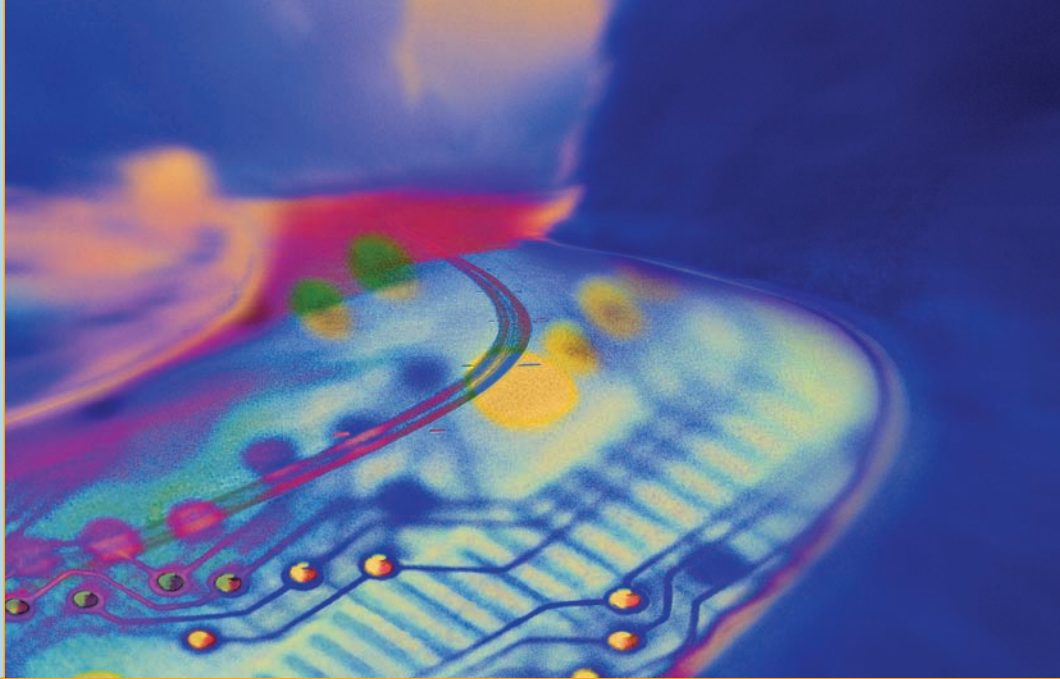




The Path of the PC Tech

“Of everything I’ve learned during my stint at Maximum PC, one lesson reigns supreme: The PC is what we make of it.”

—GEORGE JONES, MAXIMUM PC



In this chapter, you will learn how to

- **Explain the importance of gaining skill in managing and troubleshooting PCs**
- **Explain the importance of CompTIA A+ certification**
- **Describe how to become a CompTIA A+ Certified Technician**

Computers have taken over the world, or at least many professions. Everywhere you turn, a quick dig beneath the surface sawdust of construction, the grease of auto mechanics, and the hum of medical technology reveals one or more personal computers (PCs) working away, doing essential jobs. Because the PC evolved from novelty item to essential science tool to everyday object in a short period of time, there’s a huge demand for a workforce that can build, maintain, troubleshoot, and repair PCs.

■ The Importance of Skill in Managing and Troubleshooting PCs

The people who work with computers—the **Information Technology (IT)** workforce—do such varied jobs as design hardware, write computer programs that enable you to do specific jobs on the PC, and create small and large groupings of computers—**networks**—so people can share computer resources. IT people built the Internet, one of the most phenomenal inventions of the 20th century. IT people maintain the millions of computers that make up the Internet. Computer technicians (or **PC techs**, as those of us in the field call each other) make up the core of the IT workforce. Without the techs, none of the other stuff works. Getting workers with skill in building, maintaining, troubleshooting, and fixing PCs is essential for success for every modern business.

In the early days of the personal computer, anyone who used a PC had to have skills as a PC tech. The PC was new, buggy, and prone to problems. You didn't want to rely on others to fix your PC when the inevitable problems arose. Today's PCs are much more robust and have fewer problems, but they're also much more complex machines. Today's IT industry, therefore, needs specialized workers who know how to make the machines run well.

Every profession requires specialized skills. For the most part, if you want to *get* or *keep* a job that requires those specialized skills, you need some type of **certification** or license. If you want a job fixing automobiles, for example, you get the *Automotive Service Excellence (ASE)* certification. If you want to perform companies' financial audits, you get your *Certified Public Accountant (CPA)* certification.

Nearly every profession has some criteria that you must meet to show your competence and ability to perform at a certain level. Although the way this works varies widely from one profession to another, all of them will at some point make you take an exam or series of exams. Passing these exams proves that you have the necessary skills to work at a certain level in your profession, whether you're an aspiring plumber, teacher, barber, or lawyer.

If you successfully pass these exams, the organization that administers those exams grants you certification. You receive some piece of paper or pin or membership card that you can show to potential clients or employers. This certification gives those clients or employers a level of confidence that you can do what you say you can do. Without this certification, either you will not find suitable work in that profession or no one will trust you to do the work.

