

G-MAC

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CompTIA A+ 3

CompTIA A+

No. of Course(s): 2

Duration per Course: 40 Hours

Total Duration: 80 Hours

Course: CompTIA A+ Essentials

Content:

1.0 Personal Computer Components

1.1 Identify the fundamental principles of using personal computers

Identify the names, purposes and characteristics of storage devices

- FDD
- HDD
- CD / DVD / RW (e.g. drive speeds, media types)
- Removable storage (e.g. tape drive, solid state such as thumb drive, flash and SD cards, USB, external CD-RW and hard drive)

Identify the names, purposes and characteristics of motherboards

- Form Factor (e.g. ATX / BTX, micro ATX / NLX)
- Components
 - Integrated I/Os (e.g. sound, video, USB, serial, IEEE 1394 / firewire, parallel, NIC, modem)
 - Memory slots (e.g. RIMM, DIMM)
 - Processor sockets
 - External cache memory
 - Bus architecture
 - Bus slots (e.g. PCI, AGP, PCIe, AMR, CNR)
 - EIDE / PATA
 - SATA
 - SCSI Technology
- Chipsets
- BIOS / CMOS / Firmware
- Riser card / daughter board

Identify the names, purposes and characteristics of power supplies, for example: AC adapter, ATX, proprietary, voltage

Identify the names purposes and characteristics of processor / CPUs

- CPU chips (e.g. AMD, Intel)
- CPU technologies
 - Hyperthreading
 - Dual core
 - Throttling
 - Micro code (MMX)
 - Overclocking
 - Cache
 - VRM
 - Speed (real vs. actual)
 - 32 vs. 64 bit

Identify the names, purposes and characteristics of memory

- Types of memory (e.g. DRAM, SRAM, SDRAM, DDR / DDR2, RAMBUS)
- Operational characteristics
- Memory chips (8, 16, 32)
- Parity versus non-parity
- ECC vs. non-ECC
- Single-sided vs. double-sided

Identify the names, purposes and characteristics of display devices, for example: projectors, CRT and LCD

- Connector types (e.g. VGA, DVI / HDMI, S-Video, Component / RGB)
- Settings (e.g. V-hold, refresh rate, resolution)

Identify the names, purposes and characteristics of input devices for example: mouse, keyboard, bar code reader, multimedia (e.g. web and digital cameras, MIDI, microphones), biometric devices, touch screen.

Identify the names, purposes and characteristics of adapter cards

- Video including PCI / PCIe and AGP
- Multimedia
- I / O (SCSI, serial, USB, Parallel)
- Communications including network and modem

Identify the names, purposes and characteristics of ports and cables for example: USB

1.1 and 2.0, parallel, serial, IEEE 1394 / firewire, RJ45 and RJ11, PS2 / Mini-DIN, centronics (e.g. mini, 36) multimedia (e.g. 1 / 8 connector, MIDI Coaxial, SPDIF)

Identify the names, purposes and characteristics of cooling systems for example heat sinks, CPU and case fans, liquid cooling systems, thermal compound

1.2 Install, configure, optimize and upgrade personal computer components

Add, remove and configure internal and external storage devices

- Drive preparation of internal storage devices including format / file systems and imaging technology

Install display devices

Add, remove and configure basic input and multimedia devices

1.3 Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components

Recognize the basic aspects of troubleshooting theory for example:

- Perform backups before making changes
- Assess a problem systematically and divide large problems into smaller components to be analyzed individually
- Verify even the obvious, determine whether the problem is something simple
- and make no assumptions
- Research ideas and establish priorities
- Document findings, actions and outcomes

Identify and apply basic diagnostic procedures and troubleshooting techniques for example:

- Identify the problem including questioning user and identifying user changes to computer
- Analyze the problem including potential causes and make an initial determination of software and / or hardware problems
- Test related components including inspection, connections, hardware / software configurations, device manager and consult vendor documentation
- Evaluate results and take additional steps if needed such as consultation, use of alternate resources, manuals

- Document activities and outcomes

Recognize and isolate issues with display, power, basic input devices, storage, memory, thermal, POST errors (e.g. BIOS, hardware)

Apply basic troubleshooting techniques to check for problems (e.g. thermal issues, error codes, power, connections including cables and / or pins, compatibility, functionality, software / drivers) with components for example:

- Motherboards
- Power supply
- Processor / CPUs
- Memory
- Display devices
- Input devices
- Adapter cards

Recognize the names, purposes, characteristics and appropriate application of tools for example: BIOS, self-test, hard drive self-test and software diagnostics test

1.4 Perform preventive maintenance on personal computer components

Identify and apply basic aspects of preventive maintenance theory for example:

- Visual / audio inspection
- Driver / firmware updates
- Scheduling preventive maintenance
- Use of appropriate repair tools and cleaning materials
- Ensuring proper environment

Identify and apply common preventive maintenance techniques for devices such as input devices and batteries

