Programming

6640 36 weeks

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Acknowledgments

The components of this instructional framework were developed by the following curriculum development team members:

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Course Description

Suggested Grade Level: 10 or 11 or 12

Students in the Programming course explore programming concepts, use algorithmic procedures, implement programming procedures with one or more standard languages, and master programming fundamentals. Coding is used throughout the course. Graphical user interfaces may be used as students design and develop interactive multimedia applications, including game
programs. In addition, students employ hypertext markup language (HTML) or JavaScript to create web pages. Students develop their employability skills through a variety of activities.

*Recommended prerequisite(s): Keyboarding course(s) or teacher-approved demonstration and documentation of touch keyboarding skills and Information Technology Fundamentals 6670*

**Task Essentials Tables**

- Tasks/competencies designated by plus icons (✝) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (〇) are optional
- Tasks/competencies designated by minus icons (☒) are omitted
- Tasks marked with an asterisk (*) are sensitive.

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Tasks/Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploring Programming Concepts</td>
<td></td>
</tr>
<tr>
<td>39 ✝</td>
<td>Describe the development of computers and current industry trends in the programming field.</td>
</tr>
<tr>
<td>40 ✝</td>
<td>Describe the development of programming languages and applications.</td>
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<td>41 ✝</td>
<td>Describe the functions of computer hardware, computer software, and computer system components.</td>
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<tr>
<td>42 ✝</td>
<td>Compare computer operating systems.</td>
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<tr>
<td>43 ✝</td>
<td>Identify the software development life cycle (SDLC).</td>
</tr>
<tr>
<td>44 ✝</td>
<td>Describe the integrated development environment (IDE) for a specific programming language.</td>
</tr>
<tr>
<td>45 ✝</td>
<td>Describe basic concepts of a programming language.</td>
</tr>
<tr>
<td>Using Algorithmic Procedures</td>
<td></td>
</tr>
<tr>
<td>46 ✝</td>
<td>Analyze the problem statement.</td>
</tr>
<tr>
<td>47 ✝</td>
<td>Create possible solutions to the problem.</td>
</tr>
<tr>
<td>48 ✝</td>
<td>Determine the best solution to the problem.</td>
</tr>
<tr>
<td>Implementing Programming Procedures</td>
<td></td>
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</table>

**Mastering Programming Fundamentals**

<table>
<thead>
<tr>
<th>56</th>
<th>+</th>
<th>Identify syntax errors of a given programming language.</th>
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<tbody>
<tr>
<td>57</td>
<td>+</td>
<td>Identify industry standards for a graphical user interface (GUI).</td>
</tr>
<tr>
<td>58</td>
<td>+</td>
<td>Create a graphical user interface that adheres to industry standards.</td>
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<tr>
<td>59</td>
<td>+</td>
<td>Code a program that will produce formatted output.</td>
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<tr>
<td>60</td>
<td>+</td>
<td>Code a program that uses mathematical operators and built-in functions.</td>
</tr>
<tr>
<td>61</td>
<td>+</td>
<td>Write a program that uses variables and constants.</td>
</tr>
<tr>
<td>62</td>
<td>+</td>
<td>Write a program that accepts user input.</td>
</tr>
<tr>
<td>63</td>
<td>+</td>
<td>Write a program that uses arrays.</td>
</tr>
<tr>
<td>64</td>
<td>+</td>
<td>Write a modular program that uses functions or methods.</td>
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<tr>
<td>65</td>
<td>+</td>
<td>Write a program that uses conditional structures.</td>
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<tr>
<td>66</td>
<td>+</td>
<td>Write a program that uses looping structures.</td>
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<tr>
<td>67</td>
<td>+</td>
<td>Write a program that uses counters and accumulators.</td>
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**Developing Interactive Multimedia Applications**

<table>
<thead>
<tr>
<th>68</th>
<th>+</th>
<th>Code a program to display graphics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>+</td>
<td>Code a program to incorporate multimedia.</td>
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<tr>
<td>70</td>
<td>Code a program to animate objects.</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>Examine the history of game design and development.</td>
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<tr>
<td>72</td>
<td>Analyze the effect of intellectual property law on game design.</td>
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</tr>
<tr>
<td>73</td>
<td>Identify the target markets for game applications.</td>
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<tr>
<td>74</td>
<td>Identify game genres.</td>
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<td>75</td>
<td>Examine a variety of game programming platforms.</td>
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<tr>
<td>76</td>
<td>Create a storyboard.</td>
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<td>77</td>
<td>Code a game program from the storyboard.</td>
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<tr>
<td>78</td>
<td>Create a game object.</td>
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<td>79</td>
<td>Specify behaviors of a game object.</td>
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<tr>
<td>80</td>
<td>Develop a game program that uses a scoring method.</td>
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<tr>
<td>81</td>
<td>Create a game program with multiple levels.</td>
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<tr>
<td></td>
<td>Using Web Technology</td>
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</tr>
<tr>
<td>82</td>
<td>Explain how to locate resources and references to aid program development.</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>Evaluate sample code obtained from the Internet and/or other sources.</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>Develop a web page, using hypertext markup language (HTML) and cascading style sheets (CSS) and/or JavaScript.</td>
<td></td>
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<tr>
<td></td>
<td>Preparing for Industry Certification</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>Describe the process and requirements for obtaining industry certifications related to the Programming course.</td>
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</tr>
<tr>
<td>86</td>
<td>Identify testing skills/strategies for a certification examination.</td>
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</tr>
<tr>
<td>87</td>
<td>Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification exams).</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Successfully complete an industry certification examination representative of skills learned in this course (e.g., MCP, IC3).</td>
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</tr>
</tbody>
</table>
### Developing Employability Skills

