CHAPTER

The Path of the PC Tech

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*—that enable people to 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.

The Concept of Certifications

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. While 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. Until relatively recently, PC technicians have been the exception to this rule.

The Importance of CompTIA A+ Certification

Although microcomputers were introduced in the late 1970s, 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, there were vendor-specific certifications, 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 one 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 get 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 Novell), the vendor-specific certifications have provided a great way to get and keep a job. For example, Microsoft's *Microsoft Certified Systems Engineer (MCSE)*, Novell's *Certified Novell Engineer (CNE)*, 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, installing hard drives, upgrading device drivers, and building systems? What about the PC hobbyists who want to get 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 like "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 600,000 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 different aspects of the computer industry. CompTIA sponsors A+, Network+, i-Net+, 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 that 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 that you have solid competency as a PC technician, *CompTIA Network+* 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, Novell, 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's series of certifications for networking professionals are a natural next step after the CompTIA certifications. They offer a whole slew of tracks and exams, but you should first pursue the *Microsoft Certified Professional (MCP)*. The MCP is the easiest Microsoft certification to get, as it only requires you to pass one of many different exams—and all of these exams count toward more advanced Microsoft certifications.

When it comes to advanced certifications, Microsoft's ever-popular Microsoft Certified Systems Engineer (MCSE) certification holds a lot of clout in the job market. The MCSE consists of seven exams: six core exams covering three study areas—client operating system, networking system, and design—and one elective. You can find more details on Microsoft's training Web site at www.microsoft.com/learning/mcp/default.asp.

Cisco Certification

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 three levels of certification for folks who want to show their skills at handling Cisco products. Nearly everyone interested in Cisco certification starts with the *Certified Cisco Network Associate (CCNA)*. The CCNA can be yours for the price of only one completed exam, after which you can happily slap the word Cisco on your resume! After your CCNA, you should consider the *Certified Cisco Networking Professional (CCNP)* certification. 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. There is no required training course, and there are 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 a *CompTIA A+ Certified Service Technician.* There are no requirements for professional experience. You do not have to go through an authorized training center. There are no annual dues. There are no continuing education requirements. You pass; you're in. That's it. Now for the details.

NOTE In June of 2006, CompTIA announced comprehensive changes to the CompTIA A+ certification exams. Up to this point, the CompTIA A+ certification consisted of two exams very different from what we now use. CompTIA gave these two exams a number of different official names over the years, but regardless of the name they boiled down to what we called the "hardware" exam and the "operating system" exam. That split always seemed forced because you can't have a functional computer without both hardware and operating systems working together to get things done.

In keeping with the idea of a PC as a single system instead of the PC as two separate entities—a pile of hardware and a pile of software—CompTIA reshaped the exams into a basic, conceptual exam followed by a more in-depth configuration/maintenance/repair exam, for which you have three choices. This book will get you through all of the current exam paths.

The Basic Exam Structure

CompTIA offers three tracks to CompTIA A+ certification: a primary (referred to as the IT Technician track) and two secondary (Help Desk and Depot Technician tracks). All three tracks require you to take two exams, the first of which is called the *CompTIA A+ Essentials.*

The Essentials exam concentrates on understanding terminology and technology, how to do fundamental tasks such as upgrading RAM, and basic Windows operating system support.

To follow the primary track, you would also take the *CompTIA A+ 220-602* exam, called the "602" or "IT Technician exam." The IT Technician exam builds on the Essentials exam, concentrating on advanced configuration and troubleshooting, including using the command line to accomplish tech tasks. This exam also includes network and Internet configuration questions.

To attain CompTIA A+ Certification on one of the two secondary tracks, you would take Essentials and follow with either the *CompTIA A+ 220-603* exam (Help Desk Technician) or the *CompTIA A+ 220-604* exam (Depot Technician). Both exams test on a subset of the information covered in the IT Technician exam, but go more in-depth on some subjects and have less coverage on other subjects. Nearly a third of all questions

on the Help Desk Technician exam ask about managing, configuring, and troubleshooting operating systems, for example, whereas only one in five questions on the IT Technician exam hits that subject.

All 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 type of question you will see on the exams:

A dot-matrix printer is printing blank pages. Which item should you check first?

