

Grades 9-10

Computing Systems

- 1 Devices:** Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects. [9-10.CS.01](#)
- 2 Hardware and Software:** Compare levels of abstraction and interactions between application software, system software, and hardware layers. [9-10.CS.02](#)
- 3 Troubleshooting:** Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. [9-10.CS.03](#)

Networks and the Internet

- 4 Network Communication and Organization:** Evaluate the scalability and reliability of networks by describing the relationship between routers, switches, servers, topology, and addressing. [9-10.NI.04](#)
- 5 Network Communication and Organization:** Give examples to illustrate how sensitive data can be affected by malware and other attacks. [9-10.NI.05](#)
- 6 Network Communication and Organization:** Compare various security measures, considering tradeoffs between the usability and security of a computing system. [9-10.NI.06](#)
- 7 Cybersecurity:** Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts. [9-10.NI.07](#)
- 8 Cybersecurity:** Explain tradeoffs when selecting and implementing cybersecurity recommendations. [9-10.NI.08](#)

Data and Analysis

- 9 Storage:** Translate between different bit representations of real-world phenomena, such as characters, numbers, and images. [9-10.DA.09](#)
- 10 Storage:** Evaluate the tradeoffs in how data elements are organized and stored. [9-10.DA.10](#)
- 11 Collection, Visualization, and Transformation:** Create interactive data visualizations using software tools to help others better understand real-world phenomena. [9-10.DA.11](#)
- 12 Interference and Models:** Create computational models that represent the relationships among different elements of data collected from a phenomenon or process. [9-10.DA.12](#)

Algorithms and Programming

- 13 Algorithms:** Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests. 9-10.AP.13
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- 14 Variables:** Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables. 9-10.AP.14
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- 15** Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made. 9-10.AP.15
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- 16 Control:** Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions. 9-10.AP.16
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- 17 Control:** Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, or objects. 9-10.AP.17
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- 18 Modularity:** Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 9-10.AP.18
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- 19 Modularity:** Systematically design and develop programs for broad audiences by incorporating feedback from users. 9-10.AP.19
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- 20 Program Development:** Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries. 9-10.AP.20
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- 21 Program Development:** Evaluate and refine computational artifacts to make them more usable and accessible. 9-10.AP.21
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- 22 Program Development:** Design and develop computational artifacts working in team roles using collaborative tools. 9-10.AP.22
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- 23 Program Development:** Document design decisions using text, graphics, presentations, or demonstrations in the development of complex programs. 9-10.AP.23
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- 24 Program Development:** Describe the characteristics and evaluate the impact of human computer interaction. 9-10.AP.24
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Impacts of Computing

- 25 Culture:** Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. Evaluate the ways digital social interactions impact personal, ethical, social, economic, and cultural practices. 9-10.IC.25
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- 26 Culture:** Test and refine computational artifacts to reduce bias and equity deficits. 9-10.IC.26
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- 27 Culture:** Demonstrate ways a given algorithm applies to problems across disciplines. 9-10.IC.27
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- 28 Social Interactions:** Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields. 9-10.IC.28
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- 29 Safety Law and Ethics:** Explain the beneficial and harmful effects that intellectual property laws can have on innovation. 9-10.IC.29
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- 30 Safety Law and Ethics:** Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users. 9-10.IC.30
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- 31 Safety Law and Ethics:** Evaluate the social and economic implications of privacy in the context of safety, law, or ethics. 9-10.IC.31
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Emerging and Future Technologies

- A** Explain that the field of emerging technologies will be evolving and rapidly growing. 9-10.ET.A
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- B** Compare existing and emerging technologies, ideas, and concepts. 9-10.ET.B
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- C** Describe how emerging technologies are influencing current events at a local and global scale. 9-10.ET.C
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- D** Predict the positive and negative societal, cultural, and economic impacts that emerging and future technologies may generate. 9-10.ET.D
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- E** Create new or original work by applying emerging technologies. 9-10.ET.E
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