TAKE CONTROL OF
MAINTAINING YOUR MAC

by JOE KISSELL
$14.99
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Welcome to *Take Control of Maintaining Your Mac, Third Edition*, version 3.1, published in January 2019 by alt concepts inc. This book was written by Joe Kissell and edited by Caroline Rose.

Macs, like all machines, are prone to break down eventually—in either a physical sense (a component going bad) or a logical sense (files becoming corrupted, apps misbehaving). You can reduce the risk of such problems, and minimize the damage when they do occur, with a regular maintenance regimen. This book contains simple steps you can take to keep your Mac humming.

If you want to share this ebook with a friend, we ask that you do so as you would with a physical book: “lend” it for a quick look, but ask your friend to buy a copy for careful reading or reference. Discounted classroom and Mac user group copies are available.

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### Updates and More

You can access extras related to this ebook on the web (use the link in *Ebook Extras*, near the end; it’s available only to purchasers). On the ebook’s Take Control Extras page, you can:

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Basics

To review background information that might help you understand this book better, such as finding System Preferences and working with files in the Finder, I recommend reading Tonya Engst’s ebook *Take Control of Mac Basics*.

In this book, when I use the term *disk* by itself, I generally mean your Mac’s primary internal storage device—whether that’s a mechanical hard drive, an SSD, or other solid-state storage. (Apple, after all, still uses the term “Macintosh HD” as the default name for your Mac’s startup volume, even when it’s not stored on a hard disk.) A *drive* is a physical device for storing data; a single drive can comprise one or more *volumes*, or logical storage devices. The volume that contains the copy of macOS currently used to boot your Mac is your *startup volume*. I’ll specify *hard drive* when I need to talk specifically about the little boxes with spinning platters.

What’s New in Version 3.1

Version 3.1 is a minor revision that brings this book up to date with macOS 10.14 Mojave and various changes in third-party software. Along with numerous small edits, this version contains the following significant changes:

- Explained the new user interface for automatic updates in Mojave and later; see *Turn On Automatic App Store and macOS Updates*
- Updated the description of *CleanMyMac* to cover changes in the current version, *CleanMyMac X*
- Removed outdated advice about Mac notebooks with removable batteries; see *Exercise Your Notebook’s Battery*
• Added more recommendations for anti-malware apps; see Install Anti-Malware Software

• Updated the list of browser extensions for blocking ads and cookies; see Delete Your Cookies

What Was New in the Third Edition

The third edition of this book (version 3.0) represented not only a change in its version number but also in its title. This book’s most recent ancestor in the Take Control series was Take Control of Maintaining Your Mac, Second Edition, which was published in March 2006 and last updated in August 2012. I subsequently acquired publication rights to the book, updated it significantly, and rereleased it with a new title (Maintaining Your Mac: A Joe On Tech Guide) in July 2015, followed by a version 1.1 update in June 2016 and a version 1.2 update in September 2016.

After I purchased Take Control Books from TidBITS Publishing Inc. in May 2017, I decided to bring this book back under the Take Control umbrella. That meant reverting to its previous title and incrementing the edition number by 1 (even though there was, in effect, another edition of the book between the second and third).

Along with hundreds of minor adjustments, here are the major changes between Maintaining Your Mac: A Joe On Tech Guide version 1.1 and Take Control of Maintaining Your Mac, Third Edition:

• Updated the book for compatibility with macOS 10.13 High Sierra

• Removed mentions of CrashPlan and replaced them with Backblaze (or other backup apps, as appropriate)

• Revised my advice for automatic installation of system data files and security updates in Turn On Automatic App Store and macOS Updates

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• Added more detail about how much available disk space you may need in Clean Out Accumulated Cruft, and added a sidebar, How Much Disk Space Is Really Available?

• Updated my recommendations about how much RAM you need in Be Sure You Have Enough RAM

• Expanded and revised my advice about how to Use Optimized Storage

• Updated the advice in Exercise Your Notebook’s Battery

• Offered additional advice (and deleted some that’s no longer applicable) in Install Anti-Malware Software

• Updated Delete Your Cookies to reflect recent browser versions

• Added iStat Menus to the list of Monitoring Utilities
Introduction

Back in the early 2000s, I went to the dentist for the first time in many years. After skipping dental visits for far too long, I felt increasingly reluctant to schedule an appointment. I could just hear the dentist chiding me, “Ah, I can see you haven’t had your teeth cleaned properly in five years. For shame!” The more time passed, the worse my embarrassment grew, and finally it took actual pain and a visible hole in a tooth to overcome it. So I was disappointed, but not surprised, to learn that I had several cavities and needed a root canal. The dentist was kind and understanding but nevertheless pointed out repeatedly that this visit might have been much less painful (and less expensive) had I flossed every day and gone for my semiannual checkups as I knew I should have.