<table>
<thead>
<tr>
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<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
<td>☑️</td>
<td>Identify careers in the information technology industry.</td>
</tr>
<tr>
<td>90</td>
<td>☑️</td>
<td>Describe ways that computer programs can be used in business and industry.</td>
</tr>
<tr>
<td>91</td>
<td>☑️</td>
<td>Create or update a résumé.</td>
</tr>
<tr>
<td>92</td>
<td>☑️</td>
<td>Investigate information technology educational and job opportunities.</td>
</tr>
<tr>
<td>93</td>
<td>☑️</td>
<td>Assemble a professional portfolio.</td>
</tr>
<tr>
<td>94</td>
<td>☑️</td>
<td>Describe basic employment activities.</td>
</tr>
<tr>
<td>95</td>
<td>☐</td>
<td>Deliver an oral presentation of the professional portfolio.</td>
</tr>
<tr>
<td>96</td>
<td>☑️</td>
<td>Identify potential education and employment barriers for nontraditional groups and ways to overcome those barriers.</td>
</tr>
</tbody>
</table>

Legend: ☑️ Essential ☐ Non-essential ☐ Omitted

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### Curriculum Framework

#### Exploring Programming Concepts

#### Task Number 39

**Describe the development of computers and current industry trends in the programming field.**

**Definition**

Description should include

- citing the main stages of computer development (i.e., how calculating tools began as manually operated machines, then progressed to mechanical devices, to electromechanical devices, and finally to fully electronic computers, including the progression of analog to digital)
• assessing the effects that computer technologies have had on society over time
• explaining how computer technology continues to evolve, including current trends in the programming field.

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Economics

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Analyze and compare society's influence on information technology and information technology's influence on society.

Analyze how developments in information technology affect the supply/demand characteristics of the job market.

Task Number 40

Describe the development of programming languages and applications.

Definition

Description should include the five generations of low-level and high-level programming languages:
• First generation (1GL)—machine language
• Second generation (2GL)—assembly language, including intermediate assembly language
• Third generation (3GL)—procedure-oriented/object-oriented high-level languages (e.g., COBOL, BASIC, Pascal, C, C++, C#, Java, JavaScript, Visual Basic, Game Maker, Alice, Unity, Unreal)
• Fourth generation (4GL)—non-procedural languages (e.g., Perl, PHP, Python, Ruby, SQL)
• Fifth generation (5GL)—intelligent languages

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Analyze and compare society’s influence on information technology and information technology's influence on society.

Analyze the potential societal effect of widespread reliance on information technology.

Assess the impact of information technology in a global society.

Describe the impact of technology on the knowledge and skills needed for success in the workplace.

Task Number 41
Describe the functions of computer hardware, computer software, and computer system components.

**Definition**

Description should include the functions of

- central processing unit (CPU)
- memory
- storage
- programming language
- binary number system
- bits and bytes
- American Standard Code for Information Interchange (ASCII) code and/or Unicode
- network
- database
- cloud computing.

**FBLA Competitive Events and Activities Areas**

**Computer Applications**

**Computer Game & Simulation Programming**

**Computer Problem Solving**

**Introduction to Information Technology**

**Management Information Systems**

The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**

Describe current and emerging hardware; configure, install, and upgrade hardware; diagnose problems; and repair hardware.

Describe interrelationships between hardware components and supportive software.

Evaluate and recommend hardware to solve specific problems.
Explain the nature and interrelationships of bytes, fields, records, and databases.

Explain the purpose, operation, and care of hardware components.

Identify components of hardware.

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Task Number 42

**Compare computer operating systems.**

**Definition**

Comparison of operating systems (i.e., Windows, Mac OS, Linux/UNIX, iOS, and/or Android) should include how they

- manage hardware resources
- maintain a system of files on secondary storage
- control input and output operations.

**FBLA Competitive Events and Activities Areas**

**Computer Applications**

**Computer Game & Simulation Programming**

**Computer Problem Solving**

**Introduction to Information Technology**

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**

Compare and contrast the functions, features, and limitations of different operating systems and utilities (e.g., open source, mobile, and proprietary operating systems).

Describe emerging operating systems.

Describe features of operating systems that can be personalized.
Task Number 43

Identify the software development life cycle (SDLC).

Definition

Identification should include the following basic steps:

- Define the problem.
- Develop the algorithm.
- Code the program.
- Test the program.
- Debug the program.
- Document the program.
- Implement the program.
- Maintain the program.

Software development can be done in a sequential (waterfall) or iterative (agile) method.

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Mobile Application Development

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Choose the appropriate language or application development tool for specific tasks.
Task Number 44

Describe the integrated development environment (IDE) for a specific programming language.

Definition

Description should include

- naming the system software
- opening the development environment
- navigating the environment windows
- creating a new program or modifying an existing program
- saving the program
- exiting the system environment.

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.
Code a program solution in more than one programming language.

Identify and explain programming structures.

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**Task Number 45**

**Describe basic concepts of a programming language.**

**Definition**

Description should include

- variables
- control structures
- data structures
- syntax
- tools.

**Using Algorithmic Procedures**

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**Task Number 46**

**Analyze the problem statement.**

**Definition**

Analysis should include

- identifying the need
- gathering relevant data
- evaluating expectations for the outcome and time frame.

**FBLA Competitive Events and Activities Areas**

**Computer Applications**

**Computer Game & Simulation Programming**
Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Task Number 47

Create possible solutions to the problem.

Definition

Each solution should feature step-by-step procedures and use one of the following methods:

- Flowchart
- Decision table
- Pseudocode
- Algorithm
- Current industry-approved methodologies (e.g., storyboarding, use case diagrams)

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

---

**Task Number 48**

**Determine the best solution to the problem.**

**Definition**

Determination should include evaluating multiple alternative solutions and selecting the optimal solution.

**FBLA Competitive Events and Activities Areas**

**Computer Applications**

**Computer Game & Simulation Programming**

**Computer Problem Solving**

**Introduction to Information Technology**

**Management Information Systems**

The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**

Apply design principles to programming tasks.
Choose the appropriate language or application development tool for specific tasks.

Implementing Programming Procedures

Task Number 49

Design a program, using an algorithm, pseudocode, a flowchart, and/or a decision table.

Definition

Design should illustrate how simple English instructions can be translated into standard algorithm, pseudocode, flowchart, or decision table symbols.

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.
Design, develop, test, and implement programs.

---

**Task Number 50**

**Code the program, using a programming language.**

**Definition**

Code should translate the algorithm, pseudocode, flowchart, or decision table into a standard programming language.

