

## Computer Science Principles: Learning Objectives

### Big Idea I: Creativity. The student can ...

- LO 1: ... use computing tools and techniques to create artifacts.
- LO 2: ... collaborate in the creation of computational artifacts.
- LO 3: ... analyze computational artifacts.
- LO 4: ... use computing tools and techniques for creative expression.
- LO 5: ... use programming as a creative tool.

### Big Idea II: Abstraction. The student can ...

- LO 6: ... describe the combination of abstractions used to represent data.
- LO 7: ... explain how binary sequences are used to represent digital data.
- LO 8: ... develop an abstraction.
- LO 9: ... use multiple levels of abstraction in computation.
- LO 10: ... use models and simulations to raise and answer questions.

### Big Idea III: Data. The student can ...

- LO 11: ... use computers to process information to gain insight and knowledge.
- LO 12: ... collaborate when processing information to gain insight and knowledge.
- LO 13: ... communicate how computer programs are used to process information to gain insight and knowledge.
- LO 14: ... use computing to facilitate exploration and the discovery of connections in information.
- LO 15: ... use large datasets to explore and discover information and knowledge.
- LO 16: ... analyze the considerations involved in the computational manipulation of information.

### Big Idea IV: Algorithms. The student can ...

- LO 17: ... develop an algorithm.
- LO 18: ... express an algorithm in a language.
- LO 19: ... appropriately connect problems and potential algorithmic solutions.
- LO 20: ... evaluate algorithms analytically and empirically.

### Big Idea V: Programming. The student can ...

- LO 21: ... explain how programs implement algorithms.
- LO 22: ... use abstraction to manage complexity in programs.
- LO 23: ... evaluate a program for correctness.
- LO 24: ... develop a correct program.
- LO 25: ... collaborate to solve a problem using programming.
- LO 26: ... employ appropriate mathematical and logical concepts in programming.

### Big Idea VI: Internet. The student can ...

- LO 27: ... explain the abstractions in the Internet and how the Internet functions.
- LO 28: ... explain characteristics of the Internet and the systems built on it.
- LO 29: ... analyze how characteristics of the Internet and systems built on it influence their use.
- LO 30: ... connect the concern of cybersecurity with the Internet and systems built on it.

### Big Idea VII: Impact. The student can ...

- LO 31: ... analyze how computing affects communication, interaction, and cognition.
- LO 32: ... collaborate as part of a process that scales.
- LO 33: ... connect computing with innovations in other fields.
- LO 34: ... analyze the beneficial and harmful effects of computing.
- LO 35: ... connect computing within economic, social, and cultural contexts.