I tell you this story not merely to urge proper dental hygiene but because maintaining your Mac—like maintaining your teeth, your car, your health, or your home—is a good habit whose rewards are having fewer problems later on and being able to recover more easily from problems that do arise. You can sometimes get away without doing any maintenance for a few months or perhaps much longer, but you risk losing data, wasting time, and having to spend a great deal of money repairing or replacing your computer.

This book teaches you the most important and useful maintenance tasks you should perform to increase your chances of keeping your Mac in tip-top operating condition throughout its lifetime. I’ve organized the tasks according to their frequency: what you should do daily, weekly, monthly, and yearly, as well as some important initial steps, some things you should do when a macOS upgrade appears, and some tasks you might want to avoid, contrary to conventional wisdom. If you follow these recommendations diligently, you’ll dramatically decrease the likelihood of serious problems. And if problems do occur, you’ll be far more likely to recover from them gracefully.
I want to make a few disclaimers up front:

- There’s no such thing as the One True Way to maintain your Mac. Everyone’s situation is unique, so you may need to adapt these instructions to suit your needs—perform certain tasks more often or less often, skip tasks that don’t apply to you, and so on. Take these instructions as guidelines, as a starting point to determine your own maintenance regimen.

- No amount of maintenance can guarantee that you’ll never have any problems. Manufacturing defects, malfunctioning software, user errors, and other mishaps can and do occur. Proper maintenance should, however, minimize both the number and the severity of problems you experience.

- This book does not cover troubleshooting or repair; the focus is on preventing problems, not fixing them. If your Mac crashes, loses data, fails to start up, or otherwise behaves improperly, I refer you to my book *Take Control of Troubleshooting Your Mac*.

This version of *Maintaining Your Mac* is geared toward people using 10.9 Mavericks or later, including 10.14 Mojave. The majority of the information in this book also applies to earlier versions of macOS. Even so, note that one of my first suggestions is to upgrade your Mac to run the latest version of the operating system, which is likely to contain fewer bugs than earlier versions.

To see if there’s anything new that you need to know since this book was released or if there’s a newer version of this book, check for updates using the link at the top of the About This Book chapter.

The tasks in this book are easy, and they get easier the more you do them. So start developing those good maintenance habits right now. And don’t forget to floss every day!
Quick Start

This book describes a step-by-step process for maintaining your Mac. You may do the tasks within a chapter in any order, but I strongly suggest first following the steps in Start on the Right Foot.

**Get ready:**
- Get your Mac into the best possible shape by updating software, getting rid of old files, setting up a backup system, and performing other preliminary tasks. Read Start on the Right Foot.

**Perform periodic maintenance tasks:**
- Every day, update your backup, download software updates, and empty your inbox. See Perform Daily Tasks.
- Once a week, perform maintenance such as cleaning up your desktop, backing up your disk, and installing software updates. See Perform Weekly Tasks.
- Once a month, empty your Trash, check your disk for errors, test your backups, do some light cleaning, and exercise your notebook’s battery. See Perform Monthly Tasks.
- Once a year, give your Mac a good cleaning inside and out, make extra archival backups, get rid of extraneous files, check your UPS battery, and more. See Perform Yearly Tasks.

**Save time by skipping unnecessary work:**
- Learn why you can probably avoid six common maintenance tasks in Maintenance Tasks to Skip.

**Handle macOS upgrades with ease:**
- Learn what you need to know to be ready for the next version of macOS in New Releases of macOS.

**Avoid or fix problems:**
- Catch potential problems early, or troubleshoot them if need be. See Monitor Your Mac’s Health and Learn More.
Start on the Right Foot

Whether you’ve just unpacked a shiny new Mac or you’re hoping to get an older machine into shape, your first step should be to perform some initial cleanup and preparation tasks. These tasks will help your Mac run better now and will make ongoing maintenance tasks easier.

Install the Latest Version of macOS

If your Mac is already running the latest version of macOS, good for you! Skip to Turn On Automatic App Store and macOS Updates (next). If not, your first step should be to upgrade.