**FBLA Competitive Events and Activities Areas**

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts

**NBEA Achievement Standards for Information Technology**

Code a program solution in more than one programming language.

Code common tasks (e.g., creating, adding, deleting, sorting, and updating records).

Identify and define the coding task.

Maintain and reengineer existing code.

Use application development tools to create code.

---

**Task Number 51**

**Test the program with sample data.**
Definition

Testing should be linked directly to the requirements and should include using sample data to validate expected output.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Design, develop, test, and implement programs.

Test, debug, and document code.

Task Number 52

Debug the program.

Definition

Debugging the program should include identifying and fixing syntax, logic, and runtime errors.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts
NBEA Achievement Standards for Information Technology

Test, debug, and document code.

Task Number 53

Document the program.

Definition

Documentation should include the following options:

- In-line comments appearing in the code
- Comments within the program while it is running, making the program easier for the user to understand
- User notes or an instruction manual supplied with the software

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Test, debug, and document code.

Task Number 54

Implement the program.
Definition

Implementation may include

- compiling code
- creating an executable file
- running a script.

Task Number 55

Describe maintenance procedures.

Definition

Description should include

- the concept that users often request additions or deletions as needs change
- the maintenance steps involved in updating a program
- the methods for conducting periodic testing to ensure the program is current and functioning correctly.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Maintain and reengineer existing code.

Mastering Programming Fundamentals
Task Number 56

Identify syntax errors of a given programming language.

Definition

Identification should include checking language-specific rules to ensure correct syntax.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Introduction to Information Technology

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Code a program solution in more than one programming language.

Use application development tools to create code.

Task Number 57

Identify industry standards for a graphical user interface (GUI).

Definition

Identification should include investigation into current industry standards and an explanation of each.

FBLA Competitive Events and Activities Areas
Task Number 58

Create a graphical user interface that adheres to industry standards.

Definition

Creation should include guided research to develop a GUI, with attention to interface design, font style, font size, color scheme, and end-user needs, including the needs of users with disabilities.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Network Design

Networking Concepts

NBEA Achievement Standards for Information Technology

Code a program solution in more than one programming language.

Task Number 59

Code a program that will produce formatted output.

Definition
Coding should produce output for currency symbol, decimal placement, tabs, alignment, and text.

**FBLA Competitive Events and Activities Areas**

**Computer Game & Simulation Programming**

**Computer Problem Solving**

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**

Code a program solution in more than one programming language.

Code common tasks (e.g., creating, adding, deleting, sorting, and updating records).

---

**Task Number 60**

**Code a program that uses mathematical operators and built-in functions.**

**Definition**

Coding should incorporate a variety of mathematical operators and built-in functions, including addition, subtraction, multiplication, division, and modulus.

**FBLA Competitive Events and Activities Areas**

**Computer Game & Simulation Programming**

**Computer Problem Solving**

**Network Design**

**Networking Concepts**

**NBEA Achievement Standards for Information Technology**
Code a program solution in more than one programming language.

Code common tasks (e.g., creating, adding, deleting, sorting, and updating records).

Task Number 61

Write a program that uses variables and constants.

Definition

The program should contain appropriate variables and constants declared in the proper places and as the correct data types, including

- integer
- floating point/double
- Boolean
- character
- string.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Task Number 62

Write a program that accepts user input.

Definition

The program should
- request information from the user
- process the data entered
- return the processed data to the user in an appropriate format.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Task Number 63

Write a program that uses arrays.

Definition

The program should include an array that associates each data element with an indexed position.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Task Number 64
Write a modular program that uses functions or methods.

Definition

The program should

- write reusable code in general functions
- call functions from other functions and return a value
- verify that the value returned has an appropriate data type.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Task Number 65

Write a program that uses conditional structures.

Definition

The program should include the following conditional structures:

- If structure
- If/Else structure
- Else-If structure
- Nested If structure

The program may also include a Switch structure.

The program should also include the use of logical and relational operators such as

- AND, OR, NOT
 Task Number 66

Write a program that uses looping structures.

Definition

The program should include the following looping structures:

- Definite (e.g., for loop, for each loop)
- Indefinite (e.g., while loop, do while loop)

The program may also include a nested looping structure.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.
Task Number 67

Write a program that uses counters and accumulators.

Definition

The program should increment by a constant value and accumulate the sum of the values.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Apply design principles to programming tasks.

Choose the appropriate language or application development tool for specific tasks.

Developing Interactive Multimedia Applications

Task Number 68

Code a program to display graphics.

Definition

Coding should incorporate a variety of graphics (e.g., photos, clip art, word art, illustrations) in the program so that they will display properly.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming
Task Number 69

Code a program to incorporate multimedia.

Definition

Coding should enhance the user interface of the program by incorporating elements such as graphics, sound, animation, and video.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Task Number 70

Code a program to animate objects.

Definition

The program should cause movement of objects via one or more of the following techniques:
- Striking the keyboard
- Using timing control
- Using array sequences
- Creating methods

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

NBEA Achievement Standards for Information Technology

Code a program solution in more than one programming language.

Code common tasks (e.g., creating, adding, deleting, sorting, and updating records).

Task Number 71

Examine the history of game design and development.

Definition

Examination should include a timeline highlighting the creation of various game platforms, types of games, and significant contributors to the field of game programming.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Task Number 72

Analyze the effect of intellectual property law on game design.

Definition
Analysis should include

- ways to protect intellectual property, such as trademarks, copyrights, patents, and company policies that protect trade secrets (e.g., nondisclosure agreements)
- examination of the costs of piracy and the legal consequences of intellectual property theft
- investigation of cases of intellectual property theft from at least one company in preparation for presenting findings.

FBLA Competitive Events and Activities Areas

Business Law

Computer Game & Simulation Programming

Computer Problem Solving

Task Number 73

Identify the target markets for game applications.

Definition

Identification should include

- demographics (e.g., age, gender, socioeconomic status)
- psychographics (e.g., values, attitudes, lifestyles)
- comparison of casual users and active users.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Computer Problem Solving

Marketing

The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

Task Number 74
Identify game genres.

