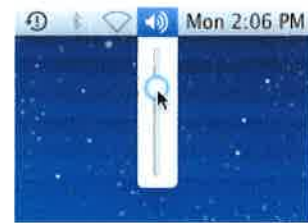
- You may have the screensaver enabled. If the screensaver is enabled, just **move your mouse** back and forth, and your original screen should appear. You can change the screensaver settings by going to your **Control Panel** (or your **System Preferences** if you're using a Mac).



No sound

- Check the **volume control** on your computer. In Windows, the sound icon will usually be on the taskbar, and you can also access the sound options in the **Control Panel**. On Macs, the sound options are found at the top of the screen or in **System Preferences**.
- Most media programs (such as **iTunes** or **Windows Media Player**) have a **volume control**, which will need to be turned up.
- Make sure the **speakers** are turned **on**, if using external speakers.

- Make sure external speakers are connected to the correct audio port or a USB port. If your computer has **color-coded** ports, the audio output will usually be **green**.
- Connect headphones to the correct audio port, and determine if sound is audible from the headphones.

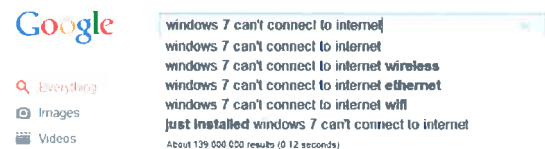


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Solving more difficult problems

If you still haven't found a solution to your problem, you may need to ask someone else for help. Try **searching the Web** for the problem you're having, as other people may have had similar problems. Also, if you have a friend or family member who knows a lot about computers, they may be able to help you.

Keep in mind that most computer problems have simple solutions, although it may take some time to find them. For difficult problems, a **more drastic solution** may be required, such as reformatting your hard drive, reinstalling programs, or reinstalling your operating system. If you're not a computer expert, it's possible that you could make the situation worse, so it's best to **consult a professional** if you believe a drastic solution is needed.



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Challenge!

- What do you do if a program on a PC is **completely unresponsive**? What about a program on a Mac?
- What should you do if you've tried everything and the problem **still isn't fixed**?
- Do you have a **family member** or **friend** who knows a lot about computers and would be able to help you with a computer problem?