All Macs introduced in 2012 or later—and even some introduced as long ago as 2010—can run macOS 10.14 Mojave. (And, frankly, if your Mac is more than seven or eight years old, you might want to think about buying a new model.) Since Apple no longer charges for operating system upgrades and your Mac most likely supports the latest version, you should seriously consider installing the latest version of macOS that will run on it. (Even if your Mac doesn’t support Mojave, it might still support the previous version of macOS, 10.13 High Sierra.)

Every release of macOS includes dozens if not hundreds of bug fixes to prevent crashes or other errors and to patch security holes. That fact alone is reason enough to keep up to date. In addition, Apple constantly introduces useful new features, and some newer software runs only on recent versions of the operating system. Often, doing nothing more than updating your system software can eliminate a wide range of problems—and prevent others.

Operating system updates fall into two categories: major and minor. Major updates (more properly known as upgrades) change the operating system’s name (as in High Sierra and Mojave) and increment the digit(s) after the first decimal point in the version number: 10.0, 10.10, and 10.14 were all major updates. Minor updates change the number...
after the second decimal point; for example, 10.14.1 and 10.14.2 were
minor updates.

You should always download and install every minor update, because
minor updates focus on bug fixes. (However, I suggest waiting a few
days after a macOS update appears to make sure it doesn’t contain any
serious errors; see Check for Software Updates, later.) The easiest way
to do so is to use the automatic update features in the App Store app
and, if applicable, the Software Update pane of System Preferences
(see Turn On Automatic App Store and macOS Updates, next). Major
upgrades are less urgent, especially when they focus on new features;
nevertheless, since they also fix numerous bugs, you should install
them as soon as it’s convenient. Read New Releases of macOS, later,
for details.

Some Mac users, having heard horror stories of half-baked releases
that cause as many problems as they fix, feel anxious when software
updates appear. Major errors can sneak into system updates, but this
happens rarely, and usually Apple resolves such problems promptly. In
addition, many errors that appear to be update-related are in fact the
result of existing problems on the user’s Mac, minor issues such as
outdated third-party apps, or even (gasp!) user errors. I can’t guaran-
tee a software update will never break anything, but in my experience
the benefits of updates overwhelmingly outweigh the risks—especially
if you maintain good backups (see Set Up a Backup System).

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**Turn On Automatic App Store and macOS Updates**

You can check for and install updates to all Apple apps, and many
third-party apps, using the App Store app. Starting in Mojave, the
Software Update pane of System Preferences, which you can use to
manually update macOS, also lets you configure automatic updating of
those apps, as well as of macOS itself. (Under High Sierra and earlier,
the App Store pane of System Preferences serves that purpose.) Al-
though you can manually update using the App Store app and System
Perform Daily Tasks

If you performed all the preliminary steps in *Start on the Right Foot*, your daily maintenance ritual consists of at most three tasks, and at best, none! How much you’ll need to do each day depends on the decisions you made in the *Start on the Right Foot* chapter.

Update Your Versioned Backup

One important component of the backup strategy I recommend (refer back to *Set Up a Backup System*) is *versioned backups*. This means that after your first full backup, each successive backup copies only those files (or portions thereof) that are new, or have changed, since the previous time. And it keeps the previous copies of the files, so you can go back to an earlier version if you accidentally modify a file you shouldn’t have changed (plus, files you delete on your regular disk remain in the backup).

At a minimum, be sure your backup app updates your versioned backups once a day (and more often is even better). Although I recommend backing up all your files, if you have to be selective, at least be sure you make a daily copy of any files you could not recreate in a matter of minutes, such as your saved email, photographs, and any documents you’ve spent hours working on during the day.

If you’re using Time Machine, Backblaze, or any of the numerous other backup apps that work continuously in the background—or if you configured your backup software to run on a schedule—this happens automatically and you need not take any explicit action. And if you aren’t using automated backups of some sort, please reconsider. In my experience, Murphy’s Law tends to apply here: the day you forget to back up your files manually is the day you lose data!

Once you’ve confirmed that backups are occurring at least daily, you no longer have to worry about manually performing this daily task. But
even if your backup software runs automatically, you should verify that the backup worked and your files can be restored. I classify that as a monthly task; see Test Your Backups.