■ The Importance of CompTIA A+ Certification

Microcomputers were introduced in the late 1970s, and for many years PC technicians did not have a universally recognized way to show clients or

employers that they know what to do under the hood of a personal computer. Sure, vendor-specific certifications existed, but the only way to get them was to get a job at an authorized warranty or repair facility first and then get the certification. Not that there's anything wrong with vendor-specific training; it's just that no single manufacturer has taken enough market share to make IBM training, for example, something that works for any job. (Then there is always that little detail of getting the job first before you can be certified....)

The software/networking side of our business has not suffered from the same lack of certifications. Due to the dominance of certain companies at one time or another (for example, Microsoft and Cisco), the vendor-specific certifications have provided a great way to get and keep a job. For example, Microsoft's *Microsoft Certified Systems Engineer (MCSE)* and Cisco's *Cisco Certified Internetwork Expert (CCIE)* have opened the doors for many.

But what about the person who runs around all day repairing printers, repartitioning hard drives, upgrading device drivers, and assembling systems? What about the PC hobbyists who want to be paid for their skills? What about the folks who, because they had the audacity to show that they knew the difference between CMOS and a command prompt, find themselves with a new title such as PC Support Technician or Electronic Services Specialist? On the other hand, how about the worst title of them all: "The Person Who Doesn't Get a Nickel Extra but Who Fixes the Computers"? CompTIA A+ certification fills that need.

What Is CompTIA A+ Certification?

CompTIA A+ certification is an industry-wide, vendor-neutral certification program developed and sponsored by the **Computing Technology Industry Association (CompTIA)**. The CompTIA A+ certification shows that you have a basic competence in supporting microcomputers. You achieve this certification by taking two computer-based, multiple-choice examinations. The tests cover what technicians should know after nine months of full-time PC support experience. CompTIA A+ certification enjoys wide recognition throughout the computer industry. To date, more than 800,000 technicians have become CompTIA A+ certified, making it the most popular of all IT certifications.

Who Is CompTIA?

CompTIA is a nonprofit industry trade association based in Oakbrook Terrace, Illinois. It consists of over 20,000 members in 102 countries. You'll find CompTIA offices in such diverse locales as Amsterdam, Dubai, Johannesburg, Tokyo, and São Paulo.

CompTIA provides a forum for people in these industries to network (as in meeting people), represents the interests of its members to the government, and provides certifications for many aspects of the computer industry. CompTIA sponsors A+, Network+, Security+, and other certifications. CompTIA works hard to watch the IT industry and constantly looks to provide new certifications to meet the ongoing demand from its membership. Check out the CompTIA Web site at www.comptia.org for details on the other certifications you can obtain from CompTIA.

Virtually every company of consequence in the IT industry is a member of CompTIA. Here are a few of the biggies:

Adobe Systems	AMD	Best Buy	Brother International
Canon	Cisco Systems	CompUSA	Fujitsu
Gateway	Hewlett-Packard	IBM	Intel
Kyocera	McAfee	Microsoft	NCR
Novell	Panasonic	Sharp Electronics	Siemens
Symantec	Toshiba	Total Seminars, LLC (that's my company)	Plus many thousands more

CompTIA began offering CompTIA A+ certification back in 1993. When it debuted, the IT industry largely ignored CompTIA A+ certification. Since that initial stutter, however, the CompTIA A+ certification has grown to become the de facto requirement for entrance into the PC industry. Many companies require CompTIA A+ certification for all of their PC support technicians, and the CompTIA A+ certification is widely recognized both in the United States and internationally. Additionally, many other certifications recognize CompTIA A+ certification and use it as credit toward their certifications.

The Path to Other Certifications

Most IT companies—big and small—see CompTIA A+ certification as the entry point to IT. From CompTIA A+, you have a number of certification options, depending on whether you want to focus more on hardware and operating systems or move into network administration (although these aren't mutually exclusive goals). The following three certifications are worth serious consideration:

- CompTIA Network+ certification
- Microsoft Certified Professional certifications
- Cisco certifications

CompTIA Network+ Certification

If you haven't already taken the CompTIA Network+ certification exam, make it your next certification. Just as CompTIA A+ certification shows you have solid competency as a PC technician, **CompTIA Network+ certification** demonstrates your skills as a network technician, including understanding of network hardware, installation, and troubleshooting. CompTIA's Network+ certification is a natural step for continuing toward your Microsoft or Cisco certifications. Take the CompTIA Network+: it's your obvious next certification.

Microsoft Certified Professional Certifications

Microsoft operating systems control a huge portion of all installed networks, and those networks need qualified support people to make them run. **Microsoft Certified Professional** certifications are a natural next step after the CompTIA certifications. They offer a whole slew of tracks and exams,



CompTIA A+ is the entry point to IT, though definitely not the only route for learning about computers and having certifications to prove that knowledge. Several certifications cover computer literacy or digital literacy, the phrase that means "what every person needs to know about computers to survive in the 21st century." The most popular computer literacy certification is Certiport's IC³ certification that tests on general computer knowledge; office productivity applications, such as Word and PowerPoint; and Internet applications such as Web browsing and e-mail.

