

2. The software problems will relate to Windows operating systems and command-line skills.
3. Contestants will be awarded points based on their ability to solve the provided problems within the allotted time. Partial points can be awarded for solving partial problems.
4. Competence in the provided tasks is considered when a contestant acquires 60 percent of the available points.
5. Contestants will be provided, as required, manufacturers' documentation of the devices to be installed and/or serviced.
6. Winners will be determined on the basis of their total scores (regardless of result on certification test), which includes diagnostic procedures, speed, standard industry procedures, accuracy of adjustments and correct component replacements.
7. Specific penalties will be assessed for the failure to properly utilize anti-static straps at all times when in contact with the computers and for the introduction of computer viruses into the contest computers. Penalties will be assessed at one point per occurrence and notice of infractions will be communicated to the contestant when they occur.

Standards and Competencies

CMT 1.0 — Perform maintenance on personal computers and computer components

- 1.1 Identify the fundamental principles of using personal computers
 - 1.1.1 Identify the names, purposes and characteristics of storage devices
 - 1.1.2 Identify the names, purposes and characteristics of motherboards
 - 1.1.3 Identify the names, purposes and characteristics of power supplies
 - 1.1.4 Identify the names purposes and characteristics of processor/CPU's
 - 1.1.5 Identify the names, purposes and characteristics of memory
 - 1.1.6 Identify the names, purposes and characteristics of display devices
 - 1.1.7 Identify the names, purposes and characteristics of input devices
 - 1.1.8 Identify the names, purposes and characteristics of adapter cards
 - 1.1.9 Identify the names, purposes and characteristics of ports and cables
 - 1.1.10 Identify the names, purposes and characteristics of cooling systems
- 1.2 Install, configure, optimize and upgrade personal computer components

- 1.2.1 Add, remove and configure internal and external storage devices
- 1.2.2 Install display devices
- 1.2.3 Add, remove and configure basic input and multimedia devices
- 1.3 Identify tools, diagnostic procedures and troubleshooting techniques for personal computer components
 - 1.3.1 Recognize the basic aspects of troubleshooting
 - 1.3.2 Identify and apply basic diagnostic procedures and troubleshooting techniques
 - 1.3.3 Recognize and isolate issues with display, power, basic input devices, storage, memory, thermal, POST errors, peripherals, multimedia, specialty input devices, internal and external storage and CPUs
 - 1.3.4 Apply basic troubleshooting techniques to check for problems (e.g. thermal issues, error codes, power and connections including cables and/or pins, compatibility, functionality, software/drivers) with components
 - 1.3.5 Recognize the names, purposes, characteristics and appropriate application of tools for example: BIOS, self-test, hard drive self-test and software diagnostics test
 - 1.3.6 Identify the steps used to troubleshoot components (e.g. check proper seating, installation, appropriate components, settings and current driver)
 - 1.3.7 Recognize names, purposes, characteristics and appropriate application of tools
- 1.4 Perform preventative maintenance on personal computer components
 - 1.4.1 Identify and apply basic aspects of preventative maintenance theory
 - 1.4.2 Identify and apply common preventative maintenance techniques for devices such as input devices and batteries

CMT 2.0 — Perform maintenance procedures on laptops and portable devices

- 2.1 Identify the fundamental principles of using laptops and portable devices
 - 2.1.1 Identify names, purposes and characteristics of laptop-specific devices

- 2.1.2 Identify and distinguish between mobile and desktop motherboards and processors including throttling, power management and WiFi
- 2.1.3 Identify appropriate applications for laptop-specific communication connections such as Bluetooth, infrared, cellular WAN and Ethernet
- 2.1.4 Identify appropriate laptop-specific power and electrical input devices and determine how amperage and voltage can affect performance
- 2.1.5 Identify the major components of the LCD including inverter, screen and video card
- 2.2 Install, configure, optimize and upgrade laptops and portable devices
 - 2.2.1 Configure power management
 - 2.2.2 Demonstrate safe removal of laptop-specific hardware such as peripherals, hot-swappable devices and non-hot-swappable devices
 - 2.2.3 Remove laptop-specific hardware such as peripherals, hot-swappable and non-hot-swappable devices
 - 2.2.4 Describe how video sharing affects memory upgrades
- 2.3 Identify tools, basic diagnostic procedures and troubleshooting techniques for laptops and portable devices
 - 2.3.1 Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues
 - 2.3.2 Use tools, diagnostic procedures and troubleshooting techniques for laptops and portable devices
 - 2.3.3 Use procedures and techniques to diagnose power conditions, video, keyboard, pointer and wireless card issues
- 2.4 Perform preventative maintenance on laptops and portable devices
 - 2.4.1 Identify and apply common preventative 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