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### Check for Software Updates

In Turn On Automatic App Store and macOS Updates, I suggested setting the App Store to check for, and download, any new updates from Apple (and optionally third parties) daily. If you followed that advice, any available updates download in the background, and an alert informs you when they’re ready to install. (As I mentioned earlier, if you selected the “Install system data files and security updates” checkbox, then those types of updates will be installed without prompting.)

So your daily task is more of a don’t than a do: on the days when that inevitable alert appears, asking if you want to install the latest Apple software updates, read about the updates but consider postponing installation for a few days—in other words, don’t click Install, but rather Later, and choose Try Tonight or Remind Me Tomorrow from the pop-up menu. I say this for two reasons:

- Software updates take some time, and you may not have the time available at the instant the App Store says new software is ready. At home, Saturday mornings might work well for updating software; at the office, a weekday morning could be better (see Install App Store Software Updates, a suggested weekly task).

- In the unlikely event that an update has problems, waiting gives you a buffer. On sites like iMore, TidBITS, and MacInTouch, you can get a sense of whether an update has any serious issues. However, take isolated problem reports with a grain of salt. Updates can fail—or appear to fail—for many reasons, including user error. If one or two people cry wolf, that shouldn’t dissuade you from updating.

Exception: If an update fixes a problem that’s been interfering with your work, by all means install it right away—especially if the update doesn’t require a restart.
Perform Weekly Tasks

Your daily maintenance tasks are minor—and perhaps even happen automatically. Once a week, however, you should set aside time for some more in-depth housekeeping. Depending on your work habits and system specifications, these weekly tasks might take 15 minutes or they might take a couple of hours. If you find that you can’t finish them all conveniently in one sitting, feel free to stagger them—one each day of the week, for example—as long as any given task occurs about once every week.

Tip: For weekly, monthly, and yearly tasks, you might find it helpful to set a recurring reminder in Calendar (or your favorite calendar app) or to print the Periodic Task Checklist at the end of this book and hang it someplace conspicuous.

Clean Up Your Desktop

I want to ask you a personal question: how many icons—not counting local disks, network volumes, and removable media—are on your desktop right now? I usually try to keep my own number close to zero, just like my inbox. But I know lots of people who regularly have dozens or even hundreds of icons on their desktops, who use it as a catchall for downloaded files, work in progress, and everything else that needs a temporary home. This is a bad idea! Here’s why:

- macOS considers every icon on your desktop a window, and because every window uses up a certain amount of RAM, more desktop icons means greater RAM usage.

- **Mission Control** shortcuts notwithstanding, putting files and folders on your desktop makes them harder to find, because they’re so easily hidden behind windows. (You can access the contents of your Desktop folder in a regular Finder window, but many people put items on the desktop to avoid working with Finder windows.)
• Your desktop displays files and folders only as icons, whereas Finder windows enable the more efficient list and column views. (Yes, I know, you can view the contents of your Desktop folder in a Finder window too, but work with me here...)

• Tossing lots of files into a single big storage area (wherever it may be) creates more work later on when you try to locate specific files.

• If you use your desktop to hold important items that you want to keep “in your face” at all times, you’ll lose that effect when the files become too numerous.

A cluttered desktop slows you down, so take a few minutes once a week to organize most (if not all) the items on your desktop into other folders.

**Tip:** Hazel is a fantastic utility that helps you automate many maintenance tasks, such as cleaning off your desktop or your Downloads folder. You set up simple rules, and when a file in a certain place matches a rule, Hazel can move it, rename it, apply a label, or perform other actions. It can also delete old items from your Trash on a schedule and help you uninstall apps. Oh, and I wrote Hazel’s built-in help, which is pretty good (if I do say so myself).

I know of numerous organizational philosophies, but I have no wish to impose a rigid system on you. Instead, simply consider these suggestions for keeping files off your desktop:

• If your chief concern is keeping track of a few important files, use the Finder’s Tags feature (select a file and choose a colored tag from the bottom of the File menu, or choose File > Tags to enter custom tags). Mark all high-priority files with a given color or tag name. Then, use the per-tag smart folders in the Finder window sidebar to display all files on your disk with that tag. These folders automatically—and continuously—update themselves to display all the files tagged with the selected color or name, wherever they may be stored on your disk.
Perform Monthly Tasks

Once a month—perhaps on a different day from the one on which you perform your weekly tasks—set aside about a half hour to perform several additional maintenance tasks: emptying your Trash, running Disk Utility, testing your backups, cleaning your screen, cleaning your pointing device, exercising your notebook’s battery, and checking for ebook updates.