A. Printer drivers
B. Platen
C. Print head
D. Ribbon

The correct answer is D, the ribbon. 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 2006 tests use a regular test format, in which you answer a set number of questions and are scored based on how many correct answers you get, rather than the adaptive format used in recent years. These exams will have no more than 100 questions each.

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 constantly change. Luckily for you, however, this book does not just teach you what steps to follow in a particular case, but 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 be a better PC tech!

To keep up to date, my staff and I 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.

A Note on Adaptive Exams

Even though the current CompTIA A+ certification exams use a regular, multiple-choice exam format, CompTIA has in the past used an adaptive exam format. It's worth your time to make sure you know the difference between the two types of exams. The main difference between a regular exam and an adaptive exam is that on an adaptive exam, each question is assigned a difficulty level (for example, easy, medium, or difficult). When you answer a medium question correctly, the exam adapts and asks you a harder question. If you miss one, the exam adapts and asks an easier question.

There is a maximum number of questions the test will offer you, but not a set number of questions against which you are scored, like you'd find on a regular exam. To get

a passing score on an adaptive exam, you need to answer enough difficult-level questions to prove your mastery of the material. Adaptive exams need far fewer questions than regular exams before the test ends, usually less than half the number of questions. Another big difference is that you cannot go back and check previous questions within adaptive exams, so make sure you have the answer you want before you move on to the next question!

Essentials

The questions on the CompTIA A+ Essentials exam fit into one of eight categories or *domains.* The number of questions for each domain is based on the following 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
- CD- and DVD-media 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

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 or Windows XP. 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

Domain	Percentage
1.0 Personal Computer Components	21%
2.0 Laptop and Portable Devices	11%
3.0 Operating Systems	21%
4.0 Printers and Scanners	9%
5.0 Networks	12%
6.0 Security	11%
7.0 Safety and Environmental Issues	10%
8.0 Communication and Professionalism	5%

Table 1-1 Essentials exam domains and percentages

systems. You need to know the standard diagnostic tools available in Windows—not so you can fix everything, but so that 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. Again, you're not expected to know everything, just enough to be competent.

Finally, the Essentials exam puts a lot of emphasis on safety and environmental issues, and on 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 exams test 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.

IT Technician (Exam 220-602)

The CompTIA A+ 220-602 exam covers the same eight domains, although they're weighted differently and emphasize different aspects of the tasks involved. Table 1-2 lists the domains and percentages.

The IT Technician exam covers the same hardware and software as Essentials, but with much more focus on determining the appropriate technology for a situation—running diagnostics, 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, "Personal Computer Components," provides a stark example of the difference in focus between the exams. Essentials talks about identifying names, purposes, and characteristics of various devices. The IT Technician exam, in contrast, goes into more depth: "Add, remove, and configure personal computer components, *including selection and installation of appropriate components.*" [Emphasis mine.]

"Laptops and Portable Devices" gives another great example. Domain 2.1 is the same for both exams, "Identify fundamental principles of using laptops and portable devices." Digging a little deeper into the domains shows the differences. Essentials: "Identify

Domain	Percentage
1.0 Personal Computer Components	18%
2.0 Laptop and Portable Devices	9%
3.0 Operating Systems	20%
4.0 Printers and Scanners	14%
5.0 Networks	11%
6.0 Security	8%
7.0 Safety and Environmental Issues	5%
8.0 Communication and Professionalism	15%

Table 1-2 Exam 220-602 domains and percentages

names, purposes, and characteristics of laptop-specific [devices such as] peripherals, expansion slots, [and] communication devices." IT Technician: "Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cellular WAN, and Ethernet." The former has you identify the technology; the latter requires you to understand it in detail.

The two exams differ greatly in the "Operating Systems" domain. Essentials tests you on standard installation, configuration, and diagnostic tools, for example, but the IT Technician 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 IT Technician exam grills you on operating system recovery tools and techniques, so you can help customers get back up and running quickly.

EXAM TIP The IT Technician exam puts a lot of emphasis on the last domain, "Communication and Professionalism." As this domain makes up 15 percent of the exam, expect many questions about ethics, proper behavior in the work place, ways to communicate with customers to get the most information in troubleshooting situations, and more.