2.0 Laptops and Portable Devices

2.1 Identify the fundamental principles of using laptops and portable devices

Identify names, purposes and characteristics of laptop-specific:

- Form factors such as memory and hard drives
- Peripherals (e.g. docking station, port replicator and media / accessory bay)
- Expansion slots (e.g. PCMCIA I, II and III, card and express bus)
- Ports (e.g. mini PCI slot)
- Communication connections (e.g. Bluetooth, infrared, cellular WAN, Ethernet)
- Power and electrical input devices (e.g. auto-switching and fixed-input power supplies, batteries)
- LCD technologies (e.g. active and passive matrix, resolution such as XGA,
- SXGA+, UXGA, WUXGA, contrast ratio, native resolution)
- Input devices (e.g. stylus / digitizer, function (Fn) keys and pointing devices
- such as touch pad, point stick / track point)

Identify and distinguish between mobile and desktop motherboards and processors including throttling, power management and WiFi

2.2 Install, configure, optimize and upgrade laptops and portable devices

Configure power management

- Identify the features of BIOS-ACPI
- Identify the difference between suspend, hibernate and standby

Demonstrate safe removal of laptop-specific hardware such as peripherals, hot-swappable devices and non-hot-swappable devices

2.3 Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices

Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues, for example:

- Verify AC power (e.g. LEDs, swap AC adapter)
- Verify DC power
- Remove unneeded peripherals
- Plug in external monitor
- Toggle Fn keys
- Check LCD cutoff switch
- Verify backlight functionality and pixilation
- Stylus issues (e.g. digitizer problems)
- Unique laptop keypad issues
- Antenna wires

2.4 Perform preventive maintenance on laptops and portable devices

Identify and apply common preventive maintenance techniques for laptops and portable devices, for example: cooling devices, hardware and video cleaning materials, operating environments including temperature and air quality, storage, transportation and shipping.

3.0 Operating Systems – unless otherwise noted, operating systems referred to within include Microsoft Windows 2000, XP Professional, XP Home and Media Center.

3.1 Identify the fundamentals of using operating systems

Identify differences between operating systems (e.g. Mac, Windows, Linux) and describe operating system revision levels including GUI, system requirements, application and hardware compatibility

Identify names, purposes and characteristics of the primary operating system components including registry, virtual memory and file system

Describe features of operating system interfaces, for example:

- Windows Explorer
- My Computer
- Control Panel
- Command Prompt
- My Network Places
- Task bar / systray
- Start Menu

Identify the names, locations, purposes and characteristics of operating system files for example:

- BOOT.INI
- NTLDR
- NTDETECT.COM
- NTBOOTDD.SYS
- Registry data files

Identify concepts and procedures for creating, viewing, managing disks, directories and files in operating systems for example:

- Disks (e.g. active, primary, extended and logical partitions)
- File systems (e.g. FAT 32, NTFS)
- Directory structures (e.g. create folders, navigate directory structures)

- Files (e.g. creation, extensions, attributes, permissions)

3.2 Install, configure, optimize and upgrade operating systems – references to upgrading from Windows 95 and NT may be made

Identify procedures for installing operating systems including:

- Verification of hardware compatibility and minimum requirements
- Installation methods (e.g. boot media such as CD, floppy or USB, network installation, drive imaging)
- Operating system installation options (e.g. attended / unattended, file system type, network configuration)
- Disk preparation order (e.g. start installation, partition and format drive)
- Device driver configuration (e.g. install and upload device drivers)
- Verification of installation

Identify procedures for upgrading operating systems including:

- Upgrade considerations (e.g. hardware, application and / or network compatibility)
- Implementation (e.g. backup data, install additional Windows components)

Install / add a device including loading, adding device drivers and required software including:

- Determine whether permissions are adequate for performing the task
- Device driver installation (e.g. automated and / or manual search and installation of device drivers)
- Using unsigned drivers (e.g. driver signing)
- Verify installation of the driver (e.g. device manager and functionality)

Identify procedures and utilities used to optimize operating systems for example, virtual memory, hard drives, temporary files, service, startup and applications

3.3 Identify tools, diagnostic procedures and troubleshooting techniques for operating systems

Identify basic boot sequences, methods and utilities for recovering operating systems

- Boot methods (e.g. safe mode, recovery console, boot to restore point)
- Automated System Recovery (ASR) (e.g. Emergency Repair Disk (ERD))

Identify and apply diagnostic procedures and troubleshooting techniques for example:

- Identify the problem by questioning the user and identifying user changes to the computer
- Analyze problem including potential causes and initial determination of software and / or hardware problem
- Test related components including connections, hardware / software configurations, device manager and consulting vendor documentation
- Evaluate results and take additional steps if needed such as consultation, alternate resources and manuals
- Document activities and outcomes