CMT 3.0 — Manage operating systems within Microsoft Windows 2000, XP Professional, XP Home and Media Center

- 3.1 Identify the fundamentals of using operating systems
 - 3.1.1 Identify differences between operating systems (e.g. Mac, Windows and Linux) and describe operating system revision levels including GUI, system requirements, application and hardware compatibility
 - 3.1.2 Identify names, purposes and characteristics of the primary operating system components including registry, virtual memory and file system
 - 3.1.3 Describe features of operating system interfaces
 - 3.1.4 Identify the names, locations, purposes and characteristics of operating system files
 - 3.1.5 Identify concepts and procedures for creating, viewing and managing disks, directories and files in operating systems
 - 3.1.6 Use command-line functions and utilities to manage operating systems, including proper syntax and switches
 - 3.1.7 Locate and use operating system utilities and available switches
- 3.2 Install, configure, optimize and upgrade operating systems — references to upgrading from Windows 95 and NT may be made
 - 3.2.1 Identify procedures for installing and optimizing operating systems
 - 3.2.2 Identify procedures for upgrading operating systems
 - 3.2.3 Install/add a device including loading, adding device drivers and required software
 - 3.2.4 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
 - 3.3.1 Identify basic boot sequences, methods and utilities for recovering operating systems
 - 3.3.2 Identify and apply diagnostic procedures and troubleshooting techniques

- 3.3.3 Recognize and resolve common operational issues such as blue screen, 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)
- 3.3.4 Explain common error messages and codes
- 3.3.5 Identify the names, locations, purposes and characteristics of operating system utilities
- 3.3.6 Demonstrate the ability to recover operating systems (e.g. boot methods, recovery console, ASR, ERD)
- 3.3.7 Use diagnostic utilities and tools to resolve operational problems
- 3.4 Perform preventative maintenance on operating systems
 - 3.4.1 Describe common utilities for performing preventative maintenance on operating systems; for example, software and Windows updates (e.g. service packs), scheduled backups/restore and restore points
 - 3.4.2 Demonstrate the ability to perform preventative maintenance on operating systems including software and Windows updates (e.g. service packs), scheduled backups/restore and restore points

CMT 4.0 — Install and configure printers and scanners successfully

- 4.1 Identify the fundamental principles of using printers and scanners
 - 4.1.1 Identify differences between types of printer and scanner technologies
 - 4.1.2 Identify names, purposes and characteristics of printer and scanner components and consumables
 - 4.1.3 Identify the names, purposes and characteristics of interfaces used by printers and scanners including port and cable types
 - 4.1.4 Describe processes used by printers and scanners including laser, ink dispersion, thermal, solid ink and impact printers and scanners

- 4.2 Identify basic concepts of installing, configuring, optimizing and upgrading printers and scanners
 - 4.2.1 Install and configure printers/scanners
 - 4.2.2 Optimize printer performance; for example, printer settings such as tray switching, print spool settings, device calibration, media types and paper orientation, resolution, file format and default settings
- 4.3 Identify tools, basic diagnostic procedures and troubleshooting techniques for printers and scanners
 - 4.3.1 Gather information about printer/scanner problems
 - 4.3.2 Review and analyze collected data
 - 4.3.3 Identify solutions to identified printer/scanner problems
 - 4.3.4 Isolate and resolve an identified printer/scanner problem including defining the cause, applying the fix and verifying functionality
 - 4.3.5 Identify appropriate tools used for troubleshooting and repairing printer/scanner problems

CMT 5.0 — Apply knowledge of networking principles to install, configure, optimize and upgrade networks

