

Tick one box per statement: ☐ not yet ☐ nearly ☐ confident. / /

1. Creative Development

1.1 Collaboration

- ☐☐☐ Explain how computing innovations are improved through collaboration. [Skill 1.C]
- ☐☐☐ Explain how computing innovations are developed by groups of people. [Skill 1.C]
- ☐☐☐ Demonstrate effective interpersonal skills during collaboration. [Skill 1.C]

1.2 Program Function and Purpose

- ☐☐☐ Describe the purpose of a computing innovation. [Skill 1.A]
- ☐☐☐ Explain how a program or code segment functions. [Skill 4.A]
- ☐☐☐ Identify input(s) to a program. [Skill 3.A]
- ☐☐☐ Identify output(s) produced by a program. [Skill 3.A]

1.3 Program Design and Development

- ☐☐☐ Develop a program using a development process. [Skill 1.B]
- ☐☐☐ Design a program and its user interface. [Skill 1.B]
- ☐☐☐ Describe the purpose of a code segment or program by writing documentation. [Skill 4.A]
- ☐☐☐ Acknowledge code segments used from other sources. [Skill 1.C]

1.4 Identifying and Correcting Errors

- ☐☐☐ For errors in an algorithm or program:
- ☐☐☐ Identify inputs and corresponding expected outputs or behaviors that can be used to check the correctness of an algorithm or program. [Skill 4.C]

2. Data

2.1 Binary Numbers

- ☐☐☐ Explain how data can be represented using bits. [Skill 3.C]
- ☐☐☐ Explain the consequences of using bits to represent data. [Skill 1.D]
- ☐☐☐ For binary numbers:

2.2 Data Compression

- ☐☐☐ Compare data compression algorithms to determine which is best in a particular context. [Skill 1.D]

2.3 Extracting Information from Data

- ☐☐☐ Describe what information can be extracted from data. [Skill 5.B]
- ☐☐☐ Describe what information can be extracted from metadata. [Skill 5.B]
- ☐☐☐ Identify the challenges associated with processing data. [Skill 5.D]

2.4 Using Programs with Data

- ☐☐☐ Extract information from data using a program. [Skill 2.B]
- ☐☐☐ Explain how programs can be used to gain insight and knowledge from data. [Skill 5.B]

3. Algorithms and Programming

3.1 Variables and Assignments

- ☐☐☐ Represent a value with a variable. [Skill 3.A]
- ☐☐☐ Determine the value of a variable as a result of an assignment. [Skill 4.B]

3.2 Data Abstraction

- ☐☐☐ Represent a list or string using a variable. [Skill 3.A]
- ☐☐☐ For data abstraction:

3.3 Mathematical Expressions

- ☐☐☐ Express an algorithm that uses sequencing without using a programming language. [Skill 2.A]
- ☐☐☐ Represent a step-by-step algorithmic process using sequential code statements. [Skill 2.B]
- ☐☐☐ Evaluate expressions that use arithmetic operators. [Skill 4.B]

3.4 Strings

- ☐☐☐ Evaluate expressions that manipulate strings. [Skill 4.B]

3.5 Boolean Expressions

- ☐☐☐ For relationships between two variables, expressions, or values:
- ☐☐☐ For relationships between Boolean values:

3.6 Conditionals

- ☐☐☐ Express an algorithm that uses selection without using a programming language. [Skill 2.A]
- ☐☐☐ For selection:

3.7 Nested Conditionals

- ☐☐☐ For nested selection:

3.8 Iteration

- ☐☐☐ Express an algorithm that uses iteration without using a programming language. [Skill 2.A]
- ☐☐☐ For iteration:

3.9 Developing Algorithms

- ☐☐☐ Compare multiple algorithms to determine if they yield the same side effect or result. [Skill 1.D]
- ☐☐☐ For algorithms:

3.10 Lists

- ☐☐☐ For list operations:

☐☐☐ For algorithms involving elements of a list:

3.11 Binary Search

☐☐☐ For binary search algorithms:

3.12 Calling Procedures

☐☐☐ For procedure calls:

3.13 Developing Procedures

☐☐☐ Explain how the use of procedural abstraction manages complexity in a program. [Skill 3.C]

☐☐☐ Develop procedural abstractions to manage complexity in a program by writing procedures. [Skill 3.B]

3.14 Libraries

☐☐☐ Select appropriate libraries or existing code segments to use in creating new programs. [Skill 2.B]

3.15 Random Values

☐☐☐ For generating random values:

3.16 Simulations

☐☐☐ For simulations:

3.17 Algorithmic Efficiency

☐☐☐ For determining the efficiency of an algorithm:

3.18 Undecidable Problems

☐☐☐ Explain the existence of undecidable problems in computer science. [Skill 1.A]

4. Computer Systems and Networks

4.1 The Internet

☐☐☐ Explain how computing devices work together in a network. [Skill 5.A]

☐☐☐ Explain how the Internet works. [Skill 5.A]

☐☐☐ Explain how data are sent through the Internet via packets. [Skill 5.A]

☐☐☐ Describe the differences between the Internet and the World Wide Web. [Skill 5.A]

4.2 Fault Tolerance

☐☐☐ For fault-tolerant systems, like the Internet:

4.3 Parallel and Distributed Computing

☐☐☐ For sequential, parallel, and distributed computing:

☐☐☐ Describe benefits and challenges of parallel and distributed computing. [Skill 1.D]

5. Impact of Computing

5.1 Beneficial and Harmful Effects

- ☐☐☐ Explain how an effect of a computing innovation can be both beneficial and harmful. [Skill 5.C]
- ☐☐☐ Explain how a computing innovation can have an impact beyond its intended purpose. [Skill 5.C]

5.2 Digital Divide

- ☐☐☐ Describe issues that contribute to the digital divide. [Skill 5.C]

5.3 Computing Bias

- ☐☐☐ Explain how bias exists in computing innovations. [Skill 5.E]

5.4 Crowdsourcing

- ☐☐☐ Explain how people participate in problem-solving processes at scale. [Skill 1.C]

5.5 Legal and Ethical Concerns

- ☐☐☐ Explain how the use of computing can raise legal and ethical concerns. [Skill 5.E]

5.6 Safe Computing

- ☐☐☐ Describe the risks to privacy from collecting and storing personal data on a computer system. [Skill 5.D]
- ☐☐☐ Explain how computing resources can be protected and can be misused. [Skill 5.E]
- ☐☐☐ Explain how unauthorized access to computing resources is gained. [Skill 5.E]