CompTIA has a pre-CompTIA A+ exam (*not* a certification), called the *CompTIA Strata IT Technology exam*, that's geared a bit more to a user preparing to become a tech. It's designed to check basic knowledge levels for people getting into IT.

ranging from simple specializations in Windows Vista to numerous Microsoft Certified IT Professional (MCITP) certifications and beyond. You can find more details on Microsoft's learning Web site at www.microsoft.com/learning/en/us/certification/cert-overview.aspx.

Cisco Certification

Let's face it, Cisco routers pretty much run the Internet and most intranets in the world. A *router* is a networking device that controls and directs the flow of information over networks, such as e-mail messages, Web browsing, and so on. Cisco provides five levels of certification for folks who want to show their skills at handling Cisco products, such as the **Certified Cisco Network Associate (CCNA)**, plus numerous specialty certifications. See the Cisco certification Web site here for more details: www.cisco.com/web/learning/le3/learning_career_certifications_and_learning_paths_home.html.

■ How Do I Become CompTIA A+ Certified?

You become CompTIA A+ certified, in the simplest sense, by taking and passing two computer-based, multiple-choice exams. No prerequisites are required for taking the CompTIA A+ certification exams (although there's an assumption of computer literacy, whether or not you have one of the computer literacy certifications). There is no required training course and no training materials to buy. You *do* have to pay a testing fee for each of the two exams. You pay your testing fees, go to a local testing center, and take the tests. You immediately know whether you have passed or failed. By passing both exams, you become CompTIA A+ certified. There are no requirements for professional experience. You do not have to go through an authorized training center. There are no annual dues. You pass; you're in. That's it. Now for the details.



Previously, CompTIA offered a basic exam and then a choice of three different second exams. CompTIA reverted to the simpler two-exam format in 2009.

The Basic Exam Structure

CompTIA names the two exams introduced in 2009 as **CompTIA A+ 220-701 (Essentials)** and **CompTIA A+ 220-702 (Practical Application)**. It's common to refer to these two exams as the 2009 exams to differentiate them from older CompTIA exams. Although you may take either of the two exams first, I recommend taking the Essentials followed by the Practical Application. The Essentials exam concentrates on understanding terminology and technology, how to do fundamental tasks such as upgrading RAM, and basic Windows operating system support. The Practical Application exam builds on the Essentials exam, concentrating on advanced configuration and troubleshooting.

Both of the exams are extremely practical, with little or no interest in theory. All questions are multiple choice or "click on the right part of the picture" questions. The following is an example of the questions you will see on the exams:

Your laser printer is printing blank pages. Which item should you check first?

- A. Printer drivers
- B. Toner cartridge
- C. Printer settings
- D. Paper feed

The correct answer is B, the toner cartridge. You can make an argument for any of the others, but common sense (and skill as a PC technician) tells you to check the simplest possibility first.

The 2009 exams use a regular test format in which you answer a set number of questions and are scored based on how many correct answers you give, rather than the adaptive format used in years past. These exams have no more than 100 questions each. (Both exams have 100 questions each at the time of this writing.)

Be aware that CompTIA may add new questions to the exams at any time to keep the content fresh. The subject matter covered by the exams won't change, but new questions may be added periodically at random intervals. This policy puts stronger emphasis on understanding concepts and having solid PC-tech knowledge rather than trying to memorize specific questions and answers that may have been on the tests in the past. Going forward, no book or Web resource will have all the "right answers" because those answers will change constantly. Luckily for you, however, this book does not just teach you what steps to follow in a particular case but also explains how to be a knowledgeable tech who understands *why* you're doing those steps, so that when you encounter a new problem (or test question), you can work out the answer. Not only will this help you pass the exams, you'll also be a better PC tech!

To keep up to date, we monitor the CompTIA A+ exams for new content and update the special Tech Files section of the Total Seminars Web site (www.totalsem.com) with new articles covering subjects we believe may appear on future versions of the exams.

Windows-Centric

The CompTIA A+ exams are exclusively centered on the Microsoft Windows operating systems you would expect at a workstation or home. There are no Linux questions. There are no Macintosh OS X questions. You won't be asked about any version of Windows Server or Windows Mobile (used on smartphones and PDAs). Objectives in both exams clearly focus on the following operating systems:

- Windows 2000 Professional
- Windows XP Professional
- Windows XP Home
- Windows XP Media Center
- Windows Vista Home
- Windows Vista Home Premium
- Windows Vista Business
- Windows Vista Ultimate

Windows 7

CompTIA has the darnedest luck when it comes to the timing of new CompTIA A+ exams compared to releases of new Windows versions. CompTIA released the previous CompTIA A+ exams back in 2006, about four months before Microsoft released Windows Vista. It seems that once again CompTIA is caught missing a new operating system. Just a few months after CompTIA announced the 2009 updates to the CompTIA A+, Microsoft unveiled the next version of Windows: Windows 7.

