

25 Steps to a Faster Computer

Businesses usually replace their computers every 3-5 years because maintaining machines that are used for 40 hours a week loses economic sense, especially when combined with the same curse that afflicts all flesh, age-related slowing down, and the loss of capacity to run new and upgraded versions of software. At any rate, consumers usually suffer far longer, keeping their computers from 5-10 years. This article will outline what you can do to put some more pep in that old workhorse of yours that for economic other reasons you don't want to replace just yet.

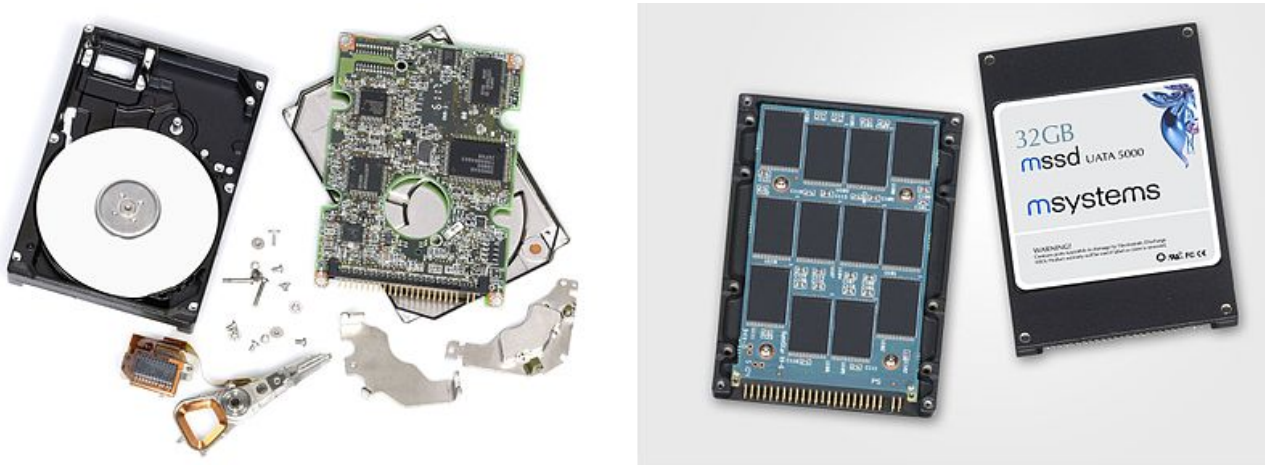


Figure 1. A disassembled **HDD** on the left and an **SSD** one on the right.

- 1. Move your operating system or the entire hard drive (HDD) to a solid-state drive (SSD) –** the single most effective you can do to speed up a laptop or desktop, **Mac** or **PC** is if you have an “old fashion” hard drive (which uses spinning magnetic disks to store your operating system and data) is to “clone” the disk to a Solid-State Drive (**SSD**) and use the SSD for main drive instead (system disk). You can also just migrate the operating system (OS) to the **SSD**. Most computers up to the last 5-10 years stored their operating systems and data on **HDD**'s but the new **SSDs** have come on the market, which are 3-10 times faster at reading and writing files, running programs and booting your computer. For instance, I recently moved the OS from an **HDD** to an **SSD** on a 2012 **Apple MacBook Pro** and the bootup time dropped from 3.5 minutes to about 30 seconds.

At first, **SSDs** were very expensive, but there have been big drops in price. Today you can get a good 256GB **SSD** for \$35. Larger **HDDs** of 1 TB (1000 GB) and 2 TB have been commonplace for many years, but most ordinary users don't use that space unless they take a lot of photos and videos, so most users will do fine with just a 256GB main drive. If you do take a lot of photos and videos, you can put your operating system (**Windows**, **OS X** or **Linux**) and programs on the **SSD** where the speed of the really matters and keep your photos, videos on your original **HDD** as either a second drive in your computer or as an external drive.

So how do you clone your **HDD** to your **SSD** or at least move the operating system there?



Figure 2. A typical 2.5" hard drive enclosure. You can plug your **SSD** in first, transfer the operating system over from the **HDD**, then switch and put the **SSD** in the laptop and the **HDD** in the enclosure, which you can now use as an external backup drive.

Many **SSD** manufacturers [offer free software](#) for doing this, but there is [some freeware](#) not made by hard drive manufacturers for doing this, too (here is one for [just transferring the OS](#)). If you have a laptop, you will most likely need some hardware additionally in the form of a 2.5" drive enclosure. These items cost \$12 or less. The one pictured, for instance, is an Amazon Basics one, which costs \$10. Once you are finished using the software to clone the hard drive to the **SSD**, you can open up your laptop and switch places between the **HDD** and the **SSD** and put the

HDD in the enclosure, which you can use as an external drive. If you have a **PC** and have a free drive bay as most do, you can install the **SSD** as a 2nd drive and keep both drives in the computer. However, be sure to keep in mind that after the OS migration or disk cloning and you need to go into the **BIOS** (or with modern computers the **UEFI**) and tell the computer to boot from the **SSD** now instead of the **HDD**. There are even adaptors for replacing your CD/DVD drives with 2.5" HDD (or SSDs) for use in laptops or **Mac Minis**.

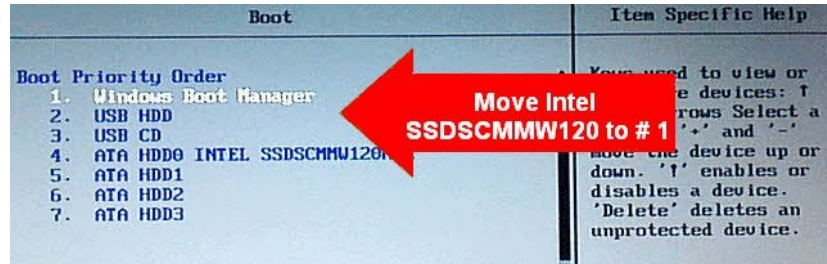


Figure 3. Be sure to remember after cloning or moving your OS to your **SSD**, to open the **BIOS** and tell the computer to boot from the **SSD** first.

So the \$50 question is who is going to do this for me? As a technician, this is one of the most frequent operations I do. I charge a nominal fee for it, which you can donate to the Benevolent Fund if you want instead of me. There are others from Cyber Asbury who might be willing to do this for you and you can always pay **Amazon** (they offer technician service too-at the time of purchase), **Geek Squad (Best Buy)**, or **Staples** technicians \$100 or so to do it. If you have some technical knowledge or are brave, there are many videos on YouTube which detail cloning your disk or transferring just the OS to your **SSD**. There is also a plain old text and pictures site, ifixit.com, which is very helpful in this regard also and will give you precise instructions for many common laptop and desktop models for removing **HDD**. You replace the **HDD** with the **SSD** by just reversing the steps.

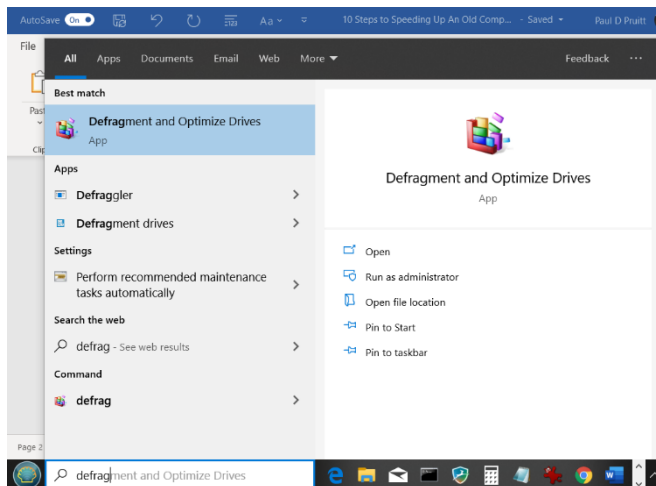


Figure 5. Type "defrag" in the *Cortana/Start* menu search box to start the *Defragmenter/Disk Optimizer*.

2. If you do have an HDD, make sure it is defragmented and you have a good amount of free space – the old fashion HDDs start to slow down after they are over one-half full. Additionally, the data gets fragmented. The way HDDs work, files are written sequentially from the beginning of the disk. When an earlier written file is deleted, if it is small, it leaves a space in the disk and when a later bigger file is written, part of it is written as a fragment in the hole where the

smaller deleted file was written. Eventually, over time, files can become highly fragmented, with the computer seeking all over the disks to find the parts. This especially true when there is little space left on the HDDs. Luckily there is defragmenting software built into **Windows**, which will reorder the parts of files. **Mac** file systems don't need fragmenting because their file system, called **HFS+** and more recently the newer **APFS** automatically defragments files. **Windows** defragmenter is turned on by default in **Windows Vista, 7, 8.1** (the updated version of **Windows 8**) and **10** and runs once a week. It usually runs early in the morning. If you don't keep your computer on, then change the schedule.

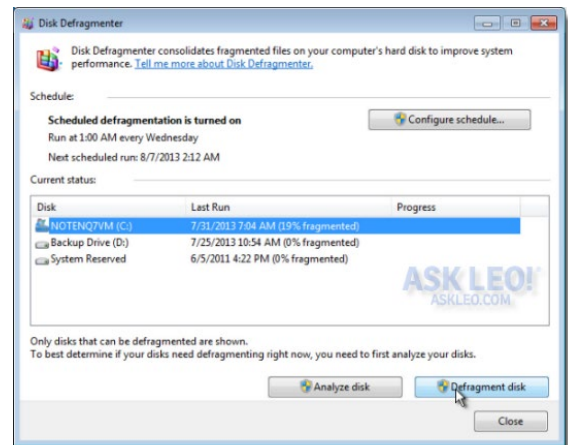


Figure 4. On volume **C:** the **HDD** is 19% fragmented, so it can used defragmenting.