Recognize and resolve common operational issues such as bluescreen, system lock-up, input / output device, application install, start or load and Windows-specific printing problems (e.g. print spool stalled, incorrect / incompatible driver for print)

Explain common error messages and codes for example:

- Boot (e.g. invalid boot disk, inaccessible boot drive, missing NTLDR)
- Startup (e.g. device / service failed to start, device / program in registry not found)
- Event Viewer
- Registry
- Windows reporting

Identify the names, locations, purposes and characteristics of operating system utilities for example:

- Disk management tools (e.g. DEFRAG, NTBACKUP, CHKDSK, Format)

- System management tools (e.g. device and task manager, MSCONFIG.EXE)
- File management tools (e.g. Windows Explorer, ATTRIB.EXE)

3.4 Perform preventive maintenance on operating systems

Describe common utilities for performing preventive maintenance on operating systems for example, software and Windows updates (e.g. service packs), scheduled backups / restore, restore points

4.0 Printers and Scanners

4.1 Identify the fundamental principles of using printers and scanners

Identify differences between types of printer and scanner technologies (e.g. laser, inkjet, thermal, solid ink, impact)

Identify names, purposes and characteristics of printer and scanner components (e.g. memory, driver, firmware) and consumables (e.g. toner, ink cartridge, paper)

Identify the names, purposes and characteristics of interfaces used by printers and scanners including port and cable types for example:

- Parallel
- Network (e.g. NIC, print servers)
- USB
- Serial
- IEEE 1394 / firewire
- Wireless (e.g. Bluetooth, 802.11, infrared)
- SCSI

4.2 Identify basic concepts of installing, configuring, optimizing and upgrading printers and scanners

Install and configure printers / scanners

- Power and connect the device using local or network port
- Install and update device driver and calibrate the device
- Configure options and default settings
- Print a test page

Optimize printer performance for example, printer settings such as tray switching, print spool settings, device calibration, media types and paper orientation

4.3 Identify tools, basic diagnostic procedures and troubleshooting techniques for printers and scanners

Gather information about printer / scanner problems

- Identify symptom
- Review device error codes, computer error messages and history (e.g. event log, user reports)
- Print or scan test page
- Use appropriate generic or vendor-specific diagnostic tools including web-based utilities

Review and analyze collected data

- Establish probable causes
- Review service documentation
- Review knowledge base and define and isolate the problem (e.g. software vs. hardware, driver, connectivity, printer)

Identify solutions to identified printer / scanner problems

- Define specific cause and apply fix
- Replace consumables as needed
- Verify functionality and get user acceptance of problem fix

5.0 Networks

5.1 Identify the fundamental principles of networks

Describe basic networking concepts

- Addressing
- Bandwidth
- Status indicators
- Protocols (e.g. TCP / IP including IP, classful subnet, IPX / SPX including NWLINK, NETBEUI / NETBIOS)
- Full-duplex, half-duplex
- Cabling (e.g. twisted pair, coaxial cable, fiber optic, RS-232, USB, IEEE 1394 / Firewire)
- Networking models including peer-to-peer and client / server

Identify names, purposes and characteristics of the common network cables

- Plenum / PVC
- UTP (e.g. CAT3, CAT5 / 5e, CAT6)
- STP
- Fiber (e.g. single-mode and multi-mode)

Identify names, purposes and characteristics of network connectors (e.g. RJ45 and RJ11, ST / SC / LC, MT-RJ)

Identify names, purposes and characteristics (e.g. definition, speed and connections) of technologies for establishing connectivity for example:

- LAN / WAN
- ISDN
- Broadband (e.g. DSL, cable, satellite)
- Dial-up
- Wireless (all 802.11)
- Infrared
- Bluetooth
- Cellular
- VoIP

5.2 Install, configure, optimize and upgrade networks

Install and configure network cards (physical address)

Install, identify and obtain wired and wireless connection

5.3 Identify tools, diagnostic procedures and troubleshooting techniques for networks

Explain status indicators, for example speed, connection and activity lights and wireless signal strength

6.0 Security

6.1 Identify the fundamental principles of security

Identify names, purposes and characteristics of hardware and software security for example:

- Hardware deconstruction / recycling
- Smart cards / biometrics (e.g. key fobs, cards, chips and scans)
- Authentication technologies (e.g. user name, password, biometrics, smart cards)

- Malicious software protection (e.g. viruses, Trojans, worms, spam, spyware, adware, grayware)
- Software firewalls
- File system security (e.g. FAT32 and NTFS)

Identify names, purposes and characteristics of wireless security for example:

- Wireless encryption (e.g. WEP.x and WPA.x) and client configuration
- Access points (e.g. disable DHCP / use static IP, change SSID from default, disable SSID broadcast, MAC filtering, change default username and password, update firmware, firewall)

Identify names, purposes and characteristics of data and physical security

- Data access (basic local security policy)
- Encryption technologies
- Backups
- Data migration
- Data / remnant removal
- Password management
- Locking workstation (e.g. hardware, operating system)

