

Information Technology Service NYS



PURPOSE

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

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with computer maintenance technology, computer networking and security, Cisco network academy as the career objectives.

CLOTHING REQUIREMENT

Men: Black dress slacks; white dress shirt; plain black tie with no pattern or a SkillsUSA black tie. Black socks and black shoes.

Women: Black dress slacks or skirt, with businesslike white, collarless blouse or white blouse with small, plain collar that may not extend onto the lapels of the blazer; black sheer or skin-tone hose and black shoes, that are not backless or open toe.

Note: Contestants must wear their official contest clothing to the contest orientation meeting. Also bring #2 pencil, resume, and safety assurance form

EQUIPMENT AND MATERIALS

1. Supplied by the NY Chair/committee:
All materials, schematics and equipment required for the contest.
 - a. Internet white paper documents or internet research documents are not permitted. If determined by the committee such documentation is required for the module it will be supplied by the state technical committee.
2. Supplied by the contestant:
 - a. Pencils
 - b. Basic hand tools suited for accessibility to a device, such as screwdrivers,

- needle-nose pliers, etc.
- c. Anti-static wrist strap with alligator clip end. Straps must be in proper working order
- d. Contestants may bring diagnostic software with proof of software released into public domain (freeware) or establish proof of ownership through licensing
- e. Contestants 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
- f. Contestants may use malware detection and removal software with proof of ownership, as described in Item d
- g. All contestants will participate in an onboarding process that includes, but is not limited to, completion of a job application, contestant preparation assignment, company policy acknowledgment, and policy verification exam
- h. All contestants must create a one-page résumé, which will be submitted during the contest orientation meeting. Failure to do so will result in a 10-point penalty.
Note: Your contest will require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site: <http://www.nysskillsusa.org/>

SCOPE OF THE CONTEST

The contest is defined by industry standards as determined from elements of the CompTIA A+ Network + and Security + guides. Certification objectives may be found at the following website: www.comptia.org. These are also free by request. Write to: CompTIA, 3500 Lacey Road, Suite 100, Downers Grove, IL 60515; 630-678-8300.

Knowledge Performance

This portion of the contest will be a computer-based knowledge exam. Competencies evaluated on the written exam are congruent with those evaluated on the A+ Certification exam.

Skill Performance

This portion of the contest will be a series of modules through which each contestant will rotate on a fixed time schedule to troubleshoot or complete tasks with client, server, or end user computing issues. Adaptive research is not in the current scope of the contest.

Contest Guidelines

1. The contests will have several hands-on skill scenarios that demonstrate one's entry level employment skills selected from the list of competencies as determined by the SkillsUSA Championships technical committee. Scenarios may include but are not limited to the following:
 - a. Diagnose and service client issues with their relation to server or network interaction
 - b. Diagnose and resolve operating system and startup problems
 - c. Demonstrate ability to use utility software, drives and other peripherals
 - d. Demonstrate knowledge and functions of components within a computer cabinet
 - e. Install, configure and demonstrate proper operations of devices including desktop, laptop, tablets and mobile devices
 - f. Demonstrate ability to create, manage and operate virtual machines
 - g. Demonstrate ability to remotely connect to and manage customer end points
 - h. Demonstrate ability to configure, interconnect and secure networks
 - i. Demonstrate interpersonal and customer service skills using service order management systems, service requests and statements of work while interacting in both consumer, consulting and corporate practices policies and observance of security best practices
2. The software problems will relate to Windows operating systems, powershell and command- line skills.
3. Contestants will be awarded points based on their ability to solve problems or complete tasks within the allotted time.. Partial points can be awarded for solving partial problems.

4. Competence is determined when the 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 contest equipment Penalties will be assessed at two points per occurrence, and notice of infractions will be communicated to the contestant when they occur.
8. Penalties will be assessed for failure to follow a judges instruction that results in damage or loss of equipment or when improper handling is determined. Penalty may be assessed up to 10 points per each infraction.

Standards and Competencies

ITS 1.0 — Perform maintenance on systems and components

- 1.1 Identify the fundamental principles of using computing devices
 - 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 system 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 systems and 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

ITS 2.0 — Perform maintenance procedures on portable devices

- 2.1 Identify the fundamental principles of using laptops, tablets, and mobile devices
 - 2.1.1 Identify names, purposes and characteristics of laptop-specific devices
 - 2.1.2 Identify and distinguish between mobile and desktop motherboards

- 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

ITS 3.0 - Manage operating systems within Microsoft Windows 8.1 RT, Windows 8 Pro

Edition, Windows 10 and Windows 10 Pro Edition

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
- 3.1.8 Windows Operating Systems will be removed from scope when they have exceeded the end of life cycle documented by the manufacture.