There is some faulty information regarding **Windows**, the defragmenter program and **SSDs**. In general, **SSDs** do not need defragmenting, and it's potentially dangerous to do so, unlike **HDDs**. Because of this, the **Windows 7** team turned the tool off by default for **SSDs**. Curiosity got the best of me and I was still able to ruin an **SSD** by running defragmenter manually in I believe **Windows 7** (or maybe it was **Vista**). At any rate in **Windows 8, 8.1** and **10** the defragment program works on **SSDs**, but it doesn't do standard defragmenting as it does on **HDDs**. Instead, it runs a disk optimizer program that sends "hints" to the disk to engage in "**TRIM**" commands to clear out blocks of memory as files are deleted. If the disk is too busy, **Windows** stores up the **TRIM** hints for when the disk is ready.

If you want to reach the Defragmenter/Disk Optimizer, type "defrag" in the **Start**

menu/**Cortana** search box.

Use Window's **Disk Clean-up Tool** or [CCleaner](#) and [WinDirStat](#) (to find big unneeded files) to make space on your **HDD** to speed it up. The **Disk Clean-Up Tool** is reached by right-clicking on a drive letter in **Explorer**, say **C:** or **D:** and choosing **Properties** > on the **General** tab that opens up, is a button about 2/3 down on the right that says **Disk Cleanup**, click on that > check off which files you want to delete (they are all safe to delete) > you can also click on the **Clean up system files** button on the lower left, which opens a window with more file types you can choose to delete > this new window that opens has another tab called **More options** > the **Clean up programs and features** button just opens the **Programs and Features** window where you can uninstall programs and features >, however, the second button down may particularly good in freeing up space, it allows you to remove older unneeded **System restore points** and **Shadow copies**, which can be quite large. Defragment after removing unnecessary files. [PCDecrapifier](#) is a free program that can also help in identifying unneeded programs you can target for uninstallation.

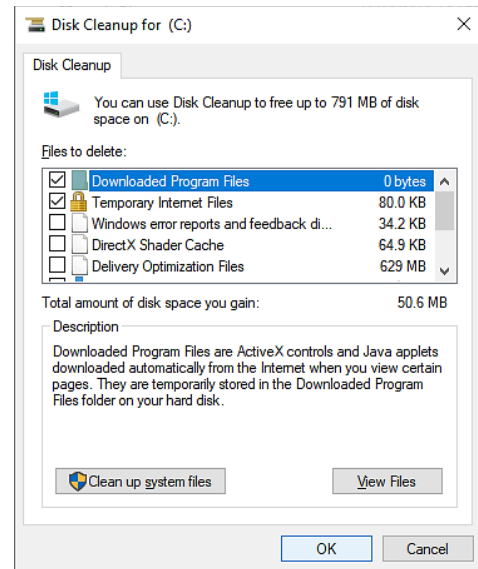


Figure 6. *Windows Explorer's Disk Cleanup tool*

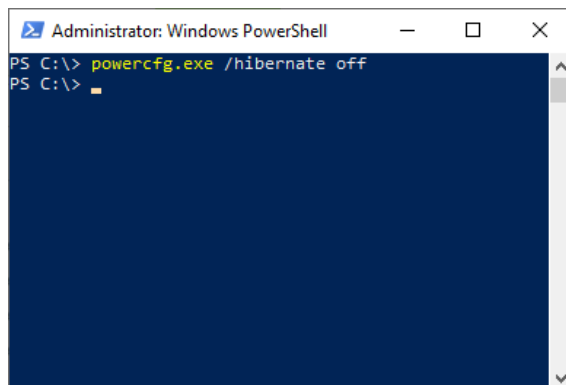


Figure 7. Turning off **hibernation** with an **Admin PowerShell** command that also works in **CMD** launched in **Admin** mode.

Also, turning off hibernation will get rid of a large file, 2GB or larger. You can do this by starting a **CMD** line in admin mode and running a command. To open **CMD** as such, search for **CMD** in your **Cortana** or **Start** button search bar > right-click on **CMD** program icon in the search result and choose **Start as administrator**. You can also accomplish turning off hibernation by running a command in the Powershell in Admin mode by opening **Windows Explorer** > clicking on the **File** menu up top on the

upper left > **Open Windows PowerShell** > **Open PowerShell as Administrator**. In either **CMD** or the **PowerShell**, the command is: "powercfg.exe /hibernate off".

To access a similar tool to Disk Cleanup in Mac, choose the **Apple** menu > **About This Mac** > click the **Storage** tab > then click the **Manage** button. From **Sierra (OS X 10.12)** onwards,

you can store your files on your **iCloud** account, of which 5 GB is available for free. Another thing you can do is upload your files to services like [Dropbox](#) (which you can do with your **PC** too and use the built-in [OneDrive](#) on Windows). Another choice on the **Manage** tab is **Optimize Storage**, which does things like gets rid of downloaded movies after you watch them and older Email attachments (which I suppose can be downloaded again from your mail service if needed). An additional choice on the **Manage** tab is to automatically delete files that have been in the Recycle bin for 30 days. Finally, the button **Review Clutter** leads to a window displaying your files sorted by file sizes with the largest ones on top. The **Review Clutter** window can help free disk space quickly because you might find huge files in the results list you no longer need.

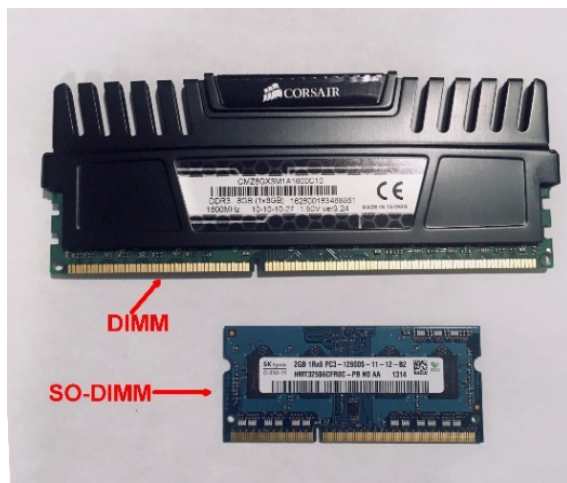


Figure 9. The wider **DIMM** is for desktops and the more compact **SO-DIMMs** function as **RAM** for laptops.

memory. **SO-DIMM** memory is less than half the width of **DIMM** memory but can have a higher density of memory chips. You can find out what kind of memory you have by using the free program [CPU-Z](#). Your motherboard, computer, or laptop manual will tell you what the maximum amount of **RAM** for which it has a capacity. For **Apple** machines, a quick shortcut to that information is at the [everyMac.com](#) website.

A free website [Crucial Memory Guide](#) will give you exactly what kind of memory and **SSD's** will work in your machine as long as you know, either

3. Make sure you have enough memory – RAM, unlike the **HDD** or **SSD**, is volatile, so it gets erased when the computer is turned off. Many older computers will have 4GB of **DDR3** memory. Adding another 4GB or if you have 8GB, adding another 8GB will speed up your computer. This especially true if you run a lot of programs at the same time, or you keep many tabs open at one time in **Chrome**, **Safari**, **Firefox**, or **Edge**.

If you have an older machine, you will most likely need **DDR3** memory, not the modern **DDR4**. A really old machine will need **DDR2**. Another characteristic of **RAM** is for laptops: you need **SO-DIMM** memory, whereas desktops use **DIMM**

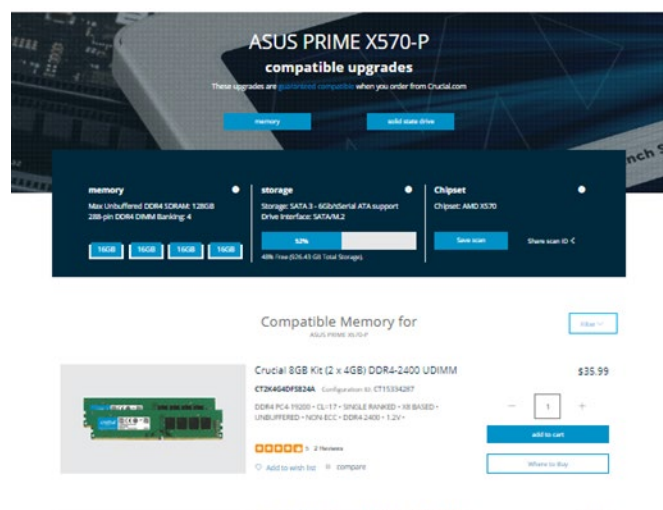


Figure 8. The results of running the web app **Crucial's Scanner Tool** on my computer.

the laptop or motherboard model. The motherboard model is on one of the tabs of the **CPU-Z** program. Conversely, it is probably easier to check off the little box on the right side of the **Crucial Memory Guide** next to where you can enter the maker and model of your machine, agree to terms then click on the button that lights up to run a little web app, which can figure out all that information. You don't have to buy the **RAM** or **SSDs** that **Crucial** recommends, but you can copy the **DDR** type, recommended speeds and amounts that are most closely fitting your budget and then buy another brand on **Amazon**, **NewEgg**, **BestBuy** or **eBay** (used hardware on **eBay**). **Crucial** is a top brand and the prices on the site do match those on Amazon, so if they are not too expensive, the **Crucial Memory Guide** store might be a place to buy your **RAM** and/or **SSD**.