Assuming CompTIA stays true to form, the chances of Windows 7 making it onto this version of the CompTIA A+ are very small. Adding Windows 7 is a major undertaking that would require CompTIA to change their clearly defined exam objectives. Don't worry about Windows 7. Structurally it is identical to Windows Vista. Even Microsoft has stated that Windows 7 is "a refined version of Windows Vista." If you know Vista, you will know Windows 7—and CompTIA isn't going to ask you about Windows 7 until the next update, probably around 2012.

Essentials (Exam 220–701)

The questions on the CompTIA A+ Essentials exam fit into one of six objectives. The number of questions for each objective is based on the percentages shown in Table 1.1.

The Essentials exam tests your knowledge of computer components, expecting you to be able to identify just about every common device on PCs, including variations within device types. Here's a list:

- Floppy drives
- Hard drives
- Optical drives
- Solid state drives
- Motherboards
- Power supplies
- CPUs
- RAM
- Monitors
- Input devices, such as keyboards, mice, and touchscreens
- Video and multimedia cards
- Network and modem cards
- Cables and connectors
- Heat sinks, fans, and liquid cooling systems
- Laptops and portable devices
- Printers
- Scanners
- Network switches, cabling, and wireless adapters
- Biometric devices

Table 1.1 Essentials (Exam 220-701) Objectives and Percentages

Domain	Percentage
1.0 Hardware	27%
2.0 Troubleshooting, Repair, and Maintenance	20%
3.0 Operating Systems and Software	20%
4.0 Networking	15%
5.0 Security	8%
6.0 Operational Procedure	10%

The Essentials exam tests your ability to install, configure, and maintain all the standard technology involved in a personal computer. You need to be able to install and set up a hard drive, for example, and configure devices in Windows 2000, Windows XP, and Windows Vista. You have to understand drivers. You have to know your way around Windows and understand the tasks involved in updating, upgrading, and installing the operating systems. You need to know the standard diagnostic tools available in Windows—not only so you can fix problems, but also so you can work with higher-level techs to fix things.

You're tested on your knowledge of computer security, including identifying, installing, and configuring security hardware and software. You need to know security tools and diagnostic techniques for troubleshooting. You're not expected to know everything, just enough to be competent.

Finally, the Essentials exam puts a lot of emphasis on operational procedures, such as safety and environmental issues and also communication and professionalism. You need to know how to recycle and dispose of computer gear properly. You have to understand and avoid hazardous situations. The exam tests your ability to communicate effectively with customers and coworkers. You need to understand professional behavior and demonstrate that you have tact, discretion, and respect for others and their property.

Practical Application (Exam 220-702)

The CompTIA A+ 220-702 exam covers four objectives. Table 1.2 lists the objectives and percentages.

The Practical Application exam covers the same hardware and software as Essentials, but with a much more hands-on approach to determining the appropriate technology for a situation—running diagnostics and troubleshooting—rather than identification of hardware or operating system utilities. The exam tests your knowledge of computer components and programs so you can make informed recommendations to customers. You need to understand how all the technology should work, know the proper steps to figure out why something doesn't work, and then fix it.

The first domain, Hardware, provides a stark example of the difference in focus between the exams. Essentials talks about identifying names, purposes, and characteristics of various devices. The Practical Application exam, in contrast, goes into more depth, placing you in real-world scenarios where you must decide what to do. Every sub-objective in the Hardware objective starts with "Given a scenario" and then asks you to do something. Objective 1.1 says, for example, "Given a scenario, install, configure and maintain personal computer components." Objective 1.2 says, "Given a

Table 1.2 Practical Application (Exam 220-702) Objectives and Percentages

Domain	Percentage
1.0 Hardware	38%
2.0 Operating Systems	34%
3.0 Networking	15%
4.0 Security	13%



Even though the Practical Application exam does not specifically cover operational procedures, expect some questions about ethics, proper behavior in the workplace, ways to communicate with customers to get the most information in troubleshooting situations, and more.

scenario, detect problems, troubleshoot and repair/replace personal computer components.” The other objectives follow suit.

Another big difference between the two exams is the treatment of the Operating Systems and Software objective in the Essentials exam versus Operating Systems in the Practical Application exam. Essentials tests you on how to use Windows and how to recognize the components, features, and basic utilities of the operating systems. The Practical Application exam goes much deeper. You need to understand intimately how to use the command line to manage the operating systems. You’re expected to know all sorts of disk structures and run all the major disk management tools. Finally, the Practical Application exam grills you on operating system recovery tools and techniques so you can help customers get back up and running quickly.

How Do I Take the Exams?

Two companies, **Prometric** and **Pearson VUE**, administer the CompTIA A+ testing. There are thousands of Prometric and Pearson VUE testing centers across the United States and Canada, and the rest of the world. You may take the exams at any testing center. Both Prometric and Pearson VUE offer complete listings online of all available testing centers. You can select the closest training center and schedule your exams right from the comfort of your favorite Web browser:

www.prometric.com

www.vue.com

Alternatively, in the United States and Canada, call Prometric at 800-776-4276 or Pearson VUE at 877-551-PLUS (7587) to schedule the exams and to locate the nearest testing center. International customers can find a list of Prometric and Pearson VUE international contact numbers for various regions of the world on CompTIA’s Web site at www.comptia.org.