Describe importance and process of incident reporting

Recognize and respond appropriately to social engineering situations

6.2 Install, configure, upgrade and optimize security

Install, configure, upgrade and optimize hardware, software and data security for example:

- BIOS
- Smart cards
- Authentication technologies
- Malicious software protection
- Data access (basic local security policy)
- Backup procedures and access to backups
- Data migration
- Data / remnant removal

6.3 Identify tool, diagnostic procedures and troubleshooting techniques for security

Diagnose and troubleshoot hardware, software and data security issues for example:

- BIOS
- Smart cards, biometrics
- Authentication technologies
- Malicious software
- File system (e.g. FAT32, NTFS)
- Data access (e.g. basic local security policy)
- Backup
- Data migration

6.4 Perform preventive maintenance for computer security

Implement software security preventive maintenance techniques such as installing service packs and patches and training users about malicious software prevention technologies

7.0 Safety and Environmental Issues

7.1 Describe the aspects and importance of safety and environmental issues

Identify potential safety hazards and take preventive action

Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation

Use appropriate repair tools

Describe methods to handle environmental and human (e.g. electrical, chemical, physical) accidents including incident reporting

7.2 Identify potential hazards and implement proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling

7.3 Identify proper disposal procedures for batteries, display devices and chemical solvents and cans

8.0 Communication and Professionalism

8.1 Use good communication skills including listening and tact / discretion, when communicating with customers and colleagues

- Use clear, concise and direct statements
- Allow the customer to complete statements – avoid interrupting
- Clarify customer statements – ask pertinent questions
- Avoid using jargon, abbreviations and acronyms
- Listen to customers

8.2 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

Behavior

- Maintain a positive attitude and tone of voice
- Avoid arguing with customers and / or becoming defensive
- Do not minimize customers' problems
- Avoid being judgmental and / or insulting or calling the customer names
- Avoid distractions and / or interruptions when talking with customers

Property

- Telephone, laptop, desktop computer, printer, monitor, etc.

Course: IT Technician

Content:

1.0 Personal Computer Components

1.1 Install, configure, optimize and upgrade personal computer components

Add, remove and configure personal computer components including selection and installation of appropriate components for example:

- Storage devices
- Motherboards
- Power supplies
- Processors / CPUs
- Memory
- Display devices
- Input devices (e.g. basic, specialty and multimedia)
- Adapter cards
- Cooling systems

1.2 Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components

Identify and apply basic diagnostic procedures and troubleshooting techniques

- Isolate and identify the problem using visual and audible inspection of components and minimum configuration

Recognize and isolate issues with peripherals, multimedia, specialty input devices, internal and external storage and CPUs

Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate components, settings and current driver) for example:

- Power supply
- Processor / CPUs and motherboards
- Memory
- Adapter cards
- Display and input devices

Recognize names, purposes, characteristics and appropriate application of tools for example:

- Multimeter
- Anti-static pad and wrist strap
- Specialty hardware / tools
- Loop back plugs
- Cleaning products (e.g. vacuum, cleaning pads)

1.3 Perform preventive maintenance of personal computer components

Identify and apply common preventive maintenance techniques for personal computer components for example:

- Display devices (e.g. cleaning, ventilation)
- Power devices (e.g. appropriate source such as power strip, surge protector, ventilation and cooling)
- Input devices (e.g. covers)
- Storage devices (e.g. software tools such as Disk Defragmenter and cleaning of optics and tape heads)
- Thermally sensitive devices such as motherboards, CPU, adapter cards memory (e.g. cleaning, air flow)

2.0 Laptops and Portable Devices

2.1 Identify fundamental principles of using laptops and portable devices

Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cellular WAN and Ethernet

Identify appropriate laptop-specific power and electrical input devices and determine how amperage and voltage can affect performance

Identify the major components of the LCD including inverter, screen and video card

2.2 Install, configure, optimize and upgrade laptops and portable devices

Removal of laptop-specific hardware such as peripherals, hot-swappable and non hotswappable devices
Describe how video sharing affects memory upgrades

2.3 Use tools, diagnostic procedures and troubleshooting techniques for laptops and portable devices

Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues for example:

- Verify AC power (e.g. LEDs, swap AC adapter)
- Verify DC power

- Remove unneeded peripherals
- Plug in external monitor
- Toggle Fn keys
- Check LCD cutoff switch
- Verify backlight functionality and pixilation
- Stylus issues (e.g. digitizer problems)
- Unique laptop keypad issues
- Antenna wires

3.0 Operating Systems – unless otherwise noted, operating systems referred with within include Microsoft Windows 2000, XP Professional, XP Home and Media Center.