Help Desk Technician (Exam 220-603)

The CompTIA A+ 220-603 exam emphasizes skills you need to succeed as a help desk technician, remotely helping people who run into problems on their PCs. As such, you'll be tested a lot more intensely on operating system questions than on the IT Technician exam. In fact, almost a third of the questions cover OS diagnostic and troubleshooting problems. Perhaps even more interesting is the coverage of "Communication and Professionalism." *One out of every five questions* is about the proper way to talk with people, working to get the most information and being polite and kind when speaking to angry and upset people. Table 1-3 lists the domains and percentages.

Although the Help Desk exam removes mention of portable computers, the percentages on the "Security" and "Safety and Environmental Issues" domains go up a lot (from 8 percent and 5 percent to 15 percent for both). You've got to know these topics very well to succeed on this exam.

A fundamental difference between the IT Technician and Help Desk Technician exams is that the former covers installing devices in detail, whereas the latter emphasizes troubleshooting even more. Of the two, the Help Desk Technician exam is clearly the more difficult. You should go that route only if your employer insists upon it!

Table 1-3 Exam 220-603 domains and percentages

Domain	Percentage
1.0 Personal Computer Components	15%
2.0 Operating Systems	29%
3.0 Printers and Scanners	10%
4.0 Networks	11%
5.0 Security	15%
6.0 Safety and Environmental Issues	15%
7.0 Communication and Professionalism	20%

Depot Technician (Exam 220-604)

The CompTIA A+ 220-604 exam is targeted at folks who work behind the scenes fixing computers. These are the techs who don't interact with customers much, so the emphasis on this exam is hardware, hardware, and even more hardware. If you can't build, maintain, troubleshoot, and repair any personal computer—desktop and portable—on the planet, this path is not for you! Table 1-4 lists the domains and percentages.

A quick glance at the domain percentages tells the tale. Almost half of all questions are on installing, configuring, optimizing, and upgrading PCs. Although operating systems as a domain has been removed, you definitely need to know a lot about them to install, configure, and troubleshoot devices. "Laptop and Portable Devices" and "Printers and Scanners" domains leap up to 40 percent of the exam questions. You'll be grilled on fixing portables and printers! Because the exam assumes you'll be in a lab environment rather than in an office space, security is de-emphasized. The presumed lack of communication between tech and customer caused the "Communication and Professionalism" objective to go completely away.

Help! Which Exam Should I Take?

With three different tracks to becoming a CompTIA A+ Certified Technician, the inevitable question revolves around choosing the proper track. *The bottom line is that unless you have an employer specifically telling you otherwise,* ***do the primary track.*** Take Essentials and follow that with the 220-602 IT Technician exam. This is by far the more common track and the one the vast majority of employers will want to see on your résumé! When you complete a track, your test results will show which track you chose.

If you choose the primary IT Technician track, potential employers will know they're getting a properly well-rounded tech who can be thrown into pretty much any IT situation and handle it well. The Help Desk and Depot Technician tracks target very specific jobs, so unless that job is yours, completing one of these tracks—and not doing the IT Technician track—limits your employment opportunities.

A glance at the competencies for the three Technician exams (602, 603, and 604) might suggest that it would be easier to take 603 or 604 because they have fewer domains than 602, but that assumption could prove very painful indeed. The Help Desk and Depot Technician exams test you on the same material as the IT Technician exam, but emphasize different aspects or different ways to tackle personal computer issues.

Table 1-4 Exam 220-604 domains and percentages

Domain	Percentage
1.0 Personal Computer Components	45%
2.0 Laptop and Portable Devices	20%
3.0 Printers and Scanners	20%
4.0 Security	5%
5.0 Safety and Environmental Issues	10%

Help! What Chapters Cover the Help Desk and Depot Technician Exams?

The *All-in-One A+ Certification Exam Guide* teaches you what you need to know to become a great tech, first and foremost. It just so happens that by learning how to become a great tech, you learn enough to pass the CompTIA A+ certification exams. Because the book focuses on tech and not exclusively on certification, the sections covered under the IT Tech banner in each chapter pertain to all three advanced exams, 220-602, 220-603, and 220-604.

To pass the 603 or 604 exams, focus more time on chapters weighted more heavily in the CompTIA domains for those exams. Table 1-5 shows the full eight domains for Essentials and IT Technician exams, with a series of check marks that tell you where to focus for which exam. The key is pretty straightforward. One check means around 10 percent on the domains. Two checks means approximately 20 percent, three checks approximately 30 percent, and so on. For a complete breakdown by sub-domain, see the "Mapping to the CompTIA A+ Objectives," Appendix A in this book.