You must pay for the exam when you call to schedule. Be prepared to sit on hold for a while. Have your Social Security number (or international equivalent) and a credit card ready when you call. Both Prometric and Pearson VUE will be glad to invoice you, but you won’t be able to take the exam until they receive full payment.

If you have special needs, both Prometric and Pearson VUE will accommodate you, although this may limit your selection of testing locations.

How Much Does the Exam Cost?

The cost of the exam depends on whether you work for a CompTIA member or not. At this writing, the cost for non-CompTIA members is \$168 (U.S.) for each exam. International prices vary, but you can check the CompTIA Web site for international pricing. Of course, the prices are subject to change without notice, so always check the CompTIA Web site for current pricing.

Very few people pay full price for the exam. Virtually every organization that provides CompTIA A+ training and testing also offers discount **vouchers**. You buy a discount voucher and then use the voucher number instead of a credit card when you schedule the exam. Vouchers are sold per exam, so you’ll need two vouchers to take the two CompTIA A+ exams.

Total Seminars is one place to get discount vouchers. You can call Total Seminars at 800-446-6004 or 281-922-4166, or get vouchers via the Web site: www.totalsem.com. No one should ever pay full price for CompTIA A+ exams.

How to Pass the CompTIA A+ Exams

The single most important thing to remember about the CompTIA A+ certification exams is that CompTIA designed the Essentials exam to test the knowledge of a technician with only 500 hours experience (about three months) and the Practical Application exam to test the knowledge of a technician with only 1000 hours experience (about six months)—so keep it simple! The exams aren't interested in your ability to overclock DDR3 CAS timings in CMOS or whether you can explain the exact difference between the Intel ICH10 and the AMD 790 southbridges. Don't bother with a lot of theory—think in terms of practical knowledge and standards. Read the book, do whatever works for you to memorize the key concepts and procedures, take the practice exams on the CD in the back of the book, review any topics you miss, and you should pass with no problem.

Some of you may be in or just out of school, so studying for exams is nothing novel. But if you haven't had to study for and take an exam in a while, or if you think maybe you could use some tips, you may find the next section valuable. It lays out a proven strategy for preparing to take and pass the CompTIA A+ exams. Try it. It works.

Obligate Yourself

The very first step you should take is to schedule yourself for the exams. Have you ever heard the old adage, "Heat and pressure make diamonds"? Well, if you don't give yourself a little "heat," you'll end up procrastinating and delay taking the exams, possibly forever. Do yourself a favor. Using the following information, determine how much time you'll need to study for the exams, and then call Prometric or Pearson VUE and schedule them accordingly. Knowing the exams are coming up makes it much easier to turn off the television and crack open the book. You can schedule an exam as little as a few weeks in advance, but if you schedule an exam and can't take it at the scheduled time, you must reschedule at least a day in advance or you'll lose your money.

Set Aside the Right Amount of Study Time

After helping thousands of techs get their CompTIA A+ certification, we at Total Seminars have developed a pretty good feel for the amount of study time needed to pass the CompTIA A+ certification exams. The following table provides an estimate to help you plan how much study time you must commit to the CompTIA A+ certification exams. Keep in mind that these are averages. If you're not a great student or if you're a little on the nervous side, add 10 percent; if you're a fast learner or have a good bit of computer experience, you may want to reduce the figures.

To use Table 1.3, just circle the values that are most accurate for you and add them up to get your estimated total hours of study time.



Those of you who just want more knowledge in managing and troubleshooting PCs can follow the same strategy as certification-seekers. Think in practical terms and work with the PC as you go through each chapter.

Table 1.3 Analyzing Skill Levels

Tech Task	Amount of Experience			
	None	Once or Twice	Every Now and Then	Quite a Bit
Installing an adapter card	12	10	8	4
Installing and configuring hard drives	12	10	8	2
Installing modems and NICs	8	6	6	3
Connecting a computer to the Internet	8	6	4	2
Installing printers and scanners	4	3	2	1
Installing RAM	8	6	4	2
Installing CPUs	8	7	5	3
Fixing printers	6	5	4	3
Fixing boot problems	8	7	7	5
Fixing portable computers	8	6	4	2
Building complete systems	12	10	8	6
Using the command line	8	8	6	4
Installing/optimizing Windows	10	8	6	4
Using Windows 2000/XP	6	6	4	2
Using Windows Vista	10	8	4	2
Configuring NTFS permissions	6	4	3	2
Configuring a wireless network	6	5	3	2
Configuring a software firewall	6	4	2	1
Installing a sound card	2	2	1	0
Removing malware	4	3	2	0
Using OS diagnostic tools	8	8	6	4
Using a volt-ohm meter	4	3	2	1

To that value, add hours based on the number of months of direct, professional experience you have had supporting PCs, as shown in Table 1.4.

A total neophyte usually needs a little over 200 hours of study time. An experienced tech shouldn't need more than 60 hours.

Total hours for you to study: _____.