3.1 Identify the fundamental principles of operating systems

Use command-line functions and utilities to manage operating systems, including proper syntax and switches for example:

- CMD
- HELP
- DIR
- ATTRIB
- EDIT
- COPY
- XCOPY
- FORMAT
- IPCONFIG
- PING
- MD / CD / RD

Identify concepts and procedures for creating, viewing and managing disks, directories and files on operating systems

- Disks (e.g. active, primary, extended and logical partitions and file systems including FAT32 and NTFS)
- Directory structures (e.g. create folders, navigate directory structures)
- Files (e.g. creation, attributes, permissions)

Locate and use operating system utilities and available switches for example:

- Disk management tools (e.g. DEFRAG, NTBACKUP, CHKDSK, Format)
- System management tools
- Device and Task Manager
- MSCONFIG.EXE
- REGEDIT.EXE
- REGEDT32.EXE
- CMD
- Event Viewer
- System Restore
- Remote Desktop
- File management tools (e.g. Windows EXPLORER, ATTRIB.EXE)

3.2 Install, configure, optimize and upgrade operating systems – references to upgrading from Windows 95 and NT may be made

Identify procedures and utilities used to optimize operating systems for example:

- Virtual memory

- Hard drives (e.g. disk defragmentation)
- Temporary files
- Services
- Startup
- Application

3.3 Identify tools, diagnostic procedures and troubleshooting techniques for operating systems

Demonstrate the ability to recover operating systems (e.g. boot methods, recovery console, ASR, ERD)
Recognize and resolve common operational problems for example:

- Windows specific printing problems (e.g. print spool stalled, incorrect / incompatible driver form print)
- Auto-restart errors
- Bluescreen error
- System lock-up
- Device drivers failure (input / output devices)
- Application install, start or load failure

Recognize and resolve common error messages and codes for example:

- Boot (e.g. invalid boot disk, inaccessible boot drive, missing NTLDR)
- Startup (e.g. device / service failed to start, device / program in registry not found)
- Event Viewer
- Registry
- Windows reporting

Use diagnostic utilities and tools to resolve operational problems for example:

- Bootable media
- Startup modes (e.g. safe mode, safe mode with command prompt or networking, step-by-step / single step mode)
- Documentation resources (e.g. user / installation manuals, internet / web based, training materials)
- Task and Device Manager
- Event Viewer
- MSCONFIG command
- Recover CD / recovery partition
- Remote Desktop Connection and Assistance
- System File Checker (SFC)

3.4 Perform preventive maintenance for operating systems

Demonstrate the ability to perform preventive maintenance on operating systems including software and Windows updates (e.g. service packs), scheduled backups / restore, restore points

4.0 Printers and Scanners

4.1 Identify the fundamental principles of using printers and scanners

Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink and impact printers and scanners

4.2 Install, configure, optimize and upgrade printers and scanners

Install and configure printers / scanners

- Power and connect the device using local or network port
- Install and update device driver and calibrate the device

- Configure options and default settings
- Install and configure print drivers (e.g. PCLTM, PostscriptTM, GDI)
- Validate compatibility with operating system and applications
- Educate user about basic functionality

Install and configure printer upgrades including memory and firmware

Optimize scanner performance including resolution, file format and default settings

4.3 Identify tools and diagnostic procedures to troubleshoot printers and scanners

Gather information about printer / scanner problems

Review and analyze collected data

Isolate and resolve identified printer / scanner problem including defining the cause, applying the fix and verifying functionality

Identify appropriate tools used for troubleshooting and repairing printer / scanner problems

- Multimeter
- Screwdrivers
- Cleaning solutions
- Extension magnet
- Test patterns

4.4 Perform preventive maintenance of printers and scanners

Perform scheduled maintenance according to vendor guidelines (e.g. install maintenance kits, reset page counts)

Ensure a suitable environment

Use recommended supplies

5.0 Networks

5.1 Identify the fundamental principles of networks

Identify names, purposes and characteristics of basic network protocols and terminologies for example:

- ISP
- TCP / IP (e.g. gateway, subnet mask, DNS, WINS, static and automatic address assignment)
- IPX / SPX (NWLink)
- NETBEUI / NETBIOS
- SMTP
- IMAP
- HTML
- HTTP
- HTTPS
- SSL
- Telnet
- FTP
- DNS

Identify names, purposes and characteristics of technologies for establishing connectivity for example:

- Dial-up networking
- Broadband (e.g. DSL, cable, satellite)
- ISDN networking
- Wireless (all 802.11)
- LAN / WAN

- Infrared
- Bluetooth
- Cellular
- VoIP

5.2 Install, configure, optimize and upgrade networks

Install and configure browsers

- Enable / disable script support
- Configure proxy and security settings

Establish network connectivity

- Install and configure network cards
- Obtain a connection
- Configure client options (e.g. Microsoft, Novell) and network options (e.g. domain, workgroup, tree)
- Configure network options

Demonstrate the ability to share network resources

- Models
- Configure permissions
- Capacities / limitations for sharing for each operating system

5.3 Use tools and diagnostic procedures to troubleshoot network problems

Identify names, purposes and characteristics of tools for example:

- Command line tools (e.g. IPCONFIG.EXE, PING.EXE, TRACERT.EXE, NSLOOKUP.EXE)
- Cable testing device

Diagnose and troubleshoot basic network issue for example:

- Driver / network interface
- Protocol configuration
- TCP / IP (e.g. gateway, subnet mask, DNS, WINS, static and automatic address assignment)
- IPX / SPX (NWLink)
 - Permissions
 - Firewall configuration
 - Electrical interference

5.4 Perform preventive maintenance of networks including securing and protecting network Cabling

6.0 Security

6.1 Identify the fundamentals and principles of security

Identify the purposes and characteristics of access control for example:

Access to operating system (e.g. accounts such as user, admin and guest. Groups, permission actions, types and levels), components, restricted spaces
 Identify the purposes and characteristics of auditing and event logging

6.2 Install, configure, upgrade and optimize security

Install and configure software, wireless and data security for example:

- Authentication technologies
- Software firewalls

- Auditing and event logging (enable / disable only)
- Wireless client configuration
- Unused wireless connections
- Data access (e.g. permissions, basic local security policy)
- File systems (converting from FAT32 to NTFS only)

6.3 Identify tool, diagnostic procedures and troubleshooting techniques for security

Diagnose and troubleshoot software and data security issues for example:

- Software firewall issues
- Wireless client configuration issues
- Data access issues (e.g. permissions, security policies)
- Encryption and encryption technology issues

6.4 Perform preventive maintenance for security

Recognize social engineering and address social engineering situations

7.0 Safety and Environmental Issues

7.1 Identify potential hazards and proper safety procedures including power supply, display devices and environment (e.g. trip, liquid, situational, atmospheric hazards and highvoltage and moving equipment)

8.0 Communication and Professionalism

8.1 Use good communication skills including listening and tact / discretion, when communicating with customers and colleagues

- Use clear, concise and direct statements
- Allow the customer to complete statements – avoid interrupting
- Clarify customer statements – ask pertinent questions
- Avoid using jargon, abbreviations and acronyms
- Listen to customers

8.2 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

Behavior

- Maintain a positive attitude and tone of voice
- Avoid arguing with customers and / or becoming defensive
- Do not minimize customers' problems
- Avoid being judgmental and / or insulting or calling the customer names
- Avoid distractions and / or interruptions when talking with customers

Property

- Telephone, laptop, desktop computer, printer, monitor, etc.

Course: Remote Support Technician

Content:

1.0 Personal Computer Components

1.1 Install, configure, optimize, and upgrade personal computer components

Add, remove, and configure display devices, input devices and adapter cards including basic input and multimedia devices.

1.2 Identify tools, diagnostic procedures, and troubleshooting techniques for personal computer components

Identify and apply basic diagnostic procedures and troubleshooting techniques, for example:

- Identify and analyze the problem/potential problem
- Test related components and evaluate results
- Identify additional steps to be taken if/when necessary
- Document activities and outcomes

Recognize and isolate issues with display, peripheral, multimedia, specialty input device and storage. Apply steps in troubleshooting techniques to identify problems (e.g. physical environment, functionality and software/driver settings) with components including display, input devices and adapter cards

1.3 Perform preventive maintenance on personal computer components

Identify and apply common preventive maintenance techniques for storage devices, for example:

- Software tools (e.g., Disk Defragmenter, Check Disk)
- Cleaning (e.g., optics, tape heads)

2.0 Operating Systems – unless otherwise noted, operating systems referred to within include Microsoft Windows 2000, XP Professional, XP Home and Media Center.

2.1 Identify the fundamental principles of using operating systems

Use command-line functions and utilities to manage Windows 2000, XP Professional and XP Home, including proper syntax and switches, for example:

- CMD
- HELP
- DIR
- ATTRIB
- EDIT
- COPY
- XCOPY
- FORMAT
- IPCONFIG
- PING
- MD / CD/ RD

Identify concepts and procedures for creating, viewing, managing disks, directories and files in Windows 2000, XP Professional and XP Home, for example:

- Disks (e.g. active, primary, extended and logical partitions)
- File systems (e.g. FAT 32, NTFS)
- Directory structures (e.g. create folders, navigate directory structures)
- Files (e.g. creation, extensions, attributes, permissions)

Locate and use Windows 2000, XP Professional and XP Home utilities and available switches

- Disk Management Tools (e.g. DEFRAG, NTBACKUP, CHKDSK, Format)
- System Management Tools
- Device and Task Manager
- MSCONFIG.EXE

- REGEDIT.EXE
- REGEDIT32.EXE
- CMD
- Event Viewer
- System Restore
- Remote Desktop
- File Management Tool (e.g. Windows Explorer, ATTRIB.EXE)

2.2 Install, configure, optimize and upgrade operating systems

Identify procedures and utilities used to optimize the performance of Windows 2000, XP Professional and XP Home, for example:

- Virtual memory
- Hard drives (e.g. disk defragmentation)
- Temporary files
- Services
- Startup
- Applications

2.3 Identify tools, diagnostic procedures and troubleshooting techniques for operating systems.

Recognize and resolve common operational problems, for example:

- Windows-specific printing problems (e.g. print spooler stalled, incorrect/incompatible driver form print)
- Auto-restart errors
- Bluescreen error
- System lock-up
- Device drivers failure (input/output devices)
- Application install, start or load failure

Recognize and resolve common error messages and codes, for example:

- Boot (e.g. invalid boot disk, inaccessible boot device, missing NTLDR)
- Startup (e.g. device/service has failed to start, device/program references in registry not found)
- Event viewer
- Registry
- Windows reporting

Use diagnostic utilities and tools to resolve operational problems, for example:

- Bootable media
- Startup Modes (e.g. safe mode, safe mode with command prompt or networking, step-by-step/single step mode)
- Documentation resources (e.g. user/installation manuals, internet/web-based, training materials)
- Task and Device Manager
- Event Viewer
- MSCONFIG command
- Recovery CD / Recovery partition
- Remote Desktop Connection and Assistance
- System File Checker (SFC)

2.4 Perform preventive maintenance for operating systems

Perform preventive maintenance on Windows 2000, XP Professional and XP Home including software and Windows updates (e.g. service packs)

3.0 Printers and Scanners

3.1 Identify the fundamental principles of using printers and scanners

Describe processes used by printers and scanners including laser, ink dispersion, impact, solid ink and thermal printers.

3.2 Install, configure, optimize and upgrade printers and scanners

- Install and configure printers and scanners
- Power and connect the device using network or local port
- Install/update the device driver and calibrate the device
- Configure options and default settings
- Install and configure print drivers (e.g. PCL™, Postscript™ and GDI)
- Validate compatibility with OS and applications
- Educate user about basic functionality
- Optimize scanner performance for example: resolution, file format and default settings

3.3 Identify tools, diagnostic procedures and troubleshooting techniques for printers and scanners

Gather information required to troubleshoot printer/scanner problems

Troubleshoot a print failure (e.g. lack of paper, clear queue, restart print spooler, recycle power on printer, inspect for jams, check for visual indicators)

4.0 Networks

4.1 Identify the fundamental principles of networks

Identify names, purposes, and characteristics of the basic network protocols and terminologies, for example:

- ISP
- TCP/IP (e.g. Gateway, Subnet mask, DNS, WINS, Static and automatic address assignment)
- IPX/SPX (NWLink)
- NETBEUI/NETBIOS
- SMTP
- IMAP
- HTML
- HTTP
- HTTPS
- SSL
- Telnet
- FTP
- DNS

Identify names, purposes, and characteristics of technologies for establishing connectivity, for example:

- Dial-up networking
- Broadband (e.g. DSL, cable, satellite)
- ISDN Networking
- Wireless

- LAN/WAN

4.2 Install, configure, optimize and upgrade networks

Establish network connectivity and share network resources

4.3 Identify tools, diagnostic procedures and troubleshooting techniques for networks

Identify the names, purposes, and characteristics of command line tools, for example:

- IPCONFIG.EXE
- PING.EXE
- TRACERT.EXE
- NSLOOKUP.EXE

Diagnose and troubleshoot basic network issues, for example:

- Driver/network interface
- Protocol configuration

TCP/IP (e.g. Gateway, Subnet mask, DNS, WINS, static and automatic address assignment)

IPX/SPX (NWLink)

- Permissions
- Firewall configuration
- Electrical interference

5.0 Security

5.1 Identify the fundamental principles of security

Identify the names, purposes, and characteristics of access control and permissions

- Accounts including user, admin and guest
- Groups
- Permission levels, types (e.g. file systems and shared) and actions (e.g. read, write, change and execute)

5.2 Install, configure, optimize and upgrade security

Install and configure hardware, software, wireless and data security, for example:

- Smart card readers
- Key fobs
- Biometric devices
- Authentication technologies
- Software firewalls
- Auditing and event logging (enable/disable only)
- Wireless client configuration
- Unused wireless connections
- Data access (e.g. permissions, security policies)
- Encryption and encryption technologies

5.3 Identify tools, diagnostic procedures and troubleshooting techniques for security issues

Diagnose and troubleshoot software and data security issues, for example:

- Software firewall issues
- Wireless client configuration issues

- Data access issues (e.g. permissions, security policies)
- Encryption and decryption technology issues

5.4 Perform preventive maintenance for security

Recognize social engineering and address social engineering situations

6.0 Communication and Professionalism

6.1 Use good communication skills, including listening and tact / discretion, when communicating with customers and colleagues

- Use clear, concise and direct statements
- Allow the customer to complete statements – avoid interrupting
- Clarify customer statements – ask pertinent questions
- Avoid using jargon, abbreviations and acronyms
- Listen to customers