Definition

Identification should include categories such as the following:

- Action
- Strategy
- Sports
- Simulators
- Adventure
- Role-playing
- Puzzle

FBLA Competitive Events and Activities Areas

Computer Applications

Computer Game & Simulation Programming

Introduction to Information Technology

Task Number 75

Examine a variety of game programming platforms.

Definition

Examination should include explanations of the following platforms:

- Arcade
- Personal computer
- Console
- Mobile device
- Virtual reality
- Augmented reality

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Introduction to Information Technology
Mobile Application Development

Task Number 76
Create a storyboard.

Definition
The storyboard should include visual sketches of plot, location, settings, characters, purpose, and actions in sequential order, accompanied by a brief, written description of scenes.

FBLA Competitive Events and Activities Areas
Computer Game & Simulation Programming
Introduction to Information Technology
Mobile Application Development

Task Number 77
Code a game program from the storyboard.

Definition
Coding should involve translating the visual and written story into a program.

FBLA Competitive Events and Activities Areas
Computer Game & Simulation Programming
Introduction to Information Technology
Mobile Application Development

Task Number 78
Create a game object.

Definition

Creation should use assets or sprites.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Introduction to Information Technology

Mobile Application Development

Task Number 79

Specify behaviors of a game object.

Definition

Specified behaviors should facilitate the movements or actions (e.g., collisions, collision avoidance) of the object.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Introduction to Information Technology

Mobile Application Development

Task Number 80

Develop a game program that uses a scoring method.

Definition

The developed game program should include accumulators and incrementers.
Task Number 81

Create a game program with multiple levels.

Definition

The created game program should facilitate the movement of an object from one level to the next.

Task Number 82

Explain how to locate resources and references to aid program development.

Definition

Explanation should include
• the use of a variety of online and published sources (e.g., open-source websites, journal articles, online tutorials, resource libraries, application programming interfaces [APIs]) to access information about new programming ideas, structures, and code applications
• the need for proper citation of all materials adopted from other sources in the program documentation.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Mobile Application Development

NBEA Achievement Standards for Information Technology

Connect web servers to application servers for interoperability.

Identify and explain various types of online resources.

Use application development tools associated with a database system to create solutions for organization problems.

Use database application development tools to create information systems to solve organization problems.

Use, plan, develop, and maintain database management systems.

Task Number 83

Evaluate sample code obtained from the Internet and/or other sources.

Definition

Evaluation should include testing and executing the computer program to verify the validity and security of the source code.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Mobile Application Development
NBEA Achievement Standards for Information Technology

Design, develop, test, implement, update, and evaluate web solutions.

Identify and explain various types of online resources.

Identify good design concepts by reviewing various websites.

Test, implement, and evaluate the website.

Task Number 84

Develop a web page, using hypertext markup language (HTML) and cascading style sheets (CSS) and/or JavaScript.

Definition

Development should demonstrate knowledge of

- the selected programming language and structure
- file extensions.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Mobile Application Development

Website Design
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

NBEA Achievement Standards for Information Technology

Build a comprehensive website using collaborative tools.

Create a comprehensive website using good design.

Design and create web pages incorporating various types of media (e.g., text, image, video, and audio).
Design and create websites incorporating navigation and linking.

Design, develop, and deliver advanced web content and applications using authoring tools.

Test, implement, and evaluate the website.

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**Preparing for Industry Certification**

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**Task Number 85**

**Describe the process and requirements for obtaining industry certifications related to the Programming course.**

**Definition**

The description should include a list of industry certifications related to the Programming course and the process/requirements for obtaining the certifications from

- official websites of the testing organization/vendor
- materials from publishers that have developed practice materials and tests based on information from the testing organization/vendor
- information from certified instructors or industry-certified professionals
- information in the "Course Description" section of this document.

**FBLA Competitive Events and Activities Areas**

**Job Interview**

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**Task Number 86**

**Identify testing skills/strategies for a certification examination.**
Definition

The identification of testing skills and strategies should be undertaken by

- conducting an Internet research project
- reviewing materials from exam and practice-exam publishers
- interviewing certified instructors and/or industry-certified professionals.

FBLA Competitive Events and Activities Areas

Job Interview

Task Number 87

Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification exams).

Definition

The demonstration should include successfully completing practice examinations for selected certifications related to the course obtained from vendor sites and/or materials from publishers. The level of performance on a practice examination serves as a gauge of the applicant's readiness for formal industry testing.

FBLA Competitive Events and Activities Areas

Job Interview

Task Number 88

Successfully complete an industry certification examination representative of skills learned in this course (e.g., MCP, IC3).

Definition
The successful completion of an industry certification examination will be achieved when the student applicant earns an examination score deemed "passing" by the testing organization. Qualifying examinations are those currently approved at the state level as representative of Programming skills.

Students should be encouraged to attain industry certification as evidence of their programming skill level and general employability.

FBLA Competitive Events and Activities Areas

Computer Applications

Database Design & Applications

Spreadsheet Applications

Word Processing

Developing Employability Skills

Task Number 89

Identify careers in the information technology industry.

Definition

Identification should result in a list of job titles related to the information technology industry, including the preparation requirements, opportunities for advancement, geographic location of employment opportunities, and employment trends for each.

FBLA Competitive Events and Activities Areas

Computer Game & Simulation Programming

Electronic Career Portfolio

Job Interview

Mobile Application Development
Website Design
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

NBEA Achievement Standards for Career Development

Analyze a specific career cluster, using a variety of research tools (e.g., college career centers/counselors, professional and trade associations, career fairs, informational interviews, print media, and the Internet).

Describe the impact of the global economy on jobs and careers.

Evaluate several occupational interests, based on various criteria (e.g., educational requirements, starting salaries, and career ladder opportunities).

Identify employment opportunities in international trade.

Relate career interests to opportunities in the global economy.

Use a variety of research tools (e.g., computer-assisted programs, newspapers, books, professional and trade associations, informational interviews, job shadowing, career fairs, and the Internet) in the career exploration process.

NBEA Achievement Standards for Information Technology

Describe education, experience, skills and personal requirements for careers in information technology.

Task Number 90

Describe ways that computer programs can be used in business and industry.

Definition
Description should be based on real-world examples gathered from various sources (e.g., online research, guest speakers, field trips to business and industry).

