COMPUTER MAINTENANCE TECHNOLOGY (STATE ONLY CONTEST)

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of computer maintenance technology.

CLOTHING REQUIREMENT

Class E: Competition Specific — Business Casual

- Polo shirt
- Black dress slacks or black dress skirt (knee-length minimum)
- Closed-toe dress shoes

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with Computer Repair, Electronic Product Servicing, Electronics Technology Cyber Security, Information Security, or Systems and Networking Security Architecture as an occupational objective. This competition is open to middle school, high-school and college/postsecondary competitors.

EQUIPMENT AND MATERIALS

Supplied by the technical committee:

1. All materials, schematics and equipment required for the contest

Supplied by the contestant:

1. Pencils
2. Basic hand tools suited for computer repair and maintenance, such as screwdrivers, needle nose pliers, etc.
2. Anti-static wrist strap with alligator clip end. Straps must be in proper working order
3. Digital multi-meter

3. You may bring diagnostic software with proof of ownership such as original disk or original
4. software license, proof of payment of shareware license fee, or proof of software released into public domain (freeware)
5. You may use standard technical data reference books such as those that include BIOS codes, HDD parameters, etc. Books normally used as a classroom text will not be permitted

Resume Requirement

All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty

PROHIBITED DEVICES

Cellphones, electronic watches and/or other electronic devices not approved by a competition's technical committee are NOT allowed in the competition area. Please follow the guidelines in each technical standard for approved exceptions. Technical committee members may also approve exceptions onsite during the SkillsUSA Championships if deemed appropriate.

Penalties for Prohibited Devices

If a competitor's electronic device makes noise or if the competitor is seen using it at any time during the competition, the competitor's scores may be removed.

SCOPE OF THE COMPETITION

The contest is defined by industry standards as determined by the Testout-PCPro Certification Examination. PC Pro Certification objectives may be found at the following website: www.testout.com.

KNOWLEDGE PERFORMANCE

This portion of the contest will be a computer-based knowledge exam of 75 to 100 questions. Competencies evaluated on the written exam are congruent with those evaluated on the A+ Certification exam. The content areas assessed in the written exam are: components of personal computers, laptops and portable devices; Windows operating systems; printers and scanners; networking, safety and environmental issues; and security of computer systems.

SKILL PERFORMANCE

This portion of the contest will be a series of workstations through which each contestant will rotate on a fixed time schedule to troubleshoot both hardware and software problems.

COMPETITION GUIDELINES

1. The contests will have several hands-on skill scenarios that demonstrate one's ability to perform jobs or skills selected from the list of competencies as determined by the SkillsUSA Championships technical committee. Scenarios may include any or several of the following:

a. Diagnose and service personal computer systems
b. Diagnose and resolve operating system and startup problems
c. Locate and identify defective modules within the computer chassis
d. Demonstrate ability to use utility software, configure motherboards, drives and other Peripherals
e. Install, configure and demonstrate proper operations of devices within the computer cabinet

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/CPUs
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 nonhot 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

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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

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

3.2 Install, configure, optimize and upgrade operating systems — references to upgrading from Windows XP and Windows7 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

3.3.2 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

3.4 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

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 pool 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
5.2.1 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
5.3 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
6.3.1 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

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
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