Table 1.4 Adding Up Your Study Time

Months of Direct, Professional Experience...	To Your Study Time...
0	Add 50
Up to 6	Add 30
6 to 12	Add 10
Over 12	Add 0

A Strategy for Study

Now that you have a feel for how long it's going to take, you're ready to develop a study strategy. I'd like to suggest a strategy that has worked for others who've come before you, whether they were experienced techs or total newbies. This book is designed to accommodate the different study agendas of these two groups of students. The first group is experienced techs who already have strong PC experience but need to be sure they're ready to be tested on the specific subjects covered by the CompTIA A+ exams. The second group is those with little or no background in the computer field. These techs can benefit from a more detailed understanding of the history and concepts that underlie modern PC technology, to help them remember the specific subject matter information they must know for the exams. I'll use the shorthand terms Old Techs and New Techs for these two groups. If you're not sure which group you fall into, pick a few chapters and go through some end-of-chapter questions. If you score less than 70%, go the New Tech route.

I have broken most of the chapters into four distinct parts:

- **Historical/Conceptual** Topics that are not on the CompTIA A+ exams but will help you understand more clearly what is on the CompTIA A+ exams.
- **Essentials** Topics that clearly fit under the CompTIA A+ Essentials exam domains.
- **Practical Application** Topics that clearly fit under the CompTIA A+ Practical Application exam domains.
- **Beyond A+** More advanced issues that probably will not be on the CompTIA A+ exams—yet.

The beginning of each of these areas is clearly marked with a large banner that looks like this:

Historical/Conceptual

Those of you who fall into the Old Tech group may want to skip everything except the Essentials and Practical Application areas in each chapter. After reading those sections, jump immediately to the questions at the end of the chapter. The end-of-chapter questions concentrate on information in the Essentials and Practical Application sections. If you run into problems, review the Historical/Conceptual sections in that chapter. Note that you may need to skip back to previous chapters to get the Historical/Conceptual information you need for later chapters.

After going through every chapter as described, Old Techs can move directly to testing their knowledge by using the free practice exams on the CD-ROM that accompanies the book. Once you start scoring above 90%, you're ready to take the exams. If you're a New Tech—or if you're an Old Tech who wants the full learning experience this book can offer—start by reading the book, *the whole book*, as though you were reading a novel, from page one to the end without skipping around. Because so many computer terms and concepts build on each other, skipping around greatly increases the odds that you will become confused and end up closing the book and firing up



Not all chapters will have all four sections.

your favorite PC game. Not that I have anything against PC games, but unfortunately that skill is *not* useful for the CompTIA A+ exams!

Your goal on this first read is to understand concepts, the *whys* behind the *hows*. Having a PC nearby as you read is helpful so you can stop and inspect the PC to see a piece of hardware or how a particular concept manifests in the real world. As you read about floppy drives, for example, inspect the cables. Do they look like the ones in the book? Is there a variation? Why? It is imperative that you understand why you are doing something, not just how to do it on one particular system under one specific set of conditions. Neither the exams nor real life as a PC tech works that way.

If you're reading this book as part of a managing and troubleshooting PCs class rather than a certification-prep course, I highly recommend going the New Tech route, even if you have a decent amount of experience. The book contains a lot of details that can trip you up if you focus only on the test-specific sections of the chapters. Plus, your program might stress historical and conceptual knowledge as well as practical, hands-on skills.

The CompTIA A+ certification exams assume that you have basic user skills. The exams really try to trick you with questions on processes that you may do every day and not think much about. Here's a classic: "To move a file from the C:\DATA folder to the D:\ drive using Windows Explorer, what key must you hold down while dragging the file?" If you can answer that without going to your keyboard and trying a few likely keys, you're better than most techs! In the real world, you can try a few wrong answers before you hit on the right one, but for the exams, you have to *know* it. Whether Old Tech or New Tech, make sure you are proficient at user-level Windows skills, including the following:

- Recognizing all the components of the standard Windows desktop (Start menu, notification area, etc.)
- Manipulating windows—resizing, moving, and so on
- Creating, deleting, renaming, moving, and copying files and folders within Windows
- Understanding file extensions and their relationship with program associations
- Using common keyboard shortcuts/hotkeys
- Installing, running, and closing a Windows application

Any PC technician who has been around a while will tell you that one of the great secrets in the computer business is that there's almost never anything completely new in the world of computer technology. Faster, cleverer, smaller, wider—absolutely—but the underlying technology, the core of what makes your PC and its various peripheral devices operate, has changed remarkably little since PCs came into widespread use a few decades ago. When you do your initial read-through, you may be tempted to skip the Historical/Conceptual sections—don't! Understanding the history and technological developments behind today's PCs helps you understand why they work—or don't work—the way they do. Basically, I'm passing on to you the kind of knowledge you might get by apprenticing yourself to an older, experienced PC tech.

After you've completed the first read-through, go through the book again, this time in textbook mode. If you're an Old Tech, start your studying here. Try to cover one chapter at a sitting. Concentrate on the Essentials and Practical Application sections. Get a highlighter and mark the phrases and sentences that bring out major points. Be sure you understand how the pictures and illustrations relate to the concepts being discussed.