Empty Your Trash

I have no doubt that some readers are now concluding I’m out of my mind. *Empty my Trash once a month?! What could he be thinking?* The thing is, of those people, some of them are thinking that once a month is far too seldom, while others are thinking it’s far too often!

Your Trash, as you probably know, is just another folder (technically, several folders that act like a single folder). As a result, moving files or folders to the Trash doesn’t delete them, just as tossing a crumpled paper in a physical trash can doesn’t automatically turn it into landfill. On your Mac, as in your home, the contents of the Trash continue to take up space until you empty the Trash (using Finder > Empty Trash), freeing up that space for other files.

How often should you do this? It depends on how you think about the Trash.

Let me put my cards on the table: I am a compulsive Trash emptier. I picked up this habit many years ago when I was struggling to make do with a 20 MB hard disk and every kilobyte counted. If I left items in the Trash without emptying it for more than a few hours, I’d run out of space. Today, even though I have a large SSD with plenty of free space, I still haven’t kicked that habit. On the other hand, because I know I’ll be emptying the Trash shortly after putting a file there, I tend to think of moving files to the Trash as a final deletion from which recovery is
impossible, so I don’t take that step unless I’m entirely sure I can do without that file.

On the other end of the spectrum are what I’ll call pack rats. They cringe at the idea of getting rid of anything for good. For them, the Trash is just another folder, and, unlike a physical trash can, it never gets full. So they freely move files and folders to the Trash that don’t seem important at the moment—just to get them out of the way—because they can open that folder at any time and get the files back.

In between, of course, are most people. If you’re that hypothetical person in the middle of the Trash emptying spectrum—neither a pack rat nor a compulsive emptier—let’s just say that today is a good day to empty the Trash. For those at the extremes, here are some reasons why you might want to move toward my proposed happy medium of monthly Trash emptying.

**Note:** In Sierra and later, macOS can automatically delete items that have been in your Trash for 30 days; see Use Optimized Storage. The utility Hazel offers a similar but more flexible feature.

For those on the compulsive side, consider this:

- Everyone makes mistakes. You can probably recall at least one occasion when you had to fish a file out of the Trash. Remember that once you’ve emptied the Trash, the only way to recover deleted files (other than to retrieve them from a backup) is to try expensive—and often unsuccessful—undelete utilities or to send your drive to a very expensive data recovery service. Giving yourself a safety net might save you grief later.

- Modern SSDs and hard drives are large enough that you probably won’t run out of space if you wait a few weeks before emptying the Trash.

- You’ll be able to focus on your work and be more productive if you don’t keep looking to see if there’s anything in the Trash.
Perform Yearly Tasks

If you’ve ever looked around your home and thought, “It’s time for a
good spring cleaning,” you know the value of decluttering. On your
computer, as in your home, make an annual ritual of removing dirt,
tossing out junk, and putting your belongings in order. Besides giving
you a cleaner, more inviting environment, these yearly tasks can
extend your computer’s life span and help keep your data safe.

De-Dust Your Mac

Nearly all Mac models employ one or more internal cooling fans.
Without them, your computer would overheat, leading to crashes,
erratic behavior, and possibly even permanent damage to sensitive
components.

But as the fans pull air into the computer, they also pull in dust. Dust
can accumulate on the air intake vents, on the fan itself, or on any
surface along the flow of air within the computer. When a layer of dust
sits atop a hot component, it acts as an insulator, preventing some of
the heat from escaping into the air. And if dust blocks the air flow, the
heat that does escape has nowhere to go. Either way, your fan must
work harder, which not only makes it noisier but also makes it suck in
even more dust.

In short, dust is no friend of computers. By getting rid of the dust, you
can make your Mac cooler and quieter—and prevent all sorts of un-
pleasant problems.

Note: “Dusting” is what you do to get rid of dust on the surface of
your furniture. You can dust a Mac, too, but what I’m talking about
here isn’t cosmetic; you need to remove dust that hampers airflow
into and out of the Mac. That’s why I say “de-dust.”
You can remove dust from the exterior case of your Mac with a soft cloth, but what we’re more concerned with here is the dust that gunks up ventilation holes and, to some extent, dust that has accumulated inside your Mac.