3.2 Install, configure, optimize and upgrade operating systems — references to upgrading from Windows 8.1 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

ITS 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

ITS 5.0 — Apply knowledge of networking principles to install, configure, optimize and upgrade, troubleshoot and secure 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
 - 5.1.6 Identify names, purposes and functions of the OSI seven layer model
 - 5.1.7 Identify names, purposes and

- functions of the TCP/IP four layer model
 - 5.1.8 Compare and contrast the functions of the OSI seven layer model with functions of the TCP/IP four layer model
 - 5.1.9 Identify names, purposes and characteristics of network topologies
- 5.2 Install, configure, optimize and upgrade networks
 - 5.2.1 Install and configure bare metal or virtual network interfaces
 - 5.2.2 Install, identify and obtain wired and wireless connections
 - 5.2.3 Install, configure and secure Internet browsers
 - 5.2.4 Establish network connectivity with bare metal or virtual interfaces
 - 5.2.5 Demonstrate the ability to share network resources
 - 5.2.6 Demonstrate the ability to identify interfaces by media access control address (MAC), TCP/IP address and Address Resolution Protocol (ARP)
 - 5.2.7 Demonstrate the ability to optimize networks by identifying and correcting poor performance
 - 5.2.8 Describe the functions and purposes of static and dynamic addressing
 - 5.2.9 Demonstrate the ability to determine number of network hosts through the process of subnetting
 - 5.2.10 Demonstrate the process of improving network performance by separating network traffic
- 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 used to troubleshoot physical layer network issues.

- 5.3.3 Diagnose and troubleshoot basic network issue using commands in Windows CLI, Linux, IOS, (MAC)
- 5.3.4 Diagnose and troubleshoot basic network issues by identifying network scope and misconfigurations
- 5.4 Apply measures to secure networks
 - 5.4.1 Describe the purpose and functions of network address translations (NAT)
 - 5.4.2 Describe the purpose and functions of access lists (ACL)
 - 5.4.3 Describe the purpose and functions of authentication, authorization, and accounting framework (AAA)
 - 5.4.4 Describe secure methods required to connect to network devices
 - 5.4.5 Describe additional security measures taken to secure devices such as virtual terminal connections and timeouts

ITS 6.0 — Provide security measures for 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 Describe importance and process of forensics
 - 6.1.6 Contrast the processes of incidence reporting versus forensics
 - 6.1.7 Recognize and respond appropriately to social engineering situations
 - 6.1.8 Identify the purposes and characteristics of access control
 - 6.1.9 Identify the purposes and characteristics of auditing and event logging

- 6.1.10 Contrast the sequences of security processes and determine when they are relevant
- 6.1.11 Describe the process of risk management
- 6.1.12 Describe the purpose and methods related to sandbox testing
- 6.1.13 Outline the importance of employee education on protecting information and data through policy compliance
- 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
 - 6.4.2 Implement software security measures for protecting systems against malware and viruses
 - 6.4.3 Describe and identify the purpose of scan settings including real-time, scheduled and on-demand scanning and demonstrate when each method is required
 - 6.4.4 Demonstrate file and folder level scanning exclusions versus the operational requirements of applications
 - 6.4.5 Demonstrate the ability to configure software or hardware firewall settings based on port, service and application
 - 6.4.6 Demonstrate the ability to configure software or hardware firewall settings based on MAC or IP filtering

- 6.4.7 Identify resources to safely inspect files and URLs
- 6.4.8 Demonstrate containment methods when a virus or malware has been introduced and is propagating in a networked environment
- 6.4.9 Demonstrate training of users with regard to malicious software prevention technologies

ITS 7.0 — Apply awareness of safety and environmental concerns surrounding information 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

ITS 8.0 — Display communication and professionalism while working in information 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

- 8.3 Use job-related professional behavior when servicing customers in regard to:
 - 8.3.1 Verifying customer or employee identification
 - 8.3.2 Resetting customer or employee credentials
 - 8.3.3 Protecting customer or employee data
 - 8.3.4 Identifying and defining the security risks associated with the use of an external product or service
 - 8.3.5 Defining responsibilities to protect company or personal data