Once you feel you have a good grasp of the material in the book, you can check your knowledge by using the practice exams included on the CD-ROM in the back of the book. You can take these in Practice mode or Final mode. In Practice mode, you can use the Assistance window to get a helpful hint for the current questions, use the Reference feature to find the chapter that covers the question, check your answer for the question, and see an explanation of the correct answer. In Final mode, you answer all the questions and receive an exam score at the end, just like the real thing.

Both modes show you an overall grade, expressed as a percentage, as well as a breakdown of how well you did on each exam domain. The Review Questions feature lets you see what questions you missed and what the correct answers are. Use these results to guide further studying. Continue reviewing the topics you miss and taking additional exams until you are consistently scoring in the 90% range. When you get there, you are ready to pass the CompTIA A+ certification exams.

Study Tactics

Perhaps it's been a while since you had to study for a test. Or perhaps it hasn't, but you've done your best since then to block the whole experience from your mind. Either way, savvy test-takers know that certain techniques make studying for tests more efficient and effective.

Here's a trick used by students in law and medical schools who have to memorize reams of information: write it down. The act of writing something down (not typing, *writing*) in and of itself helps you to remember it, even if you never look at what you wrote again. Try taking separate notes on the material and re-creating diagrams by hand to help solidify the information in your mind.

Another oldie but goodie: Make yourself flash cards with questions and answers on topics you find difficult. A third trick: Take your notes to bed and read them just before you go to sleep. Many people find they really do learn while they sleep!

Contact

If you have any problems, any questions, or if you just want to argue about something, feel free to send an e-mail to the author—michaelm@totalsem.com—or to the editor—scottj@totalsem.com.

For any other information you might need, contact CompTIA directly at their Web site: www.comptia.org.

Chapter I Review

■ Chapter Summary

After reading this chapter and completing the exercises, you should understand the following about the path of the PC tech.

Explain the importance of gaining skill in managing and troubleshooting PCs

- The IT workforce designs, builds, and maintains computers, computer programs, and networks. PC techs take care of personal computers, thus representing an essential component in that workforce. As PCs become more complex, the IT workforce needs specialized PC techs.
- Certifications prove to employers that you have the necessary skills. If you want a job fixing automobiles, for example, you get the *Automotive Service Excellence (ASE)* certification. To be certified, you take and successfully pass exams. Then the organization that administers those exams grants you certification. This is particularly important for IT workers.

Explain the importance of CompTIA A+ certification

- In the early days of the personal computer, you could get vendor-specific certifications, such as IBM Technician, but nothing general for PC techs. Worse, you often had to have a job at that company to get the vendor-specific certification. The software and networking side of IT doesn't have that issue. To prove skill in working with Windows, for example, you could become a Microsoft Certified Technology Specialist (MCTS).
- CompTIA A+ certification is an industry-wide, vendor-neutral certification program that shows that you have a basic competence in supporting microcomputers. You achieve this certification by taking two computer-based, multiple-choice examinations. The tests cover what technicians should know after nine months of full-time PC support experience. CompTIA A+ certification enjoys wide recognition throughout the computer industry.
- CompTIA is a nonprofit, industry trade association based in Oakbrook Terrace, Illinois. It consists of over 20,000 members in 102 countries. CompTIA provides a forum for people in these industries to network, represents the interests of its members to the government, and provides certifications for many aspects of the computer industry. CompTIA sponsors A+, Network+, Security+, and other certifications.
- The CompTIA A+ certification is the de facto entry point to IT. From CompTIA A+, you have a number of certification options, depending on whether you want to focus more on hardware and operating systems or move into network administration. You can get CompTIA Network+ certification, for example, or go on to get Microsoft or Cisco certified. CompTIA Network+ certification is the most obvious certification to get after becoming CompTIA A+ certified.

Describe how to become a CompTIA A+ Certified Technician

- You become CompTIA A+ certified, in the simplest sense, by taking and passing two computer-based, multiple-choice exams. No prerequisites are required for taking the CompTIA A+ certification exams. There is no required training course and no training materials to buy. You *do* have to pay a testing fee for each of the two exams.
- The CompTIA exams introduced in 2009 are 220-701 (*Essentials*) and 220-702 (*Practical Application*). It's common to refer to these two exams as the 2009 exams to differentiate them from older CompTIA exams. Although you may take either of the two exams first, I recommend taking the Essentials, followed by the Practical Application.
- Both of the exams are extremely practical, with little or no interest in theory. All questions are multiple choice or "click on the right part of the picture" questions. CompTIA may add new questions to the exams at any time to keep the content fresh, although the subject matter covered by the exams won't change.
- Two companies, Prometric and Pearson VUE, administer the actual CompTIA A+ testing. You can schedule exam time and location via the Web site for either company, www.prometric.com or www.vue.com. Check CompTIA's Web site for international links.

- To achieve success with the CompTIA A+ certification exams, think in terms of practical knowledge. Read the book. Work through the problems. Work with computers. Take the practice exams. You should obligate yourself by scheduling your exams. This keeps you focused on study.
- Read the book all the way through once. Experienced techs should then concentrate on the test-specific sections to prepare for the exams. Less

experienced techs should read the book all the way through again until everything makes sense.