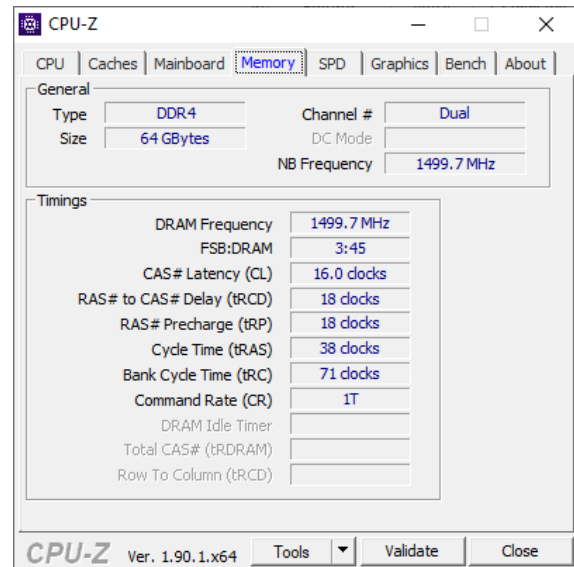


Figure 10. CPU-Z's Memory tab.

RAM is installed as 1, 2, 3, or 4 pieces. Some computers only have two slots for **RAM**. If your computer has room for two or more pieces, then pairs of pieces should be matched as coming from the same manufacturer, model, amount and speed (in MHz another thing you need to pay attention to, the higher the number is, the faster and better). Regarding speed, if you have four slots and buy two pairs of matched memory, the computer will run the **RAM** speed at the slower of the pairs, for all four pieces.

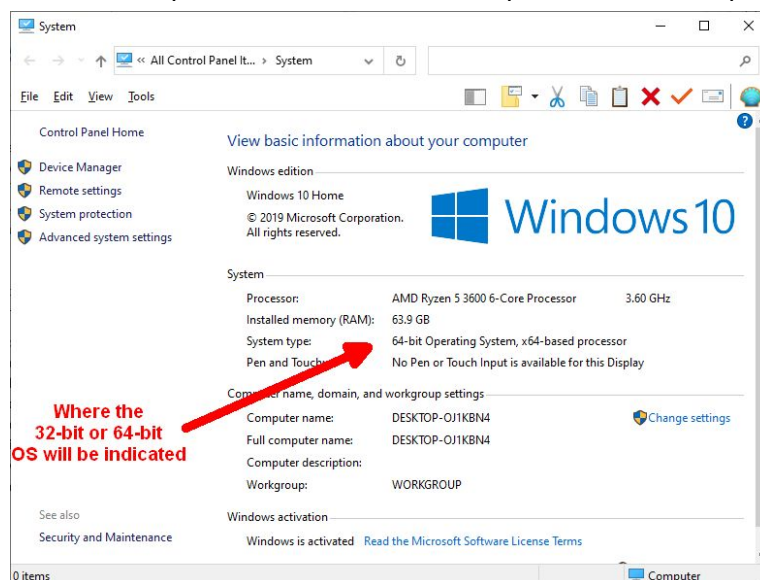


Figure 11. Where in the Control Panel's System app will be indicated whether the OS is 32-bit or 64-bit.

Note the speed information in **CPU-Z** will give half of what the **RAM** speed is because modern memory is DDR, which means double data rate.

Note also do find out about whether you have a 32-bit or 64-bit operating system as in Windows systems all RAM above 3.25GBs is not used in 32-bit systems, but not 64-bit ones (the latter can fit essentially unlimited amounts of **RAM**), so expanding **RAM** to

more than 4GBs worth with that kind of OS, that is 32-bit Windows, is wasted. You can find what version of OS you have by searching in **Cortana** or the **Start** menu search box for **System**, and then choosing that, as opposed to results for **System information** or **System configuration** (the **System** applet is also in the **Control Panel** if you know how to get there). The relevant information is listed in the center of the window as **System type**: and should be either **32-bit Operating System** or 64-bit **Operating System** version of windows.



Figure 12. **Dust Off** is a popular brand of compressed air.

4. Heat is the enemy of speed – one of the big reasons computers slow down, is they get dirty and the dust and dirt act as insulation, heating the parts. There are some parts like **CPU**, **GPU** (graphics processor chip on the motherboard or an added card) and hard drives (**HDD** or **SSD**), which will throttle down with temperature. The **GPU** on the graphics cards is the most resilient to heat of the three. With modern **CPUs** (the central computer brains of the computer), they will start throttling down their performance to cool down at 70-75 degrees Celsius and will completely shut down somewhere between 90-105 degrees Celsius depending on the model. Older models will just shut down without any throttling. **HDD** won't function above 60 degrees Celsius (older ones

above 55) but don't generate heat as much as the **CPU**, **GPU** and **SSDs**. **SSDs** will start losing efficiency above 50 degrees Celsius and the drives, especially the newest ones, will throttle their performance to get back to that temperature. They shut down at 70 degrees Celsius but are generally successful at getting down to the 50-degree mark with throttling. **GPUs**, unlike the other components, are perfectly happy running at 85 degrees Celsius.

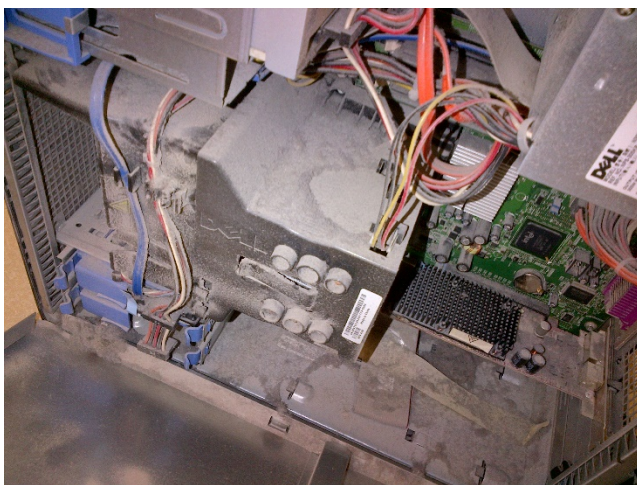


Figure 13. A dusty computer encountered by Vinny Malek, from **Desktop PC Repairs**, in Gaithersburg.

So heat is the enemy, and it's caused by dirt and dust or not enough ventilation. To remove dust and dirt, some people have reported success running their motherboards through the dishwasher after stripping them of removable parts. I don't recommend you do that! The next best thing is to use compressed air. Cans of these are available at stores that sell computers like **Micro Center**, **Staples** and **Best Buy** or online, of course, for \$5-\$6, with volume discounts. It's good to buy in bulk if you have more than one

computer because going through a can of air cleaning out the inside of your machine can occur pretty quickly.

The part that gets the dustiest is usually the fan(s) and simply blowing air for a bit is enough to clean them, but if necessary, reach into the blades with a tissue. Laptops have usually one fan, whereas **PCs** can have three or more if you include the one on the power supply. It's good to blow them all clean, if possible. Also, it's useful to remove the dust on the **CPU** and **GPU** heatsinks, which are the metal fins that dissipate heat attached to these two biggest chips on the motherboard (usually). Just look around the inside of your computer and blow off the dust wherever you see it. As mentioned earlier, you can use the **ifixit.com** site to guide you on how to take apart your machine.

Another simple way to cool down a laptop **Mac** or **PC** is to buy a cooling tray for underneath your machine. They cost about \$20-\$25 on **Amazon** or at **Micro Center**, run off one your computers **USB** port and will have 2-5 extra fans blowing on the bottom of your machine. Of course, if your computer is sitting on a surface, you can just prop it up a bit to let some air through.



Figure 14. Otimo laptop cooling pad for 12-17 inch laptop - 5 ultra-quiet fans - USB powered w/2 ports – currently available on Amazon for under \$20.

For a desktop, if you're a little technical, you can install one or two extra fans to cool the machine more. If you are a real geek or aspire to be one, there are liquid cooling units for **CPUs** that kind of act like air-conditioning units and use water, that is safely encased within some plumbing, to carry the heat away from the computers main computing chip and bring it to the outer case where it is blown with fans into the room where the machine is located.

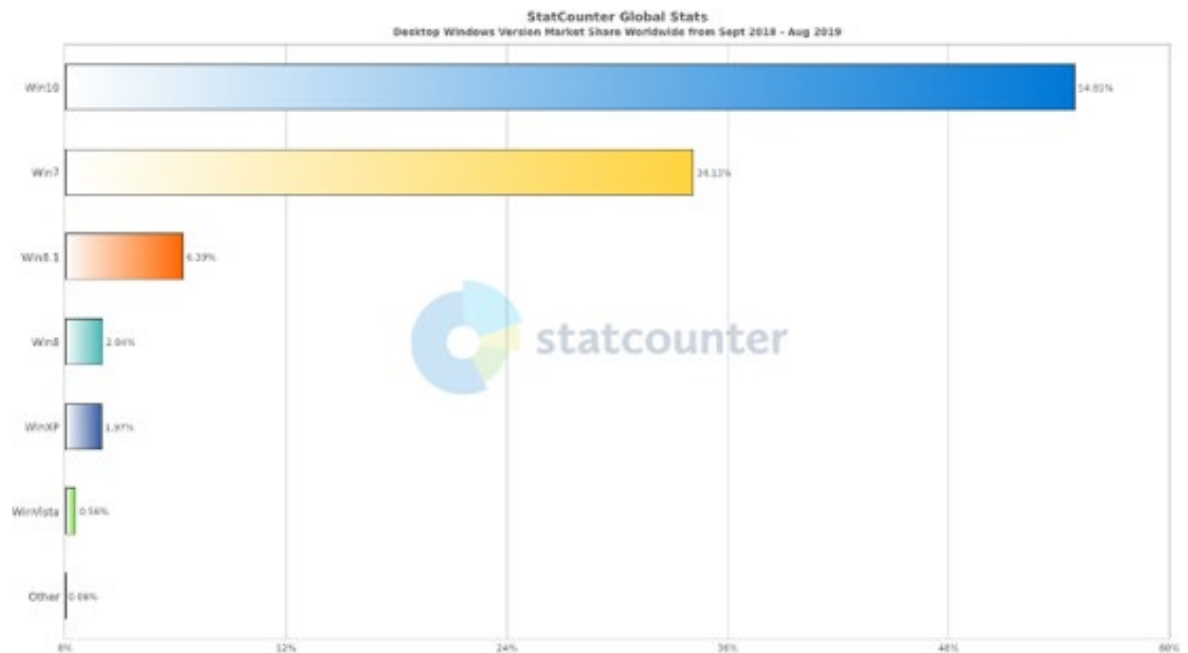


Figure 15. **Windows XP** still makes up 2% of **Windows** computers, **VISTA** makes up about 0.6% and **Windows 7** users make up about 34% of **Windows** users. All need to switch to **Windows 8.1** or **Windows 10** as soon as possible. As of January 2020 Microsoft will not support **Windows 7** and stopped supporting **VISTA** in 2017 and **XP** way back in 2014.