FBLA Competitive Events and Activities Areas

E-Business

Electronic Career Portfolio

Emerging Business Issues
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.
Job Interview

Management Information Systems
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.
Website Design
The topic for this event changes from year to year. The annual topic may or may not correlate with this particular course. Please refer to the current Virginia FBLA State Handbook.

NBEA Achievement Standards for Career Development

Explain how the needs and functions of society influence the nature and structure of work.

Explain the concept of transferable skills within and between career clusters.

Identify community businesspeople and describe career opportunities in their professional fields.

List and describe the contributions of various types of occupations in the community (e.g., banker, realtor, police officer, teacher, and firefighter).

Use a variety of research tools (e.g., computer-assisted programs, newspapers, books, professional and trade associations, informational interviews, job shadowing, career fairs, and the Internet) in the career exploration process.

Task Number 91
Create or update a résumé.

Definition

Creating or updating should be accomplished by using an appropriate software application. Résumé should include

- educational background
- work history
- honors and awards
- membership in organizations and/or community groups, leadership positions held, and community service performed.

Students should explain the importance of keeping a résumé updated to reflect experience and education.

FBLA Competitive Events and Activities Areas

Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Develop a career portfolio of items including resumes, sample cover letters, letters of recommendation, examples of work and technical skills, awards, and documentation of extracurricular activities and community service activities.

Task Number 92

Investigate information technology educational and job opportunities.

Definition

Investigation should include locating and gathering information from

- occupational analysis websites (e.g., Occupational Outlook Handbook, O*NET)
- comprehensive career-skills websites (e.g., Virginia Career VIEW, KnowHow Virginia)
- job-search websites (e.g., Virginia Workforce Connection).
FBLA Competitive Events and Activities Areas

Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Conduct the job search.

Demonstrate the ability to research prospective employers and jobs using all available resources (e.g., print media, on-site and telephone interviews, job shadowing, internships, job fairs, and Internet research).

Describe electronic and telecommunication job search tools (e.g., Internet job banks; electronic resumes; and electronic, telephone, and videoconferencing interviews).

Maintain an organizational and tracking database for the job search.

NBEA Achievement Standards for Communication

Use the Internet to research the job market and specific potential employers.

Task Number 93

Assemble a professional portfolio.

Definition

Portfolio should include

- digital and non-digital documents (e.g., program design, source code, technical documentation, output) that form a representative sample of the student’s qualifications, knowledge, experience, skills, and abilities
- a résumé in digital and traditional formats.

Students should also explain why most source code written by a developer is considered the intellectual property of the employer, not the developer.

FBLA Competitive Events and Activities Areas
Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Develop a career portfolio of items including resumes, sample cover letters, letters of recommendation, examples of work and technical skills, awards, and documentation of extracurricular activities and community service activities.

Task Number 94

Describe basic employment activities.

Definition

Description should include

- outlining the steps in the process of applying for a job
- creating an interview follow-up letter
- summarizing the procedure to follow for resigning from a position
- participating in an exit interview

FBLA Competitive Events and Activities Areas

Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Create a personal website for the presentation of the career portfolio.

Demonstrate appropriate interviewing techniques through participation in mock or actual interviews.

Demonstrate the ability to complete an online job application accurately.

Demonstrate the ability to describe personal skills to interviewers.
Demonstrate the ability to prepare and transmit electronic resumes and cover letters that meet business standards.

Describe electronic and telecommunication job search tools (e.g., Internet job banks; electronic resumes; and electronic, telephone, and videoconferencing interviews).

Describe strategies for negotiating conditions of employment.

Describe the criteria for evaluating job offers.

Discuss effective strategies for handling rejection.

Experience paid/unpaid work opportunities in one or more career clusters through various opportunities (e.g., job shadowing, mentoring, e-mentoring, internships, cooperative work experiences, and community service).

Explain the importance of appropriate interview follow-up techniques.

Explain the importance of personal appearance and grooming in the workplace.

Identify appropriate factors for evaluating job offers and deciding whether to accept or reject them.

Identify steps to prepare for an interview.

Identify techniques for negotiating monetary and benefit compensation.

Model behavior that contributes to a successful interview.

Prepare paper and electronic resumes and cover letters.

**NBEA Achievement Standards for Communication**

Participate in a variety of interview rehearsals, both as an interviewer and as an interviewee.

Role-play interview situations for simulated job opportunities.

Write a formal application message, resume, and follow-up message for a job opportunity.

Task Number 95
Deliver an oral presentation of the professional portfolio.

Definition

Delivery should include

- displaying evidence of thorough preparation and knowledge of the material
- providing relevant visual aids
- maintaining eye contact with the audience as much as possible
- speaking clearly and distinctly with confidence and enthusiasm
- demonstrating professional presentation skills, such as standing up straight and avoiding excessive movement and other nervous habits
- responding to questions in an effective manner.

FBLA Competitive Events and Activities Areas

Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Present the career portfolio.

Use evolving technologies to enhance the career portfolio.

NBEA Achievement Standards for Communication

Deliver extemporaneous and planned speeches with confidence.

Demonstrate ability to speak persuasively for a specific cause.

Discuss the preliminary steps involved in creating spoken presentations.

Evaluate media and spoken presentations analytically and critically.

Explain career-specific terminology.

Organize thoughts to reflect logical thinking before speaking.

Plan and present short presentations, individually or as a member of a group.
Present findings of capstone projects in a formal individual or team presentation using appropriate graphics, media, and support materials.

Use technology appropriately to enhance spoken presentations.

Task Number 96

Identify potential education and employment barriers for nontraditional groups and ways to overcome those barriers.

Definition

Identification should include

- barriers such as unlawful discrimination in hiring or promoting with regard to the applicant’s or employee’s gender, ethnicity, age, or disability
- ways to overcome the barriers, including scholarships, job-training programs, work-based learning opportunities, and minority assistance programs.

FBLA Competitive Events and Activities Areas

Electronic Career Portfolio

Job Interview

NBEA Achievement Standards for Career Development

Demonstrate appropriate interpersonal skills for working with and for others.

Demonstrate personal qualities related to employability (e.g., promptness, ability to get along with others, dependability, willingness to ask questions, respect for diversity, and communication skills).

