California Computer Science

Grades 9-12

Computing Systems

Devices

1 Describe ways in which abstractions hide the underlying implementation details of computing systems to simplify user experiences. 9-12.CS.1

Hardware & Software

2 Compare levels of abstraction and interactions between application software, system software, and hardware. 9-12.CS.2

Troubleshooting

3 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. 9-12.CS.3

Networks & the Internet

Network Communication & Organization

4 Describe issues that impact network functionality. 9-12.NI.4

5 Describe the design characteristics of the internet. 9-12.NI.5

Cybersecurity

6 Compare and contrast security measures to address various security threats. 9-12.NI.6

7 Compare and contrast cryptographic techniques to model the secure transmission of information. 9-12.NI.7

Data & Analysis

Storage

8 Translate between different representations of data abstractions of real-world phenomena, such as characters, numbers, and images. 9-12.DA.