5. Be Sure You Are Running a Modern Operating System – Windows XP, which was released back in 2001, is still being run on about 2% of **Windows** computers worldwide and **Windows 7**, about 34%. If that is your computer, you need to update to **Windows 8.1** or **10**, or if your hardware can't be upgraded to the requirements for these OSes, then you need to buy a new computer! The reason for avoiding even the excellent **Windows 7** is that Microsoft is ending support for that operating system in January 2020 and it ended support for **Windows XP** way back in 2014! At the recent **Activities Fair**, I told someone that Microsoft would support **Windows 7** for a couple more years. Shame on me for guessing! Although Microsoft might change its mind, as it has done for other operating systems in the past, there is no guarantee of this, so **Windows 7** users should make plans to switch to **Windows 8.1** or **10** before the deadline. When Microsoft ends support, it no longer releases security patches for that operating system, which means newly found exploits by hackers will not be fixed. If you use your computer for online banking or investing, you might be asking for trouble!

Oddly enough, even though **Microsoft** officially ended free upgrades of **Windows 7, 8** and **8.1 Home** and **Pro** versions **Windows 10 Home** and **Pro** versions several years ago, for the great majority of users, if you have activated copies of those operating systems, when you upgrade to the equivalent version of **Windows 10** with free **Windows 10** install media, the operating system stays activated, so you just got a free upgrade. Even when this kind of upgrade doesn't work, there are things you can do, like updating drivers, the **BIOS** or hardware firmware which will overcome error messages preventing the operation. Instructions [are here](#) and how to overcome error messages if you get them, [are here](#).

In regards to the subject of this article, **Windows 8.1** and **Windows 10** boot and run faster than **XP**, **Vista** (the much less successful successor to **XP**) and **7**. Understandably, many users want to hold onto **XP** or **7** as the user experiences are either big upgrades from previous consumer versions of **Windows** and/or they are just fun to use and mostly stable. It's likely that the hardware of a computer running **XP** won't be able to be upgraded to run **Windows 8.1** or **10** because it's too old. That's probably not true of a **Windows 7** computer. It's worth mentioning that the big change to **Windows** moving from the **Windows XP**, **Vista**, and **7** to **8.1** and **10** is how the **Start** menu operates and appears, which can make users afraid to upgrade. However, there is a free program called [Classic Shell](#), now renamed [Open Shell](#), which makes the Start menu behave like the ones in **7** or **XP**. It's what this author uses because I prefer the older interface, so essentially with this program, my **Windows 10** behaves like **Windows 7**, except in the speed department where it is faster.

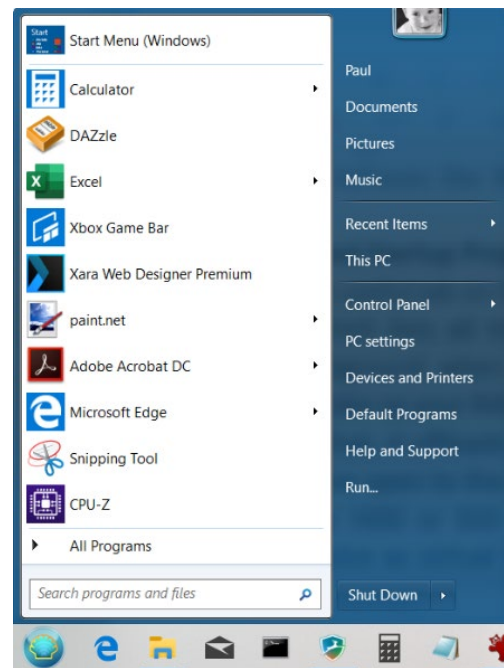


Figure 17. What my *Open Shell* *Start* menu looks like.



Figure 16. *Catalina's* desktop with the *Screen Time* app loaded.

The most recent version of **Mac OS X** is **10.15 Catalina**. Your hardware may not be capable of running that OS. If you are running a version of **Mac OS X** before **10.12 (Sierra)**, **Apple** is no longer releasing security patches, which, as mentioned, is a problem if you are running say **10.11 (El Capitan)**. [Here is Apple's page](#) detailing the requirements for various versions of **OS X**. **OS X** will

check the hardware of the machine it is trying to be installed on and determine if it is supposed to run on it. [With minor software hacks](#), it is possible to run more recent versions of **OS X** on hardware that is unsupported but don't expect everything to run smoothly, like some of the hardware drivers not working, but at least the security will be up to date if you can for instance get a 2014 **MacBook** to run **Catalina**.

6. Maybe in a related way, you can reinstall Windows or Mac OS X to improve the speed – reinstalling the operating system allows you to start fresh and will speed up your computer. There different options for this and some even allow keeping your programs as well as your files. In Windows, the trick is to do a **Repair installation/In-place upgrade** and upgrade **Windows** with the same version of **Windows** you are already running. Instructions [are here](#) for reinstalling in that manner. Here are [Apple's instructions for reinstalling OS X](#) versions.

You can find instructions here for reinstalling [Windows 10 in general](#). You can reinstall **Windows 8.1** with the iso [image from here](#). Use the [free RUFUS](#) program to burn the ISO to a USB stick or DVD. With a newly installed version of **Windows**, you can restore a lot of popular freeware programs at one time with the free [Ninite installer](#).

For **Macs** in a related way, you can repair the boot disk installation by booting into Recovery Mode by holding down the **Command** and **R** keys during bootup > select **Recovery HD** at the boot menu > select the **Disk Utility** > select the boot volume or partition on the left > select the **Repair Disk** button in the lower right of the **First Aid** tab.

Chkdsk has long been an app available on **Windows**. It's possible running this with the repair flag, can fix your disk and make the computer run faster. Chkdsk deals more with the low-level repair of your **HDD** than running a repair installation of **Windows** would do. To carry out repair this way, start a **CMD** line by searching for CMD, right-clicking in the results and choosing to run as an administrator > type "`chkdsk /f`" (without the quotes) > you will probably get a message that the checking and repairing of your disk cannot be done now because your system disk is in use, but would you like to run it when **Windows** restarts? > agree to this.

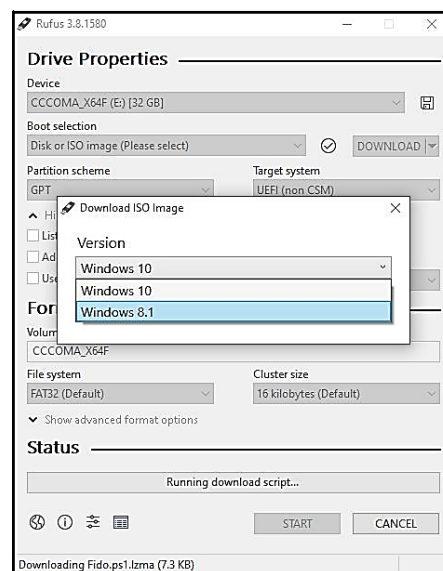


Figure 18. Rufus can actually be configured pretty simply, to download the ISO file of Windows 8.1 or 10 and burn it to a DVD or thumb drive.

```
Administrator: C:\Windows\System32\cmd.exe - DISM.exe /Online /Cleanup-image /Restorehealth
Microsoft Windows [Version 10.0.19013.1]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Windows\system32>DISM.exe /Online /Cleanup-image /Restorehealth

Deployment Image Servicing and Management tool
Version: 10.0.19013.1

Image Version: 10.0.19013.1

[===== 42.8%] _
```

Figure 19. The “DISM.exe /Online /Cleanup-image /Restorehealth” command running from an Admin CMD line.

There are another two commands that you can run at the **CMD** line, which can repair installations of **Windows** short of reinstalling. At an admin **CMD** or **PowerShell** line, use the command “DISM.exe /Online /Cleanup-image /Restorehealth”> when that completes, run “sfc /scannow”. The effect of these two commands restores the corrupt version of your operating system files and may speed up your **Windows**.

7. Replace **Windows** or **OS X** with a much faster and leaner installation of **Linux** – [Puppy Linux](#) is one that is supposed to be friendly for seniors and older computers. **Cyber Asbury’s** Vice-Chairman **Norm Wolfe** brought an old miniature notebook in that formerly ran some version of **Windows**, but with a not very high-powered **Atom CPU** or very similar, it ran slowly. Norm had installed **Puppy Linux** on it, and it was quite



Figure 20. The Puppy Linux desktop.

zippy in performance. **Linux** computers are also generally nowhere as easily hacked as **Windows** or **Mac** computers and are faster or much faster with the same hardware. The downside is they are not as user-friendly, but they have been working on that issue for 20 years and great strides have been made. For instance, **Chrome**, **Firefox**, and **Opera** are available for **Linux** and since most users just use their computers for internet and mail, the task might be just learning to use a different mail program like Thunderbird, which is intuitive anyway. Of course, some people even dispense with mail programs and use a web interface like **Comcast’s** or **Gmail’s** to get their mail, so nothing much would be different. The graphics, animation and **Windows** are not as polished as with **Windows** or **Macs**, but if you have an older computer that is no longer going to be supported by Microsoft, switching to **Linux** may be the answer. [Ubuntu](#) is another popular flavor of **Linux**.

