California Computer Science

Grades 9-12 Specialty

Computing Systems

Devices

1 Illustrate ways computing systems implement logic through hardware components. 9-12S.CS.1

Hardware & Software

2 Categorize and describe the different functions of operating system software. 9-12S.CS.2

Networks & the Internet

Network Communication & Organization

3 Examine the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing. 9-12S.NI.3

4 Explain how the characteristics of the internet influence the systems developed on it. 9-12S.NI.4

Cybersecurity

5 Develop solutions to security threats. 9-12S.NI.5

6 Analyze cryptographic techniques to model the secure transmission of information. 9-12S.NI.6

Data & Analysis

Collection Visualization & Transformation

7 Select and use data collection tools and techniques to generate data sets. 9-12S.DA.7

8 Use data analysis tools and techniques to identify patterns in data representing complex systems. 9-12S.DA.8

Inference & Models

9 Evaluate the ability of models and simulations to test and support the refinement of hypotheses. 9-12S.DA.9

Algorithms & Programming

Algorithms

10 Describe how artificial intelligence drives many software and physical systems. 9-12S.AP.10

l Implement an algorithm that uses artificial intelligence to overcome a simple challenge. 9-12S.AP.11

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12 Implement searching and sorting algorithms to solve computational problems. 9-12S.AP.12

13 Evaluate algorithms in terms of their efficiency. 9-12S.AP.13

Variables

14 Compare and contrast fundamental data structures and their uses. 9-12S.AP.14

Control

15 Demonstrate the flow of execution of a recursive algorithm. 9-12S.AP.15

Modularity

16 Analyze a large-scale computational problem and identify generalizable patterns or problem components that can be applied to a solution. 9-12S.AP.16

17 Construct solutions to problems using student-created components, such as procedures, modules, and/or objects. 9-12S.AP.17

18 Demonstrate code reuse by creating programming solutions using libraries and APIs. 9-12S.AP.18

Program Development

19 Plan and develop programs for broad audiences using a specific software life cycle process. 9-12S.AP.19

20 Develop programs for multiple computing platforms. 9-12S.AP.20

21 Identify and fix security issues that might compromise computer programs. 9-12S.AP.21

22 Develop and use a series of test cases to verify that a program performs according to its design specifications. 9-12S.AP.22

23 Modify an existing program to add additional functionality and discuss intended and unintended implications. 9-12S.AP.23

24 Evaluate key qualities of a program through a process such as a code review. 9-12S.AP.24

25 Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (e.g., code documentation) while developing software within a group. 9-12S.AP.25

26 Compare multiple programming languages, and discuss how their features make them suitable for solving different types of problems. 9-12S.AP.26

Impacts of Computing

Culture

27 Evaluate computational artifacts with regard to improving their beneficial effects and reducing harmful effects on society. 9-12S.IC.27

28 Evaluate how computational innovations that have revolutionized aspects of our culture might evolve. 9-12S.IC.28

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29 Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society. 9-12S.IC.29

Safety Law & Ethics

30 Debate laws and regulations that impact the development and use of software. 9-12S.IC.30