Describe different cultural behaviors and expectations.

Describe how physical, intellectual, and cultural diversity can strengthen workplace effectiveness.
 Describe ways tasks and the workplace environment can be structured to accommodate the diverse needs of workers.

 Discuss advantages and disadvantages of entering nontraditional occupations.

 Discuss and demonstrate the skills necessary to function as a member of a diverse workforce (e.g., diplomacy, patience, willingness to compromise, and ability to listen).

 Discuss social and economic factors that have resulted in changing career patterns for a diverse workforce.

### SOL Correlation by Task

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Subject Areas</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>Describe the development of computers and current industry trends in the programming field.</td>
<td>English: 10.5, 11.5, 12.5&lt;br&gt;History and Social Science: GOVT.9, GOVT.12, GOVT.15, VUS.13, VUS.14, WG.17, WHII.14</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Describe the development of programming languages and applications.</td>
<td>English: 10.5, 11.5, 12.5&lt;br&gt;History and Social Science: GOVT.9, GOVT.12, GOVT.15, VUS.13, VUS.14, WG.17, WHII.14</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Describe the functions of computer hardware, computer software, and computer system components.</td>
<td>English: 10.5, 11.5, 12.5&lt;br&gt;Mathematics: COM.15, COM.16</td>
<td></td>
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<tr>
<td>42</td>
<td>Compare computer operating systems.</td>
<td>English: 10.5, 11.5, 12.5</td>
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<tr>
<td>43</td>
<td>Identify the software development life cycle (SDLC).</td>
<td>English: 10.5, 11.5, 12.5&lt;br&gt;History and Social Science: GOVT.1&lt;br&gt;Mathematics: COM.1, COM.2, COM.3, COM.4, COM.5, COM.6, COM.8, COM.17, COM.18</td>
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<tr>
<td>44</td>
<td>Describe the integrated development environment (IDE) for a specific programming language.</td>
<td>English: 10.5, 11.5, 12.5</td>
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<tr>
<td>Step</td>
<td>Description</td>
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<td>Mathematics:</td>
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<tr>
<td>45</td>
<td>Describe basic concepts of a programming language.</td>
<td>10.5, 11.5, 12.5</td>
<td>COM.6, COM.7, COM.10, COM.11, COM.13, COM.14, COM.15, COM.16, COM.18</td>
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<td>46</td>
<td>Analyze the problem statement.</td>
<td>10.5, 11.5, 12.5</td>
<td>COM.1, COM.4</td>
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<td>47</td>
<td>Create possible solutions to the problem.</td>
<td>10.2, 10.5, 11.2, 11.5, 12.2, 12.5</td>
<td>GOVT.1, COM.1, COM.3, COM.4, DM.9*</td>
</tr>
<tr>
<td>48</td>
<td>Determine the best solution to the problem.</td>
<td>10.5, 11.5, 12.5</td>
<td>GOVT.1, COM.1, COM.4, DM.8</td>
</tr>
<tr>
<td>49</td>
<td>Design a program, using an algorithm, pseudocode, a flowchart, and/or a decision table.</td>
<td>11.5, 12.5</td>
<td>G.1, COM.1, COM.2, COM.4, COM.8</td>
</tr>
<tr>
<td>50</td>
<td>Code the program, using a programming language.</td>
<td></td>
<td>COM.1, COM.2, COM.4, COM.6, COM.8</td>
</tr>
<tr>
<td>51</td>
<td>Test the program with sample data.</td>
<td>10.5, 11.5, 12.5</td>
<td>COM.2, COM.17</td>
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<tr>
<td>52</td>
<td>Debug the program.</td>
<td>10.5, 11.5, 12.5</td>
<td>COM.2, COM.17, COM.18</td>
</tr>
<tr>
<td>53</td>
<td>Document the program.</td>
<td>10.2, 10.6, 11.2, 11.6, 12.2, 12.6</td>
<td>COM.2</td>
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<tr>
<td>54</td>
<td>Implement the program.</td>
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<td>COM.10, COM.11</td>
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<tr>
<td>55</td>
<td>Describe maintenance procedures.</td>
<td>10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td>56</td>
<td>Identify syntax errors of a given programming language.</td>
<td>10.5, 11.5, 12.5</td>
<td>COM.2, COM.17, COM.18</td>
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<tr>
<td>57</td>
<td>Identify industry standards for a graphical user interface (GUI).</td>
<td>10.5, 11.5, 12.5</td>
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<tr>
<td>58</td>
<td>Create a graphical user interface that adheres to industry standards.</td>
<td>COM.10</td>
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<tr>
<td>59</td>
<td>Code a program that will produce formatted output.</td>
<td>COM.11</td>
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<tr>
<td>60</td>
<td>Code a program that uses mathematical operators and built-in functions.</td>
<td>COM.1, COM.6, COM.7, COM.16</td>
<td></td>
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<tr>
<td>61</td>
<td>Write a program that uses variables and constants.</td>
<td>COM.4, COM.15, COM.16</td>
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<td>62</td>
<td>Write a program that accepts user input.</td>
<td>COM.10, COM.11</td>
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<td>63</td>
<td>Write a program that uses arrays.</td>
<td>COM.13, COM.14</td>
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<tr>
<td>64</td>
<td>Write a modular program that uses functions or methods.</td>
<td>COM.5</td>
<td></td>
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<tr>
<td>65</td>
<td>Write a program that uses conditional structures.</td>
<td>COM.3, COM.7, COM.8, COM.13, COM.14</td>
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<tr>
<td>66</td>
<td>Write a program that uses looping structures.</td>
<td>COM.3, COM.8, COM.13</td>
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<tr>
<td>67</td>
<td>Write a program that uses counters and accumulators.</td>
<td>COM.3, COM.13</td>
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<td>68</td>
<td>Code a program to display graphics.</td>
<td>COM.11, COM.12</td>
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<tr>
<td>69</td>
<td>Code a program to incorporate multimedia.</td>
<td>COM.10, COM.11, COM.12</td>
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<td>70</td>
<td>Code a program to animate objects.</td>
<td>COM.10, COM.12, COM.13, COM.14</td>
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<td>71</td>
<td>Examine the history of game design and development.</td>
<td>10.5, 11.5, 12.5</td>
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<td></td>
<td>History and Social Science:</td>
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<td></td>
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<td>GOVT.12, VUS.14, WG.17, WHII.14</td>
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<tr>
<td>72</td>
<td>Analyze the effect of intellectual property law on game design.</td>
<td>10.5, 11.5, 12.5</td>
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<td></td>
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<td>History and Social Science:</td>
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<td></td>
<td></td>
<td>GOVT.7, GOVT.8, GOVT.14, GOVT.15</td>
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<td>73</td>
<td>Identify the target markets for game applications.</td>
<td>10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td>74</td>
<td>Identify game genres.</td>
<td>10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td>75</td>
<td>Examine a variety of game programming platforms.</td>
<td>English: 10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td>76</td>
<td>Create a storyboard.</td>
<td>English: 10.5, 11.5, 12.5</td>
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<tr>
<td>77</td>
<td>Code a game program from the storyboard.</td>
<td>COM.3, COM.4</td>
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<tr>
<td>78</td>
<td>Create a game object.</td>
<td>COM.12</td>
<td></td>
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<td>79</td>
<td>Specify behaviors of a game object.</td>
<td>COM.5, COM.14</td>
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<td>80</td>
<td>Develop a game program that uses a scoring method.</td>
<td>COM.3, COM.13</td>
<td></td>
</tr>
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<td>81</td>
<td>Create a game program with multiple levels.</td>
<td>COM.2, COM.7</td>
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<tr>
<td>82</td>
<td>Explain how to locate resources and references to aid program development.</td>
<td>10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td></td>
<td>Task Description</td>
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<td></td>
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<td>---------------------------------------------------</td>
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<tr>
<td>83</td>
<td>Evaluate sample code obtained from the Internet and/or other sources.</td>
<td>Mathematics: COM.2, COM.17</td>
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<tr>
<td>84</td>
<td>Develop a web page, using hypertext markup language (HTML) and cascading style sheets (CSS) and/or JavaScript.</td>
<td>Mathematics: COM.18</td>
<td></td>
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<tr>
<td>85</td>
<td>Describe the process and requirements for obtaining industry certifications related to the Programming course.</td>
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<td>86</td>
<td>Identify testing skills/strategies for a certification examination.</td>
<td>English: 10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>History and Social Science: GOVT.7, GOVT.8</td>
<td></td>
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<tr>
<td>87</td>
<td>Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification exams).</td>
<td>English: 10.5, 11.5, 12.5</td>
<td></td>
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<td></td>
<td></td>
<td>History and Social Science: GOVT.7, GOVT.8</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Successfully complete an industry certification examination representative of skills learned in this course (e.g., MCP, IC3).</td>
<td>English: 10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>History and Social Science: GOVT.7, GOVT.8</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td>Identify careers in the information technology industry.</td>
<td>English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>History and Social Science: GOVT.7, GOVT.8</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>Describe ways that computer programs can be used in business and industry.</td>
<td>English: 10.5, 11.5, 12.5</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>History and Social Science: GOVT.9, GOVT.15</td>
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<tr>
<td>91</td>
<td>Create or update a résumé.</td>
<td>English: 10.6, 10.7, 11.6, 11.7, 12.6, 12.7</td>
<td></td>
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<tr>
<td>92</td>
<td>Investigate information technology educational and job opportunities.</td>
<td>English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>History and Social Science: GOVT.7, GOVT.8</td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>Assemble a professional portfolio.</td>
<td>English: 10.1, 10.6, 10.7, 11.1, 11.6, 11.7, 12.1, 12.6, 12.7</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>Describe basic employment activities.</td>
<td>English: 10.1, 10.6, 10.7, 11.1, 11.6, 11.7, 12.1, 12.6, 12.7</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>Deliver an oral presentation of the professional portfolio.</td>
<td>English: 10.1, 11.1, 12.1</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>Identify potential education and employment barriers for nontraditional groups and ways to overcome those barriers.</td>
<td>English: 10.5, 11.5, 12.5</td>
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</tr>
</tbody>
</table>
Teaching Resources