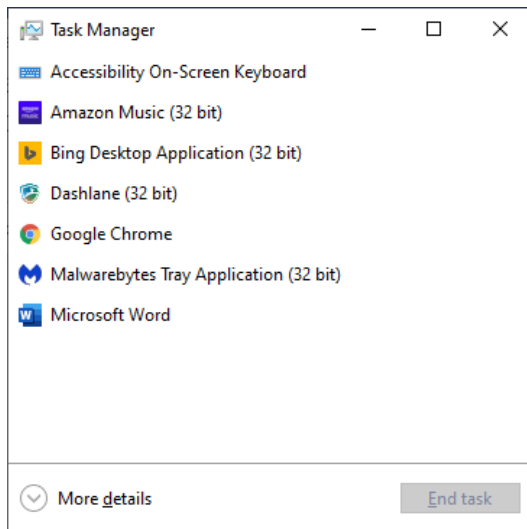


Figure 22. The **Task Manager** in the **Less details** mode.

8. Shut down unused startup programs – **Windows 8.1** and **10** have the useful **Startup** tab on the Task Manager, which lists all the programs that start in the background when **Windows** starts. These programs take up your **RAM** and if you don't have enough of that, it offloads them and/or the programs you have open to the **Paging File**, which is a part of your **HDD** or **SSD** reserved for the computer to serve as virtual **RAM**. As you can imagine, **RAM** is much faster than an **HDD**, so if your paging file is hosted on an **HDD** when the computer needs to use files in the virtual **RAM**, it needs to retrieve them first, and the **HDD** is very slow in compared to the other parts of the operation, and this will slow

down your computer in a big way. The latter is another reason why **SSDs** speed up your computer because the speeds of **SSDs** are 3-20 times faster than **HDDs**. **RAM** speed is further 30-200 times faster than **SSDs**. So, one can see how important it is to have enough **RAM** if you are running many programs at once, to avoid the use of the paging file if possible.

At any rate, to get into the Task Manager in **Windows**, hit **CTRL-ALT-Delete** while **Windows** is running and choose **Task Manager**. If the **Startup** and other tabs don't appear, click the "**More Details**" button on the lower left. To disable a startup program, right-click on it and choose **Disable**. In order to know what is important to start up with your machine and what is instead acting like a parasite on your computing power, you can right-click and choose **Search Online** for **Google** or **Bing** to search for the process and give you results which hopefully will tell you whether the program is important to run or not.

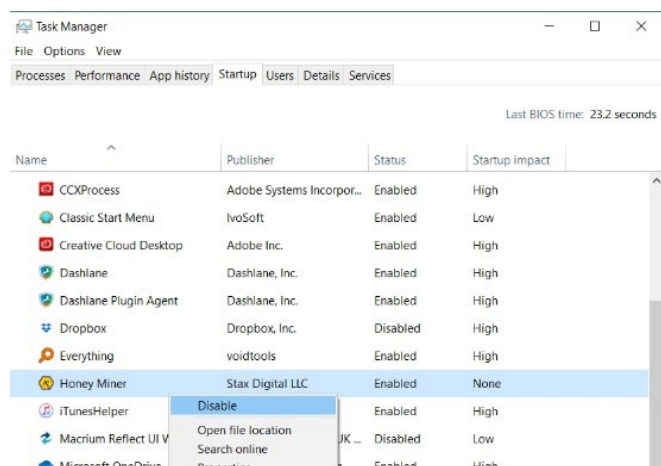


Figure 21. The list of **Startup** programs on my machine and what the **Context menu** (right-click menu) looks like when I select a background program with my right mouse button.

To prevent unnecessary programs from starting when the **Mac** boots, go to **System Preferences > Users & Groups > Login Items** tab > click on the lock in the lower left and

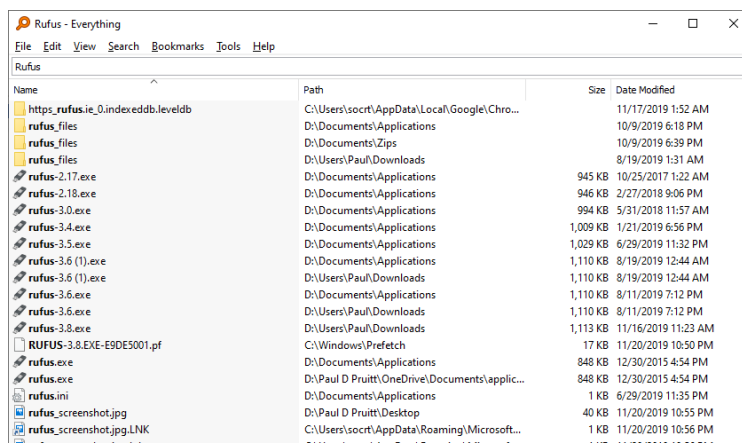
enter your machine's username and password to unlock the settings > uncheck the programs you don't need to start when **Windows** starts.

9. **Selectively turn off background apps you are not using** – in **Windows** click on **Settings** > **Privacy**> Scroll down to **Background Apps** on the left and uncheck the ones on the right that you don't use. These are like those programs listed on the **Startup** tab of **Task manager**, but they are ones that are part of **Windows** and **Microsoft** chooses them to run by default when your computer starts. You will find a lot of unnecessary programs there.

For the Mac, try [CleanMyMac](#), which has a diverse set of tools to clean your machine of unwanted running programs, malware, and all sorts of unneeded files. It can also fix all kinds of issues with performance. It's a free download but costs \$35 to go beyond the trial version. [OnyX](#) may be a similar but free program also for the **Mac**.

10. **Choose the Performance Power configuration** – in **Windows**, go to **Settings** > choose **Power & Sleep** > Move the slider to the right for better performance. Also, change the drop-down menus in the Power & Sleep settings for the monitor and **PC** to prevent them from going asleep. The **Never** choice is at the bottom of the list. If you have a laptop, it will burn through the battery life much quicker, but if it remains plugged in at home, this is, of course, not an issue. The screen on your laptop should remain brighter, too, with the high performance selected. You will use more electricity, but it may be a necessary sacrifice for speeding your use of the machine.

To run your **Mac** in the highest energy performance setting, click on the **Apple** icon > choose **System Preferences** > click on the **Energy Saver** icon (looks like a lightbulb). For **Computer sleep**: setting move the slider to the right to **Never**. For **Display sleep**: also slide to **Never**. Uncheck **Put the hard disk(s) to sleep when possible**; **Wake for network access**; and **Automatically reduce brightness before display goes to sleep**. Also, in **Settings** on your **Mac**, click on **Desktop & Screen Saver** icon > move the **Start screen saver** slider to **Never**.



Name	Path	Size	Date Modified
https_rufus.ie_0.indexeddb.leveldb	C:\Users\socrt\AppData\Local\Google\Chro...		11/17/2019 1:52 AM
rufus_files	D:\Documents\Applications		10/9/2019 6:18 PM
rufus_files	D:\Documents\Zips		10/9/2019 6:39 PM
rufus_files	D:\Users\Paul\Downloads		8/19/2019 1:31 AM
rufus-2.17.exe	D:\Documents\Applications	945 KB	10/25/2017 1:22 AM
rufus-2.18.exe	D:\Documents\Applications	946 KB	2/27/2018 9:06 PM
rufus-3.0.exe	D:\Documents\Applications	994 KB	5/27/2018 11:57 AM
rufus-3.4.exe	D:\Documents\Applications	1,009 KB	1/21/2019 6:56 PM
rufus-3.5.exe	D:\Documents\Applications	1,029 KB	6/29/2019 11:32 PM
rufus-3.6 (1).exe	D:\Documents\Applications	1,110 KB	8/19/2019 12:44 AM
rufus-3.6 (1).exe	D:\Users\Paul\Downloads	1,110 KB	8/19/2019 12:44 AM
rufus-3.6.exe	D:\Documents\Applications	1,110 KB	8/11/2019 7:12 PM
rufus-3.6.exe	D:\Users\Paul\Downloads	1,110 KB	8/11/2019 7:12 PM
rufus-3.8.exe	D:\Users\Paul\Downloads	1,113 KB	11/16/2019 11:23 AM
RUFUS-3.8.EXE-E9DE5001.pf	C:\Windows\Prefetch	17 KB	11/20/2019 10:50 PM
rufus.exe	D:\Documents\Applications	848 KB	12/30/2015 4:54 PM
rufus.exe	D:\Paul D Pruitt\OneDrive\Documents\applic...	848 KB	12/30/2015 4:54 PM
rufus.ini	D:\Documents\Applications	1 KB	6/29/2019 11:35 PM
rufus_screenshot.jpg	D:\Paul D Pruitt\Desktop	40 KB	11/20/2019 10:55 PM
rufus_screenshot.jpg.LNK	C:\Users\socrt\AppData\Roaming\Microsoft...	1 KB	11/20/2019 10:56 PM

Figure 23. Results from **Everything** for a search for the versions of **Rufus** on my machine. The results popped up instantaneously.