How Do I Take the Exams?

Two companies, Prometric and Pearson/VUE, administer the actual 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 by selecting the Find Your Test Center link on the CompTIA A+ certification page.

Domain	Essentials	220-602	220-603	220-604
Personal Computer Components	✓✓	✓✓	✓✓	✓✓✓✓✓
Laptop and Portable Devices	✓	✓	✓✓✓	✓✓
Operating Systems	✓✓	✓✓	✓	
Printers and Scanners	✓	✓	✓	✓✓
Networks	✓	✓	✓	
Security	✓	✓	✓✓	✓
Safety and Environmental Issues	✓	✓		✓
Communication and Professionalism	✓	✓✓	✓✓	

Table 1-5 Where to focus your study time

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 $158 (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 for 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 exams to test the knowledge of a technician with only nine months' experience—so keep it simple! The exams aren't interested in your ability to overclock CAS timings in CMOS or whether you can explain the exact difference between the Intel 975X Express and the NVIDIA nForce590 SLI chipsets. Don't bother with a lot of theory—think in terms of practical knowledge. 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.

NOTE 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.

Some of you may be in or just out of school, so studying for exams is nothing novel. But if it's been a while since you've had to study for and take an exam, 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 information below, determine how much time you'll need to study for the exams, and then call Prometric or 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. Table 1-6 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 are not a great student or are 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.

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 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	6	6	4	2
Using Windows XP	6	6	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
Using OS diagnostic tools	8	8	6	4
Using a Volt-Ohm Meter	4	3	2	1

Table 1-6 Analyzing skill levels

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

To that value, add hours based on the number of months of direct, professional experience you have had supporting PCs, as shown in Table 1-7.

A total neophyte usually needs around 200 hours of study time. An experienced tech shouldn't need more than 40 hours.

Total hours for you to study: _____.

A Strategy for Study

Now that you have a feel for how long it's going to take, it's time 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 different 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 percent, 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 what is on the CompTIA A+ exams more clearly.
- **Essentials** Topics that clearly fit under the CompTIA A+ Essentials exam domains.
- **IT Tech** Topics that clearly fit under the CompTIA A+ IT Technician exam domains.
- **Beyond A+** More advanced issues that probably will not be on the CompTIA A+ exams—yet.

NOTE Not all chapters will have all four sections!

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

Table 1-7 Adding up your study time

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 but the Essentials and IT Tech 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 IT Tech 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 using the free practice exams on the CD-ROM that accompanies the book. Once you start scoring in the 85 to 95 percent range, 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 you will become confused and end up closing the book and firing up 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*. It is very helpful to have a PC nearby as you read 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. The exams don't work that way, and neither does life as a PC tech!

If you're reading this book as part of a managing and troubleshooting PCs class, rather than a certification-prep course, then 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 really think about. Here's a classic: "In order to move a file from the C:\WINDOWS folder to the A:\ 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, System Tray, 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

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 really 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, more 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, this is where you start your studying. Try to cover one chapter at a sitting. Concentrate on the Essentials and IT Tech 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 using the practice exams included on the CD-ROM in the back of the book. These can be taken in Practice mode or Final mode. In Practice mode, you can use the Assistance window to get a helpful hint for the current questions, find the chapter that covers the question using the Reference feature, check your answer for the question, and see an explanation of the correct answer. In Final mode, you answer all the questions and are given 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 85 percent to 95 percent range. When you get there, you are ready to pass the CompTIA A+ certification exams!

Study Strategies 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 there are certain techniques that 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!

A Side Note on Windows Vista Microsoft's Windows Vista operating system debuts in late 2006/early 2007, and although CompTIA won't immediately put it on the CompTIA A+ certification exams, every tech will need to know it. Do yourself and your customers a favor and work with Windows Vista as soon as you can *after* you finish getting CompTIA A+ certified, even if it's using a school computer or making a lot of trips to computer stores.

I suggest waiting only because you'll want to keep the details of how to do things in Windows 2000 and Windows XP as fresh as possible before you take the exams. If you're studying simply to gain knowledge and are not worried about getting certified, then jump right in!

