

# Computer Science II

## Computing Systems

### Devices

- 1 Illustrate ways computing systems implement logic through hardware components. [11-12.CS.D.01](#)
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### Hardware & Software

- 2 Describe and categorize roles of an operating system. [11-12.CS.HS.01](#)
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### Troubleshooting

- 3 Develop, communicate and apply systematic troubleshooting strategies for correction of errors in computing systems. [9-10.CS.T.01](#)
  - 4 Describe how hardware components facilitate logic, input, output and storage in computing systems. [11-12.CS.T.01](#)
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## Networks & the Internet

### Network Communication & Organization

- 1 Analyze the relationship between routers, switches, servers, topology and addressing. [11-12.NI.NCO.01](#)
  - 2 Describe key protocols and underlying processes of internet-based services (e.g., http/https and Simple Mail Transfer Protocol (SMTP)/internet Message Access Protocol (IMAP), routing protocols). [11-12.NI.NCO.02](#)
  - 3 Explain how the characteristics of the internet influence the systems developed on it. [11-12.NI.NCO.03](#)
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### Cybersecurity

- 4 Compare and refine ways in which software developers protect devices and information from unauthorized access. [11-12.NI.C.01](#)
  - 5 Analyze cryptographic techniques to model the secure transmission of information. [11-12.NI.C.02](#)
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## Data & Analysis

### Storage

- 1 Compare different bit representations of data types, such as characters, Booleans and numbers while recognizing when using each data type is appropriate. [11-12.DA.S.01](#)

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## Collection, Visualization & Transformation

- 2 Create data visualizations to help others better understand real-world phenomena. [9-10.DA.CVT.01](#)
- 3 Generate data sets that use a variety of data collection tools and analysis techniques to support a claim and/or communicate information. [11-12.DA.CVT.01](#)

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## Inference & Models

- 4 Evaluate the ability of models and simulations to test and support the refinement of hypotheses. [11-12.DA.IM.01](#)

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## Algorithms & Programming

### Algorithms

- 1 Critically examine and trace classic algorithms (e.g., selection sort, insertion sort, binary search, linear search). [11-12.AP.A.01](#)
- 2 Implement an artificial intelligence algorithm to interact with a human or solve a problem. [11-12.AP.A.02](#)
- 3 Describe how artificial intelligence algorithms drive many software and physical systems (e.g., autonomous robots, computer vision, pattern recognition, text analysis). [11-12.AP.A.03](#)
- 4 Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency and clarity. [11-12.AP.A.04](#)

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### Variables

- 5 Create problem solutions that utilize data structures (e.g., lists, arrays, ArrayLists). [11-12.AP.V.01](#)

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### Control

- 6 Trace the execution of iteration (e.g., loops, recursion), illustrating output and changes in values of named variables. [11-12.AP.C.01](#)

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### Modularity

- 7 Construct solutions to problems using student-created components (e.g., procedures, modules, objects). [11-12.AP.M.01](#)
- 8 Create programming solutions by reusing existing code (e.g., libraries, Application Programming Interface (APIs), code repositories). [11-12.AP.M.02](#)
- 9 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. [11-12.AP.M.03](#)

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## Program Development

- 10 Use integrated development environments (IDEs) and collaborative tools and practices (code documentation) in a software project. [11-12.AP.PD.01](#)
  - 11 Plan and develop programs using a development process (e.g., waterfall, iterative, spiral, rapid application development, agile). [11-12.AP.PD.02](#)
  - 12 Identify and compare features of various programming languages that make them useful for solving problems and developing systems. [11-12.AP.PD.](#)
  - 13 Design software using version control. [11-12.AP.PD.04](#)
  - 14 Develop and use a series of test cases to verify that a program performs according to its design specifications. [11-12.AP.PD.05](#)
  - 15 Explain security issues that might lead to compromised computer programs. [11-12.AP.PD.06](#)
  - 16 Evaluate key qualities of a program through a process such as a code review. [11-12.AP.PD.07](#)
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## Impacts of Computing

### Culture

- 1 Evaluate the impact of equity, access and influence on the distribution of computing resources in a global society. [11-12.IC.C.01](#)
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### Safety, Laws & Ethics

- 2 Explain the beneficial and harmful effects that intellectual property laws can have on innovation. [9-10.IC.SLE.01](#)
  - 3 Explain the privacy concerns related to the collection and analysis of information about individuals that may not be evident to users. [9-10.IC.SLE.02](#)
  - 4 Identify and explain the potential impacts and implications of emerging technologies on larger social economic and political structures with evidence from credible sources. [9-10.IC.SLE.05](#)
  - 5 Debate laws and regulations that impact the development and use of software. [11-12.IC.SLE.01](#)
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## Prepare for Employment

### 6 Prepare for Employment

Demonstrate working as a team.

1 Demonstrate working as a team.

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Identify careers in the computer science field

2 Identify careers in the computer science field

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Demonstrate communication skills.

3 Demonstrate communication skills.

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**Discuss ethical behaviors in the workplace.**

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**4 Discuss ethical behaviors in the workplace.**

**Demonstrate interpersonal skills.**

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**5 Demonstrate interpersonal skills.**

**Exhibit leadership skills through a student organization (e.g. FBLA, PBL, ACM)**

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**6 Exhibit leadership skills through a student organization (e.g. FBLA, PBL, ACM)**

**Develop documentation for a job search in computer science.**

**7 Develop documentation for a job search in computer science.**