Instructional Scenarios

The following instructional scenarios provide classroom activities to support the major concepts included in Programming.

- **Choosing a Computer for Your School Division**
  Duty/Concept Area: Exploring Programming Concepts
  Students will research computer models and present the pros and cons of each.

- **Extreme Snowboards**
  Duty/Concept Areas: Exploring Programming Concepts; Implementing Programming Procedures; Mastering Programming Fundamentals
  Students will create an e-commerce application to sell snowboards.

- **Flowcharting a Guessing Game**
  Duty/Concept Area: Using Algorithmic Procedures
  Students will create a flowchart to help in the development of a guessing-game app.

- **Get Out the Vote**
  Duty/Concept Area: Using Algorithmic Procedures
  Students will design a program to be used to vote for prom king and queen.

- **Restaurant Order Confirmation Application**
  Duty/Concept Area: Mastering Programming Fundamentals
  Students will develop an application that customers use to order meals.

- **Selecting a Programming Language for an eLearning Business**
  Duty/Concept Areas: Exploring Programming Concepts; Using Algorithmic Procedures; Implementing Programming Procedures; Using Web Technology; Developing Employability Skills
  Students will compare features of popular programming languages and choose the best language for a curriculum-design tool.

- **Recycling Rush**
  Duty/Concept Area: Developing Interactive Multimedia Applications
  Students will create an educational game that teaches what items can be recycled.

- **The Downfalls of Downloading**
  Duty/Concept Area: Developing Interactive Multimedia Applications
  Students will determine whether downloading a song for background music in a video game violates intellectual property laws.

- **Whose Game Is It Anyway?**
  Duty/Concept Area: Developing Interactive Multimedia Applications
  Students will determine whether an employee is in violation by taking a project from one employer to his new job.

