Arkansas Computer Science and Computing

Programming - Year 3

Computational Thinking and Problem Solving

1 Students will analyze and utilize problem-solving strategies.

1. Leverage problem-solving strategies to solve problems of level-appropriate complexity CSPG.Y3.1.1
2. Analyze and utilize multiple representations of problem-solving logic used to solve problems of appropriate complexity CSPG.Y3.1.2
3. Analyze and utilize collaborative methods in problem solving of level-appropriate complexity CSPG.Y3.1.3
4. Analyze and utilize level-appropriate troubleshooting strategies for hardware and software CSPG.Y3.1.4
5. Decompose problems of level-appropriate complexity CSPG.Y3.1.5

2 Students will analyze and utilize connections between concepts of mathematics and computer science.

1. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.2
3. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.3
4. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.4
5. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.5
6. Continuation of this standard is not specifically included or excluded CSPG.Y3.2.6

Data, Information, and Security

3 Students will analyze and utilize data through the use of computing devices.

1. Create programs that store, access, and manipulate, with high level of efficiency, levelappropriate data CSPG.Y3.3.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.3.2
3. Create and test models and simulations to answer student-identified questions and scenarios CSPG.Y3.3.3
4. Continuation of this standard is not specifically included or excluded CSPG.Y3.3.4
5. Discuss real-world data sources that can be mined to produce new knowledge CSPG.Y3.3.5
6. Issue queries against data sets to produce new knowledge from stored data (e.g., databases, large sets of data) CSPG.Y3.3.6

4 Students will analyze and utilize concepts of cybersecurity.

1. Continuation of this standard is not specifically included or excluded CSPG.Y3.4.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.4.2
3. Utilize a defined process or tool to identify and resolve security vulnerabilities in student-created programs CSPG.Y3.4.3
4. Continuation of this standard is not specifically included or excluded CSPG.Y3.4.4

Algorithms and Programs

5 Students will create, evaluate, and modify algorithms.

1. Design and implement level-appropriate algorithms that solve student-identified problems CSPG.Y3.5.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.5.2
3. Evaluate multiple student-created algorithms and non-student-created algorithms in terms of time and space complexities (e.g., Big O notation) CSPG.Y3.5.3
4. Use a systematic approach to detect and resolve errors in a given algorithm CSPG.Y3.5.4

6 Students will create programs to solve problems.

1. Create programs to solve problems of levelappropriate complexity utilizing inheritance and polymorphism CSPG.Y3.6.1
2. Discuss and apply best practices of program design, user experience design, and format (e.g., descriptive names, documentation, indentation, whitespace) CSPG.Y3.6.2
3. Determine the scope and state of variables defined in classes and class procedures involving inheritance and polymorphism CSPG.Y3.6.3
4. Create programs that read from, write to, and manipulate binary files (e.g., images, sounds) CSPG.Y3.6.4
5. Use a systematic approach to detect logic, runtime, and syntax errors within a program CSPG.Y3.6.5

Computers and Communications

7 Students will analyze the utilization of computers within industry.

1. Integrate multiple hardware and/or software tools to solve level-appropriate industry-based problems CSPG.Y3.7.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.7.2

8 Students will analyze communication methods and systems used to transmit information among computing devices.

1. Continuation of this standard is not specifically included or excluded CSPG.Y3.8.1
2. Continuation of this standard is not specifically included or excluded CSPG.Y3.8.2
3. Continuation of this standard is not specifically included or excluded CSPG.Y3.8.3
4. Continuation of this standard is not specifically included or excluded CSPG.Y3.8.4

9 Students will utilize appropriate hardware and software.

1 Continuation of this standard is not specifically included or excluded CSPG.Y3.9.1

2 Compare, contrast, and utilize collaboration tools and/or version control systems in a group software project of appropriate complexity CSPG.Y3.9.2

3 Continuation of this standard is not specifically included or excluded CSPG.Y3.9.3

4 Continuation of this standard is not specifically included or excluded CSPG.Y3.9.4

Professionalism and Impacts of Computing

10 Students will analyze the impacts of technology and professionalism within the computing community.

1 Continuation of this standard is not specifically included or excluded CSPG.Y3.10.1

2 Continuation of this standard is not specifically included or excluded CSPG.Y3.10.2

3 Continuation of this standard is not specifically included or excluded CSPG.Y3.10.3

4 Discuss ethical implications encountered in software development industry that relate to intellectual property, non-compete clauses, and non-disclosure agreements CSPG.Y3.10.4

5 Utilize a software life cycle process (e.g., Agile, spiral, waterfall) in developing a program CSPG.Y3.10.5

6 Continuation of this standard is not specifically included or excluded CSPG.Y3.10.6

7 Continuation of this standard is not specifically included or excluded CSPG.Y3.10.7

8 Evaluate the quality and impact of a professional digital portfolio CSPG.Y3.10.8

9 Create and maintain a professional digital portfolio comprised of self-created work CSPG.Y3.10.9

11 Students will demonstrate understanding of storytelling with data and appropriately communicate about technical information.

1 Communicate technical information, of appropriate complexity, effectively to diverse audiences including, but not limited to, non-technical audience members CSPG.Y3.11.1

2 Continuation of this standard is not specifically included or excluded CSPG.Y3.11.2

3 Continuation of this standard is not specifically included or excluded CSPG.Y3.11.3

4 Continuation of this standard is not specifically included or excluded CSPG.Y3.11.4

5 Continuation of this standard is not specifically included or excluded CSPG.Y3.11.5