- 5.1 Identify the fundamental principles of networks
 - 5.1.1 Describe basic networking concepts
 - 5.1.2 Identify names, purposes and characteristics of the common network cables
 - 5.1.3 Identify names, purposes and characteristics of network connectors
 - 5.1.4 Identify names, purposes and characteristics of technologies for establishing connectivity
 - 5.1.5 Identify names, purposes and characteristics of basic network protocols and terminologies
- 5.2 Install, configure, optimize and upgrade networks
 - 5.2.1 Install and configure network cards (physical address)
 - 5.2.2 Install, identify and obtain wired and wireless connections
 - 5.2.3 Install and configure browsers
 - 5.2.4 Establish network connectivity
 - 5.2.5 Demonstrate the ability to share network resources
- 5.3 Identify tools, diagnostic procedures and troubleshooting techniques for networks

- 5.3.1 Explain status indicators, for example: speed, connection and activity lights and wireless signal strength
- 5.3.2 Identify names, purposes and characteristics of tools
- 5.3.3 Diagnose and troubleshoot basic network issue

CMT 6.0 — Provide security measures for computer systems

- 6.1 Identify the fundamental principles of security
 - 6.1.1 Identify names, purposes and characteristics of hardware and software security
 - 6.1.2 Identify names, purposes and characteristics of wireless security
 - 6.1.3 Identify names, purposes and characteristics of data and physical security
 - 6.1.4 Describe importance and process of incidence reporting
 - 6.1.5 Recognize and respond appropriately to social engineering situations
 - 6.1.6 Identify the purposes and characteristics of access control
 - 6.1.7 Identify the purposes and characteristics of auditing and event logging
- 6.2 Install, configure, upgrade and optimize security
 - 6.2.1 Install, configure, upgrade and optimize hardware, software and data security
 - 6.2.2 Install and configure software, wireless and data security
- 6.3 Identify tool, diagnostic procedures and troubleshooting techniques for security
 - 6.3.1 Diagnose and troubleshoot hardware, software and data security issues
 - 6.3.2 Diagnose and troubleshoot software and data security issues
- 6.4 Perform preventative maintenance for computer security
 - 6.4.1 Implement software security preventative maintenance techniques such as installing service packs and patches and training users about malicious software prevention technologies
 - 6.4.2 Recognize social engineering situations
 - 6.4.3 Address social engineering situations

CMT 7.0 — Apply awareness of safety and environmental concerns surrounding computer maintenance technology

- 7.1 Describe the aspects and importance of safety and environmental issues
 - 7.1.1 Identify potential safety hazards and take preventative action
 - 7.1.2 Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation
 - 7.1.3 Use appropriate repair tools
 - 7.1.4 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

CMT 8.0 — Display communication and professionalism while working in computer maintenance technology

- 8.1 Use good communication skills, including listening and tact/discretion, when communicating with customers and colleagues
 - 8.1.1 Use clear, concise and direct statements
 - 8.1.2 Allow the customer to complete statements — avoid interrupting
 - 8.1.3 Clarify customer statements — ask pertinent questions
 - 8.1.4 Avoid using jargon, abbreviations and acronyms
 - 8.1.5 Listen to customers
- 8.2 Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customer's property

Committee Identified Academic Skills

The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills

- Use scientific notation

Science Skills

- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of temperature scales, heat and heat transfer

- Use knowledge of work, force, mechanical advantage, efficiency and power
- Use knowledge of principles of electricity and magnetism
- Use knowledge of static electricity, current electricity and circuits
- Use knowledge of signal frequencies and baud rate
- Use knowledge of communication modes (full/half duplex)

Language Arts Skills

- Organize and synthesize information for use in written and oral presentations
- Demonstrate knowledge of appropriate reference materials

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Algebra
- Data Analysis and Probability
- Problem Solving
- Reasoning and Proof
- Communication
- Connections
- Representation

Source: NCTM Principles and Standards for School Mathematics. To view high school standards, visit: standards.nctm.org/document/chapter7/index.htm. Select “Standards” from menu.

Science Standards

- Understands relationships among organisms and their physical environment
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www.mcrel.org/standards-benchmarks/.

Language Arts Standards

- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g.,

sound-letter correspondence, sentence structure, context, graphics)

- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.readwritethink.org/standards/index.html.

CONTEST SCORECARD

Items Evaluated	Possible Points
Windows Wireless	100
Upgrades	125
Command-Line	75
Component ID.....	75
Laptop Part 1	125
Test Equipment	100
Desktop	125
Laptop Part 2	125
A+ Exams.....	150

Sub Total	1,000
Résumé Penalty	_____
Clothing Penalty	_____
Anti-Static Strap Penalty	_____
TOTAL	_____