For the ventilation openings, you can use a soft brush, a vacuum cleaner with a hose attachment (but see the warning ahead about AC-powered vacuum cleaners), or compressed air. Of these, compressed air is usually the most effective at removing dust, but unfortunately it does so by putting the dust right back into the air. To deal with that problem, you can do your cleaning outside, or try holding the compressed air in one hand and a vacuum hose in the other, using the vacuum to suck up as much of the dislodged dust as you can.

**Tip:** For further advice on cleaning the outside of your Mac, see Apple’s support article [How to clean your Apple products](https://www.apple.com/support/mac/).

Now, about the interior of your Mac...

If you have a Mac Pro (either the 2009 tower model or the 2013 cylinder model), you’re in luck! Both of these cases are trivially easy to open. Most other models pose more of a challenge. You typically need special tools, and there’s a real risk of breaking something, even if you have a pretty good idea what you’re doing. (And, any damage you cause while poking around inside your Mac won’t be covered by your warranty.)

I’ve disassembled and reassembled many Macs, including the iMac, Mac mini, and various MacBook Pro models. (And, without fail, I’ve found atrocious amounts of dust inside!) Taking apart computers is no big deal for me, but unless you have significant experience tinkering with electronics and a willingness to take risks, I can’t in good conscience recommend that you do anything that isn’t explicitly spelled out in your Mac’s manual (you can download manuals from Apple’s [Manuals](https://www.apple.com/support/mac_manuals/) page) or the [Mac support](https://support.apple.com/mac) website.
Maintenance Tasks to Skip

Careful readers may have noticed that I omitted several commonly recommended tasks from my maintenance regimen, such as repairing permissions, defragmenting disks, running the macOS maintenance scripts, periodically changing passwords, and deleting cookies. In addition, I haven’t recommended installing antivirus software. Read this chapter to discover why you might never need to do these things—or whether you’re one of the few people who should.

Repair Permissions

For many years, if you were to visit Mac discussion forums and news sites, you’d see repeated recommendations to use Disk Utility’s Repair Disk Permissions feature. Some people recommended repairing permissions on a daily basis, or before and after every software installation, or as a first troubleshooting step when any sort of problem arose. Anecdotes abounded about the magical curative (or prophylactic) properties of this feature, so it achieved a mythical status—in much the same way rebuilding the desktop file was a standard cure-all under Mac OS 9.

In 10.11 El Capitan, Apple removed the Repair Disk Permissions feature from Disk Utility. Instead, permissions are now repaired automatically when you install software using Apple’s installer. So if you’re running El Capitan or later, there’s nothing to see here; move on to Defragment Your Hard Disk.

What about those still running 10.10 Yosemite or earlier? Isn’t it still a good idea to repair your permissions? At the risk of being labeled a heretic, I’d like to suggest that in most cases repairing permissions is nothing more than a placebo. True, the procedure can solve certain problems in Yosemite and earlier, and rarely does any harm, but as a routine maintenance task, I consider it a waste of time. To explain why, I should provide a bit of background.
In OS X, each file contains information specifying which users (or parts of the system) can read it, modify it, or execute it. This information is collectively known as permissions. If a file has incorrect permissions, it can cause apps to misbehave in various ways, such as crashing or failing to launch.

Ordinarily, installers set the correct permissions for the files they install, and the permissions stay that way permanently. However, a poorly written installer can mess up permissions—even for files it did not install—and if you use Unix commands such as `chown` and `chmod`, you can accidentally set files’ permissions incorrectly. These sorts of problems occur infrequently, but they do occur.

The Repair Permissions feature looks for certain software installed using Apple’s installer, which saves files called receipts that list the locations and initial permissions of all the files in a given package. Repair Permissions compares the current permissions to those in the receipts and, if it finds any differences, changes the files back. The command ignores software installed in other ways (using a different installer or drag-and-drop installation, for instance) and knows nothing about permission changes you may have made deliberately.

Although I said earlier that some kinds of disk problems can occur without any provocation (see the sidebar Why Do Disk Errors Occur?), permissions don’t go out of whack all by themselves; you (or software you install) must do something to change them. And not all changes are bad; in many cases, a file’s permissions can be different from what they were originally without causing any problems. So repairing permissions makes little sense as a regular activity.

For those running Yosemite or earlier, I do, however, recommend repairing permissions as a troubleshooting step if (especially right after installing new software) you find that an app no longer launches or that it produces inexplicable error messages.