Online Resources

*Adventures in Alice Programming*
Lesson plans from the Alice Workshop 2008
Cyber Security and Cyber Forensics Infusion Units

Cyber Security and Cyber Forensics Infusion Units (CYBR) were designed to be infused with designated CTE courses to help students achieve additional, focused, validated
tasks/competencies in personal and professional cyber security skills. These units are not mandatory, and, as such, the tasks/competencies are marked as “optional” and are to be taught at the instructor’s discretion.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”

Microsoft Imagine Academy Resources

Microsoft Imagine Academy (MSIA) offers classroom resources and materials and instructional techniques that will help enhance instruction and learning for this course. Using the school’s membership ID and product key for the Microsoft Imagine Academy, all resources are available through the MSIA Member Dashboard on the Microsoft site.

- To access the curriculum resources, select the Classroom Tile from the member site.
- To access downloadable curriculum resources including the MOAC e-Book, Lesson Plans, and Study Guides select Curriculum Overview - Curriculum Downloads.
- To access Online Learning videos and tutorials select Online Learning Directory tile.
- For more information visit: How to Get Started with Microsoft Imagine Academy Program.
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Advanced Placement (AP) Computer Science Principles Examination
- App Development with Swift Level 1 Examination
- Certified Associate in Python Programming (PCAP) Examination
- Certified Entry-Level Python Programmer (PCEP) Examination
- Certified Internet Web (CIW) Advanced HTML 5 and CSS 3 Specialist Examination
- Certified Internet Web (CIW) Data Analyst Examination
- Certified Internet Web (CIW) Database Design Specialist Examination
- Certified Internet Web (CIW) E-Commerce Services Specialist Examination
- Certified Internet Web (CIW) Internet Business Associate Examination
- Certified Internet Web (CIW) JavaScript Specialist Examination
- Certified Internet Web (CIW) Network Technology Associate Examination
- Certified Internet Web (CIW) Site Development Associate Examination
- Certified Internet Web (CIW) Social Media Strategist Examination
- Certified Internet Web (CIW) User Interface Designer Examination
- Certified Internet Web (CIW) Web Design Specialist Examination
- Certified Internet Web (CIW) Web Security Specialist Examination
- Cloud Essentials Certification Examination
- College and Work Readiness Assessment (CWRA+)
- College Level Examination Program (CLEP): Information Systems and Computer Applications
- Computer Programming Assessment
- IC3 Digital Literacy Certification Examination
- Microsoft Technology Associate (MTA) Examinations
- National Career Readiness Certificate Assessment
- Unity Certified User Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- AP Computer Science A (3185/36 weeks)
- AP Computer Science Principles (10160/36 weeks)
- Computer Information Systems (6612/36 weeks)
- Computer Information Systems (6614/18 weeks)
- Computer Information Systems, Advanced (6613/36 weeks)
- Computer Information Systems, Advanced (6615/18 weeks)
- Computer Network Software Operations (6650/36 weeks)
- Computer Network Software Operations, Advanced (6651/36 weeks)
- Cybersecurity Software Operations (6304/36 weeks)
- Database Design and Management (Oracle) (6660/36 weeks)
- Design, Multimedia, and Web Technologies (6630/36 weeks)
• Design, Multimedia, and Web Technologies (6632/18 weeks)
• Design, Multimedia, and Web Technologies, Advanced (6631/36 weeks)
• Design, Multimedia, and Web Technologies, Advanced (6633/18 weeks)
• Digital Applications (6611/36 weeks)
• Digital Applications (6617/18 weeks)
• Information Technology Fundamentals (6670/36 weeks)
• International Baccalaureate Computer Science (10159/36 weeks)
• International Baccalaureate Information Technology in a Global Society (IB6613/36 weeks)
• Java Programming (Oracle) (6661/36 weeks)
• Modeling and Simulation Technology (8460/36 weeks)
• Office Administration (6621/36 weeks)
• Office Administration (6622/18 weeks)
• Programming, Advanced (6641/36 weeks)

### Career Cluster: Arts, Audio/Video Technology and Communications

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td>Telecommunications</td>
<td>Computer Programmer</td>
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### Career Cluster: Information Technology

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Occupations</th>
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<tbody>
<tr>
<td>Network Systems</td>
<td>Computer Security Specialist</td>
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<tr>
<td></td>
<td>Computer Software Engineer</td>
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<td></td>
<td>Database Analyst</td>
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<td></td>
<td>Network Architect</td>
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<tr>
<td></td>
<td>Network Systems and Data Communication Analyst</td>
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<tr>
<td>Programming and Software Development</td>
<td>Applications Integrator</td>
</tr>
<tr>
<td></td>
<td>Computer Software Engineer</td>
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<tr>
<td></td>
<td>Game Designer, Programmer</td>
</tr>
<tr>
<td></td>
<td>Multimedia Artist, Animator</td>
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<tr>
<td></td>
<td>Network Systems and Data Communication Analyst</td>
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<tr>
<td></td>
<td>Project Manager</td>
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<td></td>
<td>Software Applications Engineer</td>
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<td>Software Test Engineer</td>
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<td>Systems Analyst</td>
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<td></td>
<td>Web Developer</td>
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<tr>
<td>Web and Digital Communications</td>
<td>Applications Integrator</td>
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<td></td>
<td>Game Designer, Programmer</td>
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<td></td>
<td>Multimedia Artist, Animator</td>
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<td></td>
<td>Project Manager</td>
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<td>Software Test Engineer</td>
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<td>Systems Analyst</td>
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<tr>
<td>Pathway</td>
<td>Occupations</td>
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<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------</td>
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<tr>
<td>Engineering and Technology</td>
<td>Computer Hardware Engineer</td>
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<tr>
<td></td>
<td>Computer Programmer</td>
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<tr>
<td></td>
<td>Computer Software Engineer</td>
</tr>
<tr>
<td></td>
<td>Network and Computer Systems Administrator</td>
</tr>
<tr>
<td></td>
<td>Network Systems and Data Communication Analyst</td>
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<tr>
<td></td>
<td>Systems Analyst</td>
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<tr>
<td></td>
<td>Technical Writer</td>
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<tr>
<td></td>
<td>Telecommunications Specialist</td>
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<tr>
<td>Science and Mathematics</td>
<td>Bioinformatics Technician</td>
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<td></td>
<td>Secondary School Teacher</td>
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<tr>
<td></td>
<td>Technical Writer</td>
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</tbody>
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