- If you're reading this book as part of a managing and troubleshooting PCs class rather than a certification-prep course, I highly recommend going the New Tech route, even if you have a decent amount of experience. The book contains a lot of details that can trip you up if you focus only on the test-specific sections of the chapters.

■ Key Terms

certification (1)

Certified Cisco Network Associate (CCNA) (4)

CompTIA A+ 220-701 (Essentials) (4)

CompTIA A+ 220-702 (Practical Application) (4)

CompTIA A+ certification (2)

CompTIA Network+ certification (3)

Computing Technology Industry Association (CompTIA) (2)

Information Technology (IT) (1)

Microsoft Certified Professional (MCP) (3)

network (1)

PC tech (1)

Pearson VUE (8)

Prometric (8)

voucher (8)

www.comptia.org (2)

■ Key Term Quiz

Use the Key Terms list to complete the sentences that follow. Not all terms will be used.

1. You can lump together all the folks who design, build, program, and fix computers into the _____ workforce.
2. You can become CompTIA A+ certified by passing the _____ and CompTIA A+ 220-702 (Practical Application) exams.
3. A _____ gives clients and employers a level of confidence that you can do what you say you can do.
4. A casual term for a person who builds and maintains computers is _____.
5. Prometric and _____ administer the CompTIA A+ certification exams.
6. You can use a _____ when you schedule your exam to save some money.
7. Persons desiring to work in Windows-based networking should pursue _____ certification after completing their CompTIA certifications.
8. You can find the latest information about the CompTIA A+ certification exams here: _____.
9. Typically, techs who attain CompTIA A+ certification then pursue _____ to add to their computer credentials.
10. A grouping of computers that enables people to share resources is called a _____.

■ Multiple-Choice Quiz

- Which of the following is a vendor-specific certification? (Select all that apply.)
 - Certified Cisco Network Associate
 - CompTIA A+
 - CompTIA Network+
 - Microsoft Certified Systems Engineer
- Which of the following certifications is the de facto requirement for entrance into the PC industry?
 - Certified Cisco Network Associate
 - CompTIA A+
 - CompTIA Network+
 - Microsoft Certified Systems Engineer
- John loves the Internet and wants a career working on the machines that make the Internet work. He has completed both CompTIA A+ and Network+ certifications. Which of the following certifications would make a good next step?
 - Certified Cisco Network Associate
 - Certified Cisco Network Professional
 - CompTIA Security+
 - Microsoft Certified Systems Engineer
- Which of the following exams focuses on installing, configuring, and maintaining all the standard technology involved in a personal computer?
 - Certified Cisco Network Associate
 - CompTIA A+ 220-701 (Essentials)
 - CompTIA A+ 220-702 (Practical Application)
 - Microsoft Certified Systems Engineer
- At which of the following Web sites can you register to take the CompTIA A+ certification exams?
 - www.comptia.org
 - www.microsoft.com
 - www.totalsem.com
 - www.vue.com
- How many exams must you pass to become CompTIA A+ certified?
 - One
 - Two
 - Three
 - Four
- How much practical IT experience do you need to become CompTIA A+ certified?
 - Six months
 - One year
 - Two years
 - None
- How many questions should you expect on the 220-702 Practical Application exam?
 - 25
 - 50
 - 100
 - The number of questions varies because the exams are adaptive.
- The CompTIA A+ certification covers which of the following operating systems? (Select two.)
 - Linux
 - OS X
 - Windows XP Media Center
 - Windows Vista
- What percentage of questions should you expect on operating systems in the 220-701 Essentials exam?
 - 10%
 - 15%
 - 20%
 - 25%
- What percentage of questions should you expect on operating systems in the 220-702 Practical Application exam?
 - 10%
 - 13%
 - 20%
 - 34%
- How much does it cost to take each exam (at the time of this book's publication)?
 - \$100 each
 - \$138 each
 - \$168 each
 - \$150 each

13. What percentage of questions should you expect on Windows 7 in the 220-702 Practical Application exam?
- A. 10%
 - B. 13%
 - C. 20%
 - D. None
14. The 220-701 Essentials exam will *not* test you on which of the following computer components?
- A. Biometric devices
 - B. Keyboards
 - C. Printers
 - D. Zip drives
15. What is CompTIA?
- A. A vendor-specific certification association
 - B. A testing administration company
 - C. A for-profit, industry trade corporation
 - D. A nonprofit, industry trade association

■ Essay Quiz

1. Write a short essay on the benefits of certification in the field of computers. Include discussion on how the CompTIA certifications function within the broader category of computer certification.

Why do you suppose people get certifications rather than (or in addition to) two- and four-year college degrees in IT?

Lab Project

• Lab Project 1.1

- I** If you have access to the Internet, do some searching on computer certifications. Make a personal certification tree or pathway that maps out a series of certifications to pursue that might interest you. What certifications

would be useful if you want to be a graphics designer, for example? What if you want to create computer games?