6.2 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

Behavior

- Maintain a positive attitude and tone of voice
- Avoid arguing with customers and / or becoming defensive
- Do not minimize customers' problems
- Avoid being judgmental and / or insulting or calling the customer names
- Avoid distractions and / or interruptions when talking with customers

Property

- Telephone, laptop, desktop computer, printer, monitor,

Course: Depot Technician

Content:

1.0 Personal Computer Components

1.1 Install, configure, optimize and upgrade personal computer components

Add, remove and configure internal storage devices, motherboards, power supplies, processor/CPU's, memory and adapter cards, including:

- Drive preparation
- Jumper configuration
- Storage device power and cabling
- Selection and installation of appropriate motherboard
- BIOS set-up and configuration
- Selection and installation of appropriate CPU
- Selection and installation of appropriate memory
- Installation of adapter cards including hardware and software/drivers
- Configuration and optimization of adapter cards including adjusting hardware settings and obtaining network card connection

Add, remove and configure systems

1.2 Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components

Identify and apply diagnostic procedures and troubleshooting techniques, for example:
Identify and isolate the problem using visual and audible inspection of components and minimum configuration

Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate component, settings, current driver), for example:

- Power supply
- Processor/CPU and motherboards
- Memory
- Adapter cards

Recognize names, purposes, characteristics and appropriate application of tools, for example:

- Multimeter
- Anti-static pad and wrist strap
- Specialty hardware/tools
- Loop back plugs
- Cleaning products (e.g. vacuum, cleaning pads)

1.3 Perform preventive maintenance of personal computer components

Identify and apply common preventive maintenance techniques, for example:

- Thermally sensitive devices (e.g. motherboards, CPUs, adapter cards, memory)
- Cleaning
- Air flow (e.g. slot covers, cable routing)
- Adapter cards (e.g. driver/firmware updates)

2.0 Laptop and Portable Devices

2.1 Identify the fundamental principles of using laptops and portable devices

Identify appropriate applications for laptop-specific communication connections, for example:

- Bluetooth
- Infrared devices
- Cellular WAN
- Ethernet

Identify appropriate laptop-specific power and electrical input devices, for example:

- Output performance requirements for amperage and voltage

Identify the major components of the LCD (e.g. inverter, screen, video card)

2.2 Install, configure, optimize and upgrade laptops and portable devices

Demonstrate the safe removal of laptop-specific hardware including peripherals, hotswappable and non hot-swappable devices

Identify the affect of video sharing on memory upgrades

2.3 Identify tools, diagnostic procedures and troubleshooting techniques for laptops and portable devices.

Use procedures and techniques to diagnose power conditions, video issues, keyboard and pointer issues and wireless card issues, for example:

- Verify AC power (e.g. LEDs, swap AC adapter)
- Verify DC power
- Remove unneeded peripherals
- Plug in external monitor
- Toggle Fn keys
- Check LCD cutoff switch
- Verify backlight functionality and pixilation
- Stylus issues (e.g. digitizer problems)
- Unique laptop keypad issues
- Antenna wires

3.0 Printers and Scanners

3.1 Identify the fundamental principles of using printers and scanners

Describe the processes used by printers and scanners including laser, inkjet, thermal, solid ink, and impact printers

3.2 Install, configure, optimize and upgrade printers and scanners

Identify the steps used in the installation and configuration processes for printers and scanners, for example:

- Power and connect the device using network or local port
- Install and update the device driver
- Calibrate the device
- Configure options and default settings
- Print test page

Install and configure printer/scanner upgrades including memory and firmware

3.3 Identify tools, diagnostic methods and troubleshooting procedures for printers and scanners

Gather data about printer/scanner problem

Review and analyze data collected about printer/scanner problems

Implement solutions to solve identified printer/scanner problems

Identify appropriate tools used for troubleshooting and repairing printer/scanner problems

- Multimeter
- Screw drivers
- Cleaning solutions
- Extension magnet
- Test patterns

3.4 Perform preventive maintenance of printer and scanner problems

Perform scheduled maintenance according to vendor guidelines (e.g. install maintenance kits, reset page counts)

Ensure a suitable environment

Use recommended supplies

4.0 Security

4.1 Identify the names, purposes and characteristics of physical security devices and processes
Control access to PCs, servers, laptops and restricted spaces

- Hardware
- Operating systems

4.2 Install hardware security

Smart card readers
Key fobs
Biometric devices

5.0 Safety and Environmental Issues

5.1 Identify potential hazards & proper safety procedures including power supply, display devices and environment (e.g. trip, liquid, situational, atmospheric hazards, high-voltage and moving equipment)

Exam(s):

220-601 CompTIA A+ Essentials

Elective(s) [Choose One]

220-602 IT Technician
220-603 Remote Support Technician
220-604 Depot Technician