Once you have access to a Windows Vista computer, skim through this book and ask yourself these questions. What's different about setting up drives? What about installation? What diagnostic and troubleshooting tools does Vista offer that you can't find or that differ significantly from tools in Windows 2000 or Windows XP?

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 Review Questions

1. Which certification is considered required for entrance into the PC industry?
   - **A.** Certified Cisco Network Associate
   - **B.** CompTIA A+ certification
   - **C.** CompTIA Network+ certification
   - **D.** Microsoft Certified Professional
2. How many exams do you need to pass to become CompTIA A+ certified?
   - **A.** One
   - **B.** Two
   - **C.** Three
   - **D.** Four
3. Which of the following exams, combined with CompTIA A+ Essentials, gets you CompTIA A+ certified? (Select all that apply.)
   - **A.** CompTIA A+ 220-602
   - **B.** CompTIA A+ 220-604

C. CompTIA A+ Advanced

D. None of the above—passing the CompTIA A+ Essentials exam is all you need to get certified.

4. What is the primary CompTIA Web site?

A. www.comptia.com

B. www.comptia.edu

C. www.comptia.net

D. www.comptia.org

5. Which of the following best describes an adaptive exam format?

A. An adaptive exam enables you to adapt to the exam format by giving you several free questions at the beginning before the real questions start.

B. An adaptive exam offers weighted questions and adapts to your testing style by lowering the difficulty of questions when you get one right. Once you answer enough easy questions, you get a passing score.

C. An adaptive exam offers weighted questions and adapts to your testing style by raising the difficulty of questions when you get one right. Once you answer enough difficult questions, you get a passing score.

D. An adaptive exam offers questions in many formats, such as multiple choice, fill in the blank, and true/false, so that it can adapt to many testing styles. This enables adaptive exams to be more inclusive.

6. Of the eight domains listed for the CompTIA A+ Essentials exam and the IT Technician exam, which do you need to study for each exam?

A. Domains 1–4 for Essentials; 5–8 for IT Technician

B. Domains 1–3 for Essentials; 4–8 for IT Technician

C. Domains 1–3 for Essentials; 4–7 for IT Technician; 8 ("Communication and Professionalism") is optional

D. Domains 1–8 for Essentials; 1–8 for IT Technician

7. What companies administer the CompTIA A+ certification exams? (Select all that apply.)

A. CompTIA

B. Microsoft

C. Pearson/VUE

D. Prometric

8. Of the four possible exams, which requires the most in-depth understanding of the domain "Personal Computer Components"?

A. Essentials

B. 220-602 (IT Technician)

C. 220-603 (Help Desk Technician)

D. 220-604 (Depot Technician)

9. Of the four possible exams, which requires the most in-depth understanding of the domain "Security"?

   A. Essentials

   B. 220-602 (IT Technician)

   C. 220-603 (Help Desk Technician)

   D. 220-604 (Depot Technician)

10. Of the four possible exams, which requires the most in-depth understanding of the domain "Communication and Professionalism"?

    A. Essentials

    B. 220-602 (IT Technician)

    C. 220-603 (Help Desk Technician)

    D. 220-604 (Depot Technician)

Answers

1. **B.** The CompTIA A+ certification is considered required for entrance into the PC industry.
2. **B.** You need to pass two exams to become CompTIA A+ certified.
3. **A, B.** You can combine any of the three numbered exams (220-602, 220-603, and 220-604) with CompTIA A+ Essentials to become a CompTIA A+ Certified Technician.
4. **D.** The primary CompTIA Web site is www.comptia.org (although the .com and .net addresses will redirect you to the main site).
5. **C.** An adaptive exam offers weighted questions and adapts to your testing style by raising the difficulty of questions when you get one right. Once you answer enough difficult questions, you get a passing score.
6. **D.** All eight domains apply to both exams.
7. **C, D.** Pearson/VUE and Prometric administer the CompTIA A+ certification exams.
8. **D.** At 45 percent, the Depot Technician exam requires the most in-depth understanding of the domain "Personal Computer Components."
9. **C.** At 15 percent, the Help Desk Technician exam requires the most in-depth understanding of the domain "Security."
10. **C.** At 20 percent, the Help Desk Technician exam requires the most in-depth understanding of the domain "Communication and Professionalism."