IGNITE YOUR POTENTIAL 2024-2025

NYS SkillsUSA Standards

COMPUTER PROGRAMMING

PURPOSE

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

ELIGIBILITY

Open to active NYS SkillsUSA members enrolled in programs with computer programming as an occupational objective.

CLOTHING REQUIREMENTS

NYS SkillsUSA Business Professional

- White polo shirt (plain or with SkillsUSA or SkillsUSA NY monogram) or White dress shirt with plain black tie with no pattern or a SkillsUSA black tie, or business like white collarless shirt or white shirt with small plain collar.
- Black dress slacks (accompanied by black dress socks or black or skin-tone seamless hose) or black dress skirt (knee-length, accompanied by black or skin-tone seamless hose).
- Black leather shoes that are not backless or open toe

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

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
    a. Printer
    b. Programming instructions
2. Supplied by the competitor:
    a. Laptop computer with 5G Wi-Fi (5G Wi-Fi adapters can be found on Amazon, if needed).
    b. Software to write and run code in a competitor's programming language of choice.
    c. One copy only of the coding reference manual of the language in which competitors will code the program (can be hard copy or digital)
    d. Ballpoint pens or sharpened pencils
    e. Blank notebook paper
    f. All competitors must create a one-page resume.

RESUME REQUIREMENT

Competitors must create a one-page resume to submit at orientation.

DEVICES

Cell phones or other electronic devices not approved by the NYS Chairperson will be collected by the contest chair during the competition. Chairpersons will announce their acceptance by listing it on their standard or at the orientation meeting. In case of emergencies advisors should allow the competitors to take their phones to the contest areas. If the competitor uses their device in a manner which compromises the integrity of the competition, the competitor's score may be penalized.

SCOPE OF THE COMPETITION

The competition uses competencies identified by the Computing Technology Industry Association.

KNOWLEDGE PERFORMANCE

The competition includes a knowledge test assessing, but not limited to, knowledge of Java, C, C++, C#, Python, Ruby, JavaScript, PHP, Objective-C, and SQL. Competitors are also required to take the SkillsUSA Professional Development Test at orientation.

SKILL PERFORMANCE

The competition includes a computer programming problem consisting of background information and program specifications with accompanying reference materials and description of program output requirements. An appropriate (successfully executable) computer program from design notes and instructions will be developed.

COMPETITION GUIDELINES

1. The competitors will receive a packet that includes three or four projects.
2. Each project's specifications are written for either Java, C, C++, C#, Python, Ruby, JavaScript, PHP, Objective-C, or SQL.
3. Projects will be scored on the following six criteria: completeness, correctness of output, validation of input, internal documentation, efficiency of code, and quality of work.
4. The competition will also include an interview to assess competitors' ability to answer questions typical of an entry-level position for a computer programmer.

STANDARDS AND COMPETENCIES

CP 1.0 — Demonstrate knowledge of computer programming

1.1. Describe how programs and programming languages work
1.2. Describe the purposes and practices of structured programming

CP 2.0 — Perform competencies related to Java programming

2.1. Explain the structured programming paradigm
2.2. Identify the primary components of a Java program
2.3. Explain the basic syntax of a Java program
2.4. Demonstrate procedures for compiling and running a Java application
2.5. Demonstrate use of Java's online hypertext technology documentation
2.6. Demonstrate use of Java's identifiers to name variables, constants, and methods
2.7. Demonstrate use of Java's operators to write expressions
2.8. Explain the rules governing operand evaluation order and operator precedence
2.9. Summarize Java's variable naming conventions
2.10. Distinguish syntax errors, runtime errors and logic errors
2.11. Understand program flow control in selection and loop statements
2.12. Demonstrate use of methods in Java
2.13. Demonstrate use of declaring, initializing and accessing elements in arrays
2.14. Demonstrate use of the string class to process fixed strings

CP 3.0 — Perform competencies related to C++ programming

3.1. Write C++ programs using input/output statements

3.2. Write C++ programs using selection and iteration
3.3. Create C++ programs using functions
3.4. Write C++ programs using one-dimensional arrays
3.5. Properly document and debug C++ programs
3.6. Create object concepts and terminology
3.7. Implement those algorithms in the C++ programming language using classes
3.8. Debug C++ programs written by others
3.9. Use pointers in C++ programs
3.10. Use sequential files in C++ programs

CP 4.0 — Perform competencies related to Visual Basic programming

3.11. Demonstrate knowledge of the fundamentals of Visual Basic (VB) programming using Visual Basic.NET
3.12. Use sequential and random-access files in VB programs
3.13. Use advanced controls and multiple controls in a business application
3.14. Use a database and database controls in a business application
3.15. Demonstrate knowledge of structured and object-oriented programming techniques through the process of subprograms, selection, and repetition in projects
3.16. Use GUI design principles in all projects

CP 5.0 — SkillsUSA Framework

The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills and Technical Skills Grounded in Academics. Students will be expected to display or explain how they

used some of these Essential Elements.Create C++ programs using functions

3.17. Write C++ programs using one-dimensional arrays
3.18. Properly document and debug C++ programs
3.19. Create object concepts and terminology
3.20. Implement those algorithms in the C++ programming language using classes
3.21. Debug C++ programs written by others
3.22. Use pointers in C++ programs
3.23. Use sequential files in C++ programs

CP 4.0 — Perform competencies related to Visual Basic programming

4.1. Demonstrate knowledge of the fundamentals of Visual Basic (VB) programming using Visual Basic.NET
4.2. Use sequential and random-access files in VB programs
4.3. Use advanced controls and multiple controls in a business application
4.4. Use a database and database controls in a business application
4.5. Demonstrate knowledge of structured and object-oriented programming techniques through the process of subprograms, selection, and repetition in projects
4.6. Use GUI design principles in all projects

CP 5.0 — SkillsUSA Framework

The SkillsUSA Framework is used to pinpoint the Essential Elements found in Personal Skills, Workplace Skills and Technical Skills Grounded in Academics. Students will be expected to display or explain how they used some of these Essential Elements.