Another thing that slows down **Macs** is the indexing of files called **Spotlight**. **Spotlight** makes files instantly searchable, unlike **Windows** super slow search. A similar free program for **Windows** is called [Everything](#), which in itself can speed the use of your **PC** like the way **Spotlight** helps with **Macs**. Note, however, **Everything** appears to index

file much more quickly than **Spotlight** for reasons I don't understand. At any rate if you see the **Spotlight** magnifying glass in the upper right of the **Mac** desktop, pulsing and your machine getting real slow, you can make your system (and other drives or partitions on your Mac if you have them) **Private**, which means Spotlight won't index them hopefully speeding up your machine. To do this start *System Preferences* from your dock or the **Apple** menu > choose the **Spotlight** icon > Choose the **Privacy** tab > click on the + sign in the lower left, to add a disk, partition or folder which will be removed from the **Spotlight** indexing process (or minus to remove it from Privacy later).

11. Overclocking – when you buy new **RAM** for your machine, it runs at a certain speed determined by default by the motherboard, but this is sometimes considerably less than it's rated possible top speed. The previously mentioned free [CPU-Z](#) can give you insight into this. **CPU-Z** lists your **RAM** speed at one half it's speed because modern memory is DDR or "Double Data Rate," so it's running at twice the speed shown on **CPU-Z**'s Memory tab. Compare the speed on that tab with the next one over labeled "SPD." If the timings table lists a frequency that is much different than the one on the memory tab, you may be able to improve **RAM** performance in the **BIOS** significantly.

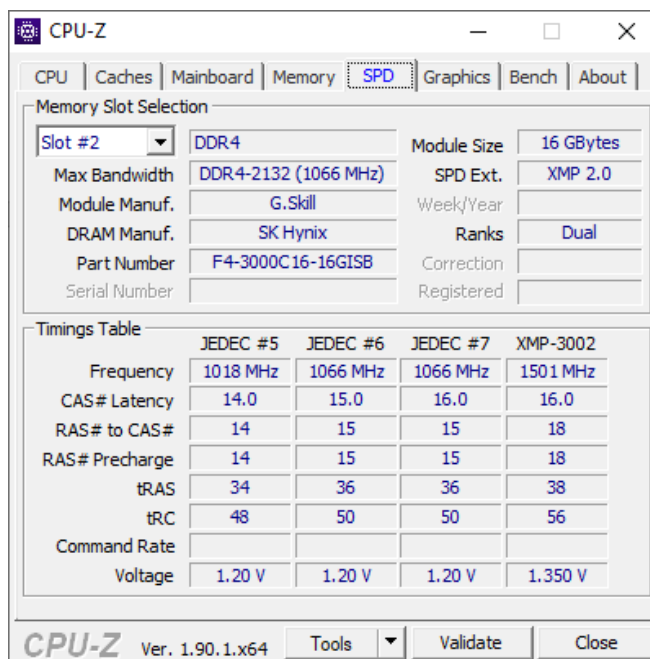


Figure 24. My **CPU-Z**'s **SPD** tab showing the **XMP** settings, which if you could see the results on the **Memory** tab would show that I have chosen the **D.O.C.P.** setting for the **AI Overclocker Tuner** setting of my **UEFI BIOS** of my **ASUS** motherboard.

Go into the **BIOS** or **UEFI BIOS** by holding down the F1, F2, F10, Delete, Esc, or whatever your computer flashes on the bottom of your screen to use. If you have an Intel processor change the "Extreme Memory Profile" (**XMP**) to enabled, this setting is found in the Advanced Settings part of your **BIOS**. For ASUS motherboards, it's the "AI Overclocker Tuner" setting. For MSI boards, it's called the "Extreme Memory Profile X.M.P.," which you move to enable. For ASRock boards, move the choice of the "Load **XMP** Setting" from auto to "**XMP 2.0 Profile 1.**" For a similar, if not identical effect, and you have an AMD processor, choose to enable the **AMP**, **D.O.C.P.** for Asus motherboards or **E.O.C.P.** for Gigabyte motherboards.

Also, choose AMD OverDrive for overall motherboard performance improvement. Even though it sounds scary, a general overclocking switch in the **BIOS** is safe and your

motherboard, plus the CPUs, are tested to withstand the higher-level settings. If your computer is too old to have a **UEFI BIOS**, the advanced settings of your regular **BIOS** may allow you manually to enter the **RAM** settings revealed in the **XMP** profile on the SPD tab of **CPU-Z**.

12. If you and only people you trust are ever going to have physical access to your machine, remove the password and/or PIN to avoid having to login when your machine restarts – to do this go into **Settings > Accounts > Sign-In options > Change Pin > Enter your Microsoft password > when it asks you to put in a pin, cancel the window > voila, no more pin.**

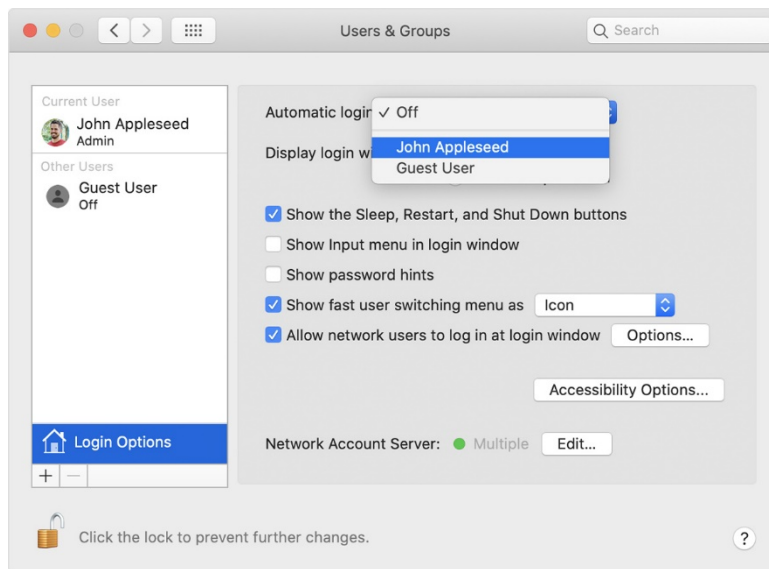


Figure 25. Setting up **Automatic Login** for Johnny Appleseed.

To bypass the login password on a **Mac**, click on the **Apple** menu > choose **System Preferences > choose Users & Groups > click on the lock icon in the lower-left corner and enter your Apple ID and password > click on Login Options in the lower-left corner above the lock > find you the ID from which you want to remove the password, in the Automatic Login drop-down menu in the upper middle of**

the resulting window > enter in the password for that login. You still will be asked to log in manually if switching from another user or when unlocking your screen if it's been locked. Note Automatic login won't be available with disks encrypted with **FileVault** ([FileVault can be turned off](#)). It will also be unavailable if you use your **icloud.com** account and password to log onto the **Mac**. To deal with that, reset your **Mac's** login password first, where you can use an ordinary username and password instead of the **iCloud** one. After that, you will have the **Automatic Login** option for this new **Mac** username and password.

You might still be required to enter a password when your **Mac** wakes up from sleep or when you stop the screensaver. To prevent this behavior, click on the **Apple** menu > choose **System Preferences > choose Security and Privacy > on the General tab, uncheck Require password after sleep or screen saver begins, or set a longer period before which the lock screen feature is engaged. These changes will increase performance at the cost of security, but if security is not a priority with you, and performance is, that is what this article is about addressing.**

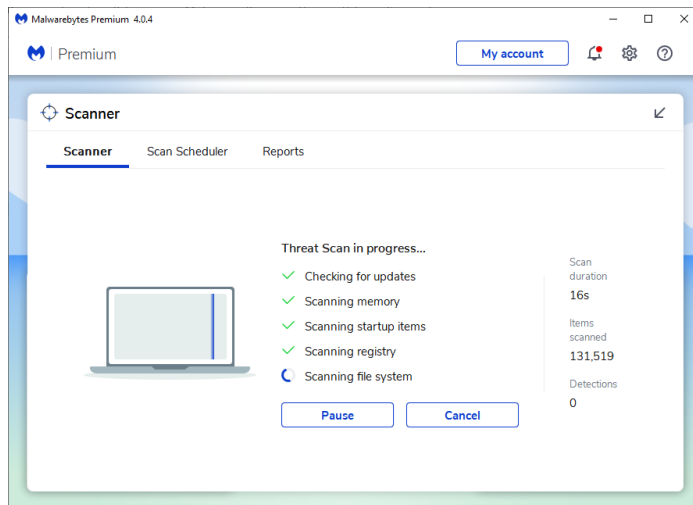


Figure 26. The most recent version of **Malwarebytes** running a scan.

viruses, trojans, and worms that **Microsoft Defender Antivirus** protects against and malware makers today are more interested in making your computer pay by stealing your banking information or computer power with spyware and bots that **Malwarebytes** and/or **SUPERAntiSpyware** are best at protecting against, though there is probably and huge amount of overlap in the types of threats the three programs protect against. If you do pay for an antivirus, the Internet Security versions are usually also geared to combat all types of malware, both viruses, bots, worms, trojans and spyware, which the combination of **Microsoft Defender Antivirus** and **Malwarebytes** or **SUPERAntiSpyware** would also cover.

For **Macs**, it is still true that hackers are less interested in hacking them than Windows machines, because there are ten times more **PCs** than **Macs**, so it makes more economic sense to attack **PCs** than **Macs**. It's also true that **OS X** is based on **Unix**, which means that programs are **sandboxed**, isolating programs from changing the most important parts and of the operating system and preventing viruses and other malware from doing significant damage. [Still, it's now advisable to get security software](#) for your **Mac** as malware threats have dramatically increased, and **Macs** don't have a built-in antivirus yet. Security software always slows down your computer a bit, but some do only a very little bit or almost not at all.