To repair permissions in Yosemite and earlier, follow these steps:

2. Select a volume in the list on the left.

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New Releases of macOS

Since 2013, Apple has maintained a September/October shipping schedule for new versions of macOS (formerly known as OS X, and before that as Mac OS X). All indications are that Apple plans to continue this schedule for the foreseeable future. I’d like to share some advice you should follow whenever Apple releases a major new version of macOS.

**Note:** Even more important than the major upgrades is keeping up with minor macOS updates, because these usually focus on fixing serious problems, whereas major upgrades focus on big new features. For details, read Install the Latest Version of macOS and Install App Store Software Updates.

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**Buy Take Control of Upgrading to...**

When Apple released Mac OS X 10.3 Panther back in 2003, I wrote *Take Control of Upgrading to Panther*, which walked readers through every step of the upgrading process. That book was a runaway hit, and for every release of OS X since then, I’ve written a new *Take Control of Upgrading to*... book that covers all the important changes to be aware of, gotchas to avoid, and precautionary steps to take when upgrading. I write these books based on extensive testing and dozens of installations on numerous test machines.

My most recent book in this series is *Take Control of Upgrading to Mojave*, released in September 2018. I may not continue this custom forever, but it’s worth checking for a new *Upgrading* book when the next version of macOS appears.

So, why should you pay for and bother to read a book about how to upgrade macOS? Isn’t it just a matter of downloading an installer and clicking a button? If only it were so. Every upgrade of macOS brings with it not just new features and fixes but new hardware and software
incompatibilities, installer oddities, and confusing custom installation options. My *Upgrading* books will help you understand each installation option, keep your data safe, and make the upgrade as stress-free as possible; you can find them (and many other titles by top Mac authors) at Take Control Books.

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### Make a Fresh Bootable Backup

Before performing any major system upgrade, be sure to update the duplicate of your startup drive or, better yet, make a new one from scratch in addition to your regularly updated duplicate. System upgrades can cause many things to go wrong—for example, you may find that some of your mission-critical software has problems after the upgrade—and you’ll appreciate the security of knowing you can restore your system to its previous state if a problem occurs.

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### Upgrade

Some people habitually wait until the first or second minor update after a major macOS release before taking the plunge, whether to give Apple time to work out any early bugs, to give developers time to update their apps for compatibility, or to see how other people like it before committing themselves. Others feel so nervous about upgrading that they wait until it’s nearly time for the next major version to be released! But the longer you put off upgrading, the longer you’ll go without useful new features, not to mention important bug fixes and security improvements.

I’m an early adopter, and although I’ve experienced my share of minor hurdles, I’ve never regretted a decision to upgrade immediately. You may, however, want to delay an upgrade if you’re in the middle of a project and can’t afford any downtime, if you rely heavily on an app that has not yet been updated to work under the new system, or if you expect to buy a new Mac in the near future (which will, of course, include the latest version of macOS).
Monitor Your Mac’s Health

No matter how diligently you perform the maintenance tasks in this book, you won’t truly know how well (or how poorly) your Mac is running unless you make the effort to find out. The fact that no smoke is billowing from your Mac is a good sign, of course, but it’s hardly definitive proof that all is well. In this chapter, I show you how to find out what’s going on under the hood.

Use Monitoring Utilities

Numerous utilities (most of them free) can provide up-to-the-minute statistics about your Mac. In most cases, these apps run in the background all the time, but if you prefer, you can run them manually when you get curious about your Mac’s current state. I provide a list of several such utilities just ahead (in Monitoring Utilities). But first, you should understand what data you might want to monitor and why.

RAM Usage

For the most part, macOS manages your computer’s RAM efficiently. Apps can dynamically adjust the amount of memory they use, and even if all your RAM is actively in use, a virtual memory system lets macOS use a portion of your disk (or SSD) to extend your RAM, automatically swapping (or “paging”) data between the disk and the physical RAM as needed. Even so, if you have enough apps open at once, and if they require enough memory to perform their respective tasks, you can reach a point where data swapping occurs constantly. This uses disk space and slows everything way down.

You should also be aware of a type of bug known as a memory leak. Apps usually ask the system for a certain amount of memory for any given task and then return it when they’re done. Sometimes, due to a programming error, an app keeps taking memory and not returning any, so that by doing nothing more than staying open, it chews up

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more and more RAM. You can recover the used memory by quitting the app—but you might not even know you have this problem without monitoring your RAM usage.

