Virginia CTE

Advanced Programming (6641)

Developing Object-Oriented Programming (OOP) AP.1

1. **Explain the reasoning behind the steps in the software development life cycle (SDLC).** AP.1.1
2. **Describe the primary principles of object-oriented programming (OOP).** AP.1.2
3. **Identify potential objects, attributes, and methods within a problem description.** AP.1.3
4. **Design attributes (properties) and methods of each class within a problem description.** AP.1.4
5. **Create a program with user-defined classes.** AP.1.5
6. **Describe the concept of reusability.** AP.1.6
7. **Identify reusable resources that will help solve a problem.** AP.1.7
8. **Import code from existing sources.** AP.1.8
9. **Describe the concepts of overloading and overriding methods in an object-oriented language.** AP.1.9
10. **Code a program that uses looping structures, conditional structures, and sequential control structures.** AP.1.10
11. **Analyze abstract data types.** AP.1.11
12. **Implement searching and sorting algorithms.** AP.1.12
13. **Code a program that uses error-handling and input-validation procedures.** AP.1.13
14. **Code a program to use an interface.** AP.1.14
15. **Create a test suite that will verify proper operation of a class or group of related classes.** AP.1.15

Perform a peer review and test of a program. AP.1.16

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	17 Analyze code that uses recursion. AP.1.17
Developing Database Applications AP.2	1 Identify relational database terminology. AP.2.1
	2 Identify database model types. AP.2.2
	3 (Optional) Describe the three-layer/tier model for database applications. AP.2.3
	4 Identify the data object model for the program language. AP.2.4
	5 Design a GUI for a database application. AP.2.5
	6 Write code to integrate an existing database into a program application. AP.2.6
	7 Write code to manage a database. AP.2.7
	8 Bind database fields to the interface elements (controls). AP.2.8
Developing Interactive Multimedia Applications AP.3	1 Write a design document for a game. AP.3.1
	2 Code a multiplayer game. AP.3.2
Developing Connected Applications (Mobile and/or Web) AP.4	1 Determine the programming languages used to create connected applications. AP.4.1
	2 Design a web application with security features. AP.4.2
	3 (Optional) Design a GUI for a connected application. AP.4.3
	4 (Optional) Code a web application (e.g., shopping cart) for a smart device or emulator. AP.4.4
	5 (Optional) Describe the process of mobile application deployment. AP.4.5
	6 (Optional) Describe the web application publishing process. AP.4.6
	7 Describe client-side and server-side applications. AP.4.7
Preparing for Industry Certification AP.5	1 Describe the process and requirements for obtaining industry certifications related to the Programming, Advanced course. AP.5.1
	2 Identify testing skills/strategies for a certification examination. AP.5.2
	3 Demonstrate ability to successfully complete selected practice examinations (e.g., practice questions similar to those on certification exams). AP.5.3
	Optional) Successfully complete an industry certification examination epresentative of skills learned in this course (e.g., MCP, IC3). AP.5.4

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Developing Employability Skills AP.6

1. **Investigate continuing education pathways and careers in the information technology industry.** AP.6.1
2. **Create or update a résumé.** AP.6.2
3. **Update professional portfolio.** AP.6.3
4. **Deliver an oral presentation of programming projects.** AP.6.4