14. Turn off fancy desktop backgrounds, screensavers and animation – in Windows, press

13. Make sure you are not running any viruses or spyware stealing your computer power – for **Windows** user, update and then run your antivirus and [Malwarebytes](#) and/or [SUPERAntiSpyware](#). **Microsoft's** built-in antivirus called **Microsoft Defender Antivirus** is supposedly good enough these days. However, it still may be important to pay for the paid version of **Malwarebytes** as I do, because it is purportedly hard to make money from the

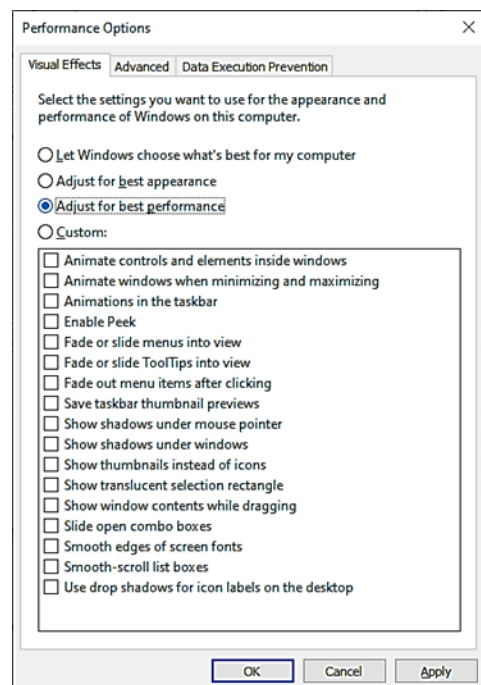


Figure 27. The *Performance options* in Windows.

Windows Key (the key between the CTL and Alt keys) + **X** > select **System** in the middle of the menu that pops up on top of the **Start** button > select **System info** in the upper right corner under **Related settings** > click on **Advanced system settings** underneath **System protection** in the upper left corner > click on the **Settings** button in the in the upper third top section labeled **Performance** of the **Advanced** tab of the **System Properties** window that pops up > move the radio button to select **Adjust for best performance**.

To get rid of most animations in **OS X**, click on the **Apple** menu > click on **System Preferences** > click on **Accessibility** in the lower right corner > click on **Display** on the left > check the checkbox labeled **Reduce Motion** in the upper right corner. Also, try the free [Tinker Tool](#) version made for your version of **OS X**. There is a bunch of easily unchecked animation settings exposed by the program, whose goal is to reveal hidden settings in **OS**

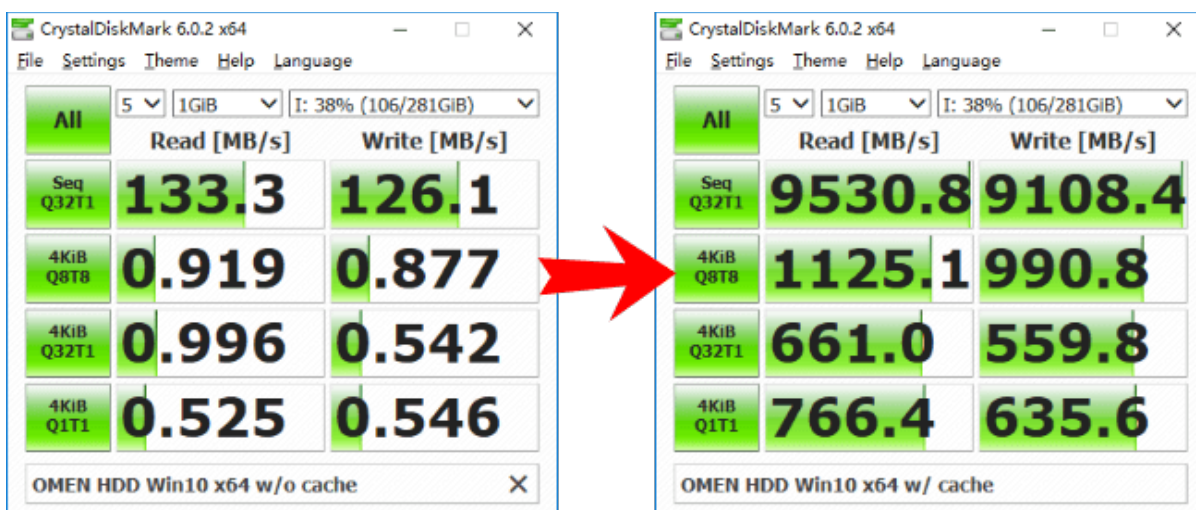


Figure 28. *Dramatic and incredible HDD system disk speeds recorded with the help of PrimoCache.*

X.

15. Download and buy [PrimoCache](#) and/or use ReadyBoost – dedicate as little as 1GB-2GB of **RAM** for your Primo cache drive. PrimoCache can dramatically increase the speed of your **HDD** or even **SSD**. If you have 16GB of **RAM**, you can probably afford to make your PrimoCache system disk use 4GB in size. This concept is like a **RAM** Drive which uses **RAM** temporarily as hard drive space, but it is different than that in that System Drives (your operating system drive) can't be stored on **RAM** Drives usually. My understanding is **PrimoCache** stores (caches) regularly used programs and files from the system disk and other disks in the **RAM** in a way that is more intelligent than **Windows** versions of that kind system, which are called **Prefetch** and its successor **SuperFetch**. The reason for the superiority of **PrimoCache** is that it caches at a very low level of the disk and caches only the parts of the files that are needed and repeatedly used, whereas **SuperFetch** caches whole files, including unused parts. Also, SuperFetch works only on a small subset of system files, whereas **PrimoCache** works on any frequently used file part. Several PrimoCache

competitors are [described here](#). One other interesting feature of **PrimoCache** and at least one of the competitors **eBoostr** is the ability to use **Hidden RAM** in the **32-bit** versions of **Windows**. As mentioned earlier, **32-bit** versions of Windows can only address 3.25GB of memory. Anything above that is wasted, except if you have **RAM** caching software like **PrimoCache** and **eBoostr** that allows using it. **Macs** and **Linux** are not affected by the limit.

A similar but perhaps slower method of caching is built into all versions of **Windows** from **Vista** onward called **ReadyBoost**. It's available only for computers that have their operating system stored on an **HDD**. It uses **SSDs**, **USB** flash drive, **SD** card, or **CompactFlash** to act as a cache, not **RAM**, so that it might be slower than the **RAM** caching software, just mentioned. However, if you have a free memory stick lying around and your system disk is on an **HDD**, this may be very helpful. The steps are first to insert your memory stick in the fastest open **USB** port you have on your computer. The places where you plug in your **USB**, if it has a black "tongue," that is **USB 1.0** and is the slowest. A white tongue is a faster **USB 2.0** capable port. The ones on new computers with blue ports are **USB 3.0**. And the fastest available only on the newest computers have an aqua colored tongue, that's **USB 3.1**. (**USB 3.2** is also available I just read) Your speed is also determined by the tongue on your memory stick, too, with the fastest speed determined by the slower of the two, your **USB** memory stick, or the **USB** port.

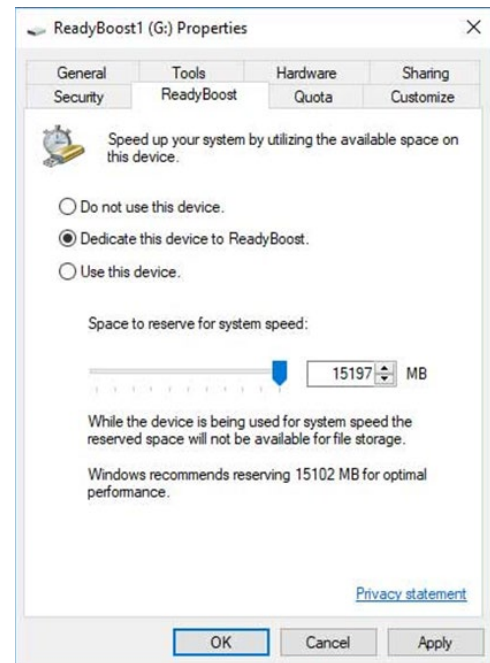


Figure 29. Using **Windows** built-in **ReadyBoost** system and a spare memory stick can significantly speed computer where the operating system is stored on an **HDD**. There is no advantage for computers where the system disk is on an **SSD**.

Next open **Explorer** (the manila folder icon with the blue) > Right-click on the drive you want to use for **ReadyBoost** > choose the **Properties** choice on the bottom of the menu > click on the **ReadyBoost** tab and configure it there. If your **system disk** is already on an **SSD**, you won't have the option to use **ReadyBoost** as memory sticks have slower or the same speed as **SSD**'s, so there is no advantage. You don't have to dedicate the whole thumb drive to **ReadyBoost** but can use a portion for conventional file storage. If you use an **SSD** for the cache drive, it will have the same limitations as the memory sticks, etc. which is 32GB cache file limits, but you may not be limited to one cache file.

Professional IT techs are taught about various flavors of **RAID** and **Tier** storage which can also increase disk performance and usually I believe requires 2 disks or more in a system, but that topic is too complex for this article and overkill for the ordinary user although using **tiered storage** is maybe what the 2 kinds of caching just mentioned are actually doing.

16. In Windows, pin frequently used programs on the taskbar – if you use programs like Word or **Chrome** frequently, once opened from the **Start Menu**, right-click on the icon and choose **Pin to taskbar**.

In a **Mac**, to accomplish the same thing, drag the desired software, file or folder icon to the **Dock**, wait for the other icons to rearrange and make room, then let go. This strategy might not work for some folders like the **Application Folder**. If you find you can't make a folder stick on the **Dock**, right-click on it > choose to **Make Alias** of the folder > drag that to the **Dock**. If something already is on the **Dock** and you want to keep it there, right-click on it > choose **Options** > **Keep on Dock**.

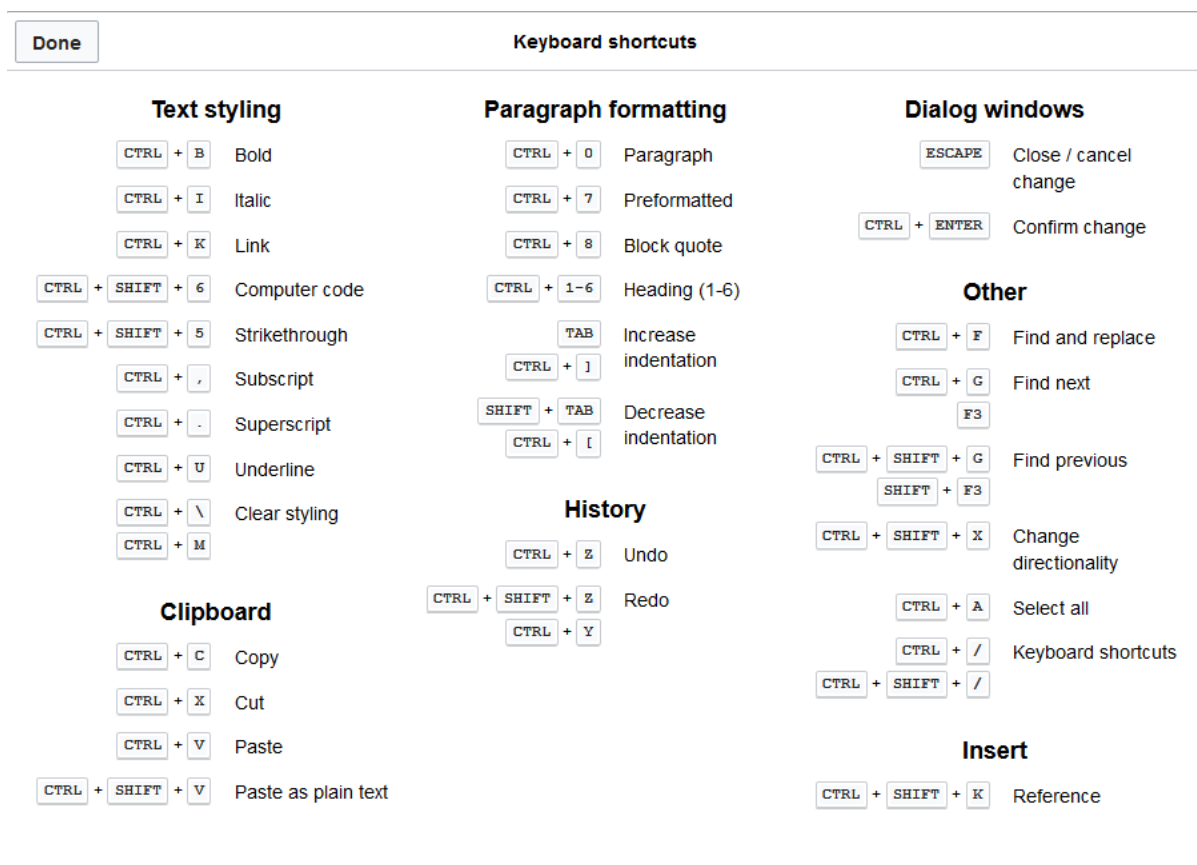


Figure 30. Learn to use shortcuts, to speed your computer use.

17. Use keyboard shortcuts – see above time-saving shortcuts that can make your computing faster in **Windows**. For a **Mac** one, [go here](#).

18. If traversing your file structures in Explorer or Finder (if you have a Mac) takes a lot of time – break folders up with large amounts files and few folders, into many folders containing a few files. Remove any unnecessary entries from the context (right-click menu) of your **Windows Explorer** with the free [ShellMenuView](#) and [ShellExView](#).

19. Call up Comcast and order faster speed on your connection ask them if they can give you a deal – you can see the speed by going to the [free Speedtest](#). In terms of getting the best deal, you can enlist the folks (or bots?) from [Trim](#) to do the negotiating for you. They claimed to save users \$12 million last year, but note they do ask you to give them access to your bank account username and password, with which is a lot to trust a website.

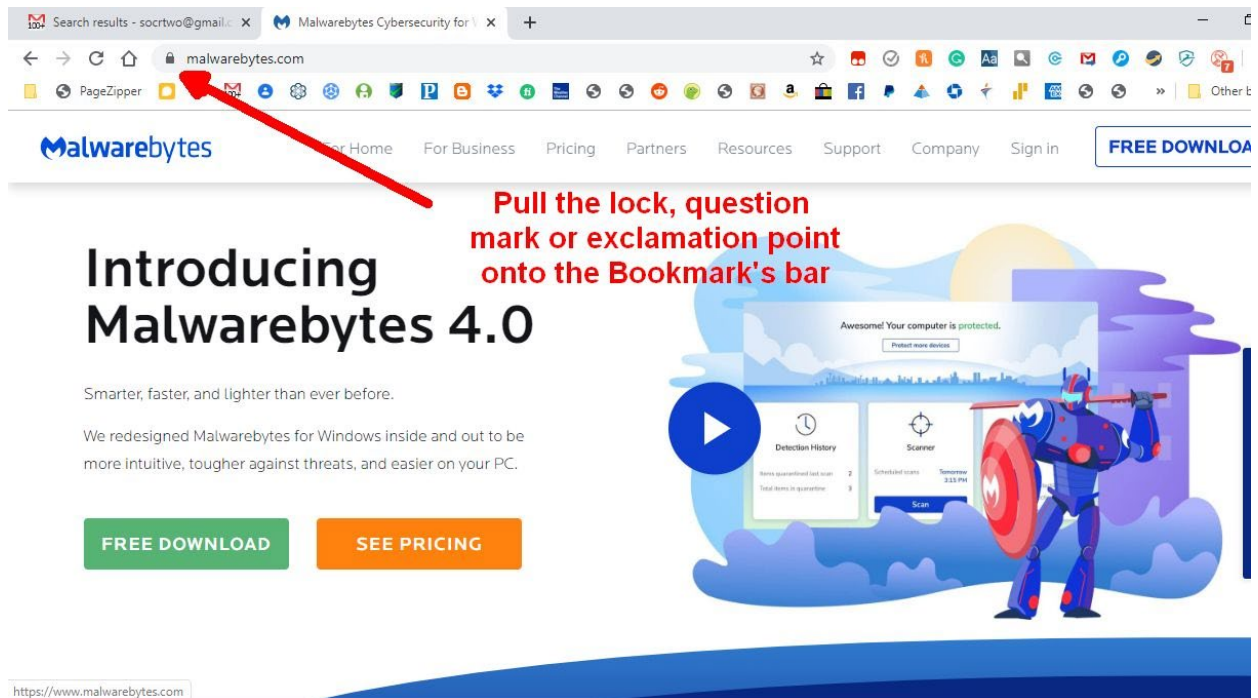


Figure 31. Pull the lock, question mark or exclamation point onto the **Bookmarks Bar** to put a shortcut there.

20. Display the Bookmark toolbar on Edge, Chrome, Firefox, Opera, or Safari and put your most-used websites there – it's easy to bookmark sites by clicking the star on the end of the address bar of your web browser. A less well-known technique is to click on the little lock, exclamation point, or question mark that shows to the left of web addresses and drag that onto your bookmark bar. Another useful technique is to right-click on the resulting web icons that represent the websites and choose **Edit**, then remove the text and rely only on the icon to tell you to which website your shortcut leads, that way you can fit more shortcuts on the visible part of the **Bookmark bar** of the browser. Note, too; it may be necessary to go into the settings of your browser and choose to have the **bookmarks bar** displayed under the address bar. For instance, in **Chrome**, you must click on the three dots in the upper right corner that gets you into the **Settings** > click on **Bookmarks** > click on the **Show the bookmarks bar**.

21. Buy a graphics card – if, on your desktop computer (this won't work for a laptop), you play games or use programs that are graphically intensive like Photoshop or video editing programs, and you notice it's sluggish, try buying a dedicated graphics card to provide the graphic processing. There has been a glut for about two years in graphics cards because

before that, it was profitable to mine cryptocurrencies with graphics cards. That is generally no longer true, so you may be able to pick up used graphics cards cheaply and new ones may be available for cheaper than at the height of the mining craze in January of 2018.

22. Rather than use Wi-Fi, switch to using Ethernet wire(s) from your router to your computer – you might need maintenance to install the wires for you. You can also invest in a [Wi-Fi Booster](#), which will strengthen the **Wi-Fi** signal for the part of your apartment, Courtyard, or Villa that is receiving a weak signal. You can also try moving your router to a more central location if that is possible.

23. Restart your computer regularly – this used to be truer than it is now. Programs with “leaky memory” would fill up the **RAM** with processes they no longer needed but didn’t properly release, slowing the computer down to a crawl. In modern operating systems, when a program is terminated, all the processes associated with it, properly released or not, are removed from the **RAM**. That wasn’t true before where orphan processes could hang on like ghosts but having real effects on computer operation. Experience teaches still even with the best of today’s computer; they need restarting if a program refuses to quit or the machine slows to a crawl for some unknown reason.

24. Delete browser (Chrome, Firefox, Edge, Safari, or Opera) extensions or plugins you don’t use – **Chrome** is a notorious computer resource hog and other browsers are probably similar, especially if you have installed a lot of extensions for convenience purposes of one sort or another. If you have a lot of extensions, make sure you are using all of them. If not, right-click on them and choose “Remove.”

Also, if you have a lot of files on your desktop on either a **PC** or **Mac**, it’s unclear, but it may help speed-wise to put them in folders there or your **Documents** folder.

25. Here is a [web page](#) that is probably the last word on speeding up your PC – it gives 99 one-sentence ways to speed your **PC** and links how to accomplish each strategy. Here is [an article with 19 ways to speed your Mac](#) covering some of the ground covered here, but also some additional strategies.