For all these reasons, I suggest keeping an eye on how much RAM is currently in use. If the free RAM drops near zero, consider closing windows, quitting apps, or even restarting your Mac to reduce your dependence on virtual memory. Better yet, add more RAM (if possible); read the sidebar Be Sure You Have Enough RAM.

**RAM Usage Meanings**

In macOS, memory is not simply “used” but can be used in any of three different ways:

- **App memory**: Used by apps and macOS itself
- **Wired**: Actively in use and unavailable to be swapped to disk
- **Compressed**: Unused recently and compacted by macOS, freeing up more space for other apps; can be expanded almost instantly when needed

Most RAM monitoring utilities also indicate how much RAM is “free” (not used at all).

**Disk Usage**

Thanks to the combination of rising disk capacity, Optimized Storage (and similar features), and low-level improvements in macOS, you’re now less likely to run out of space than you were a few years ago. But, as I explained in Clean Out Accumulated Cruft, the consequences of running out of space can be severe. For one thing, as a hard disk approaches its maximum capacity, fragmentation can make your Mac run more slowly (see Defragment Your Hard Disk). Worse, you could lose data because your Mac has no space to save a file. Even more seriously, your Mac may hang, crash, or fail to start up if it runs out of physical RAM and runs out of disk space for virtual memory.

How much disk space should you leave available for file storage, virtual memory, system overhead, and other tasks? As I said earlier (in Clean Out Accumulated Cruft), my rule of thumb is that the minimum
I wish I could promise you that by following the suggestions in this book, you’ll never experience any problems with your Mac. You’ll lessen the likelihood and perhaps the severity of problems, but things still can and will go wrong. If an app crashes, or your hard disk won’t mount, or sparks shoot out of the case, you need more help than I can give you here. But allow me to suggest some places you might look for solutions.

**Websites**

- Apple’s Mac support site: Your first stop should be the official [Mac Support](#) site, where you can search for FAQs, technical notes, and downloads that may address your problem.

- Apple Support Communities: Another Mac user may have discovered, and solved, a similar problem. Connect with other users at these [discussion forums](#).

- MacInTouch: Keep current with Mac news and real-world reports from users around the world at [MacInTouch](#).

- MacUpdate: [MacUpdate](#) provides info on updates for thousands of apps, along with user comments—but it isn’t as up to date as it once was.

**When All Else Fails**

- Visit the Genius Bar at a nearby Apple Retail Store for free advice. Apple Stores also offer expert repair services. Be sure to visit the store’s website to make an appointment.

- If you’re not near an Apple Store, search for an Apple Authorized Service Provider on Apple’s [Find Locations](#) page.
Periodic Task Checklist

Print this checklist and post it in a handy place as a reminder.

**Daily Tasks**
- Update your versioned backup.
- Check for (but don’t install) Apple software updates.
- Empty your inbox.

**Weekly Tasks**
- Clean up your desktop.
- Empty your Downloads folder.
- Update your bootable duplicate.
- Rotate physical backups offsite.
- Install App Store software updates.
- Check for other third-party software updates.
- Restart your Mac.
- Check your spam mailbox.

**Monthly Tasks**
- Empty your Trash.
- Use Disk Utility’s Repair Disk feature.
- Test your backups.
- Consider clearing certain caches.
- Clean your screen and pointing device.
- Exercise your notebook’s battery.
- Check for ebook updates.

**Yearly Tasks**
- De-dust your Mac.
- Clean your keyboard.
- Make archival backups.
- Remove unneeded files.
- Check your UPS battery.

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Joe Kissell is the author of more than 60 books about technology. As of May 2017, he also became the publisher of Take Control Books, when alt concepts inc.—the company he runs along with his wife, Morgen Jahnke—acquired the Take Control series from TidBITS Publishing Inc.’s owners, Adam and Tonya Engst.

Joe is also a contributing editor to TidBITS and a senior contributor to Macworld. Before he began writing full-time in 2003, Joe spent nearly eight years managing software development. He holds a bachelor’s degree in Philosophy and a master’s degree in Linguistics.

In his rare non-work hours, Joe likes to travel, walk, cook, eat, and practice t’ai chi. He and Morgen live in San Diego with their sons, Soren and Devin; and their cat, Zora. To contact Joe about this book, send him email and please include Take Control of Maintaining Your Mac in the subject. You can also follow him on Twitter (@joekissell) or visit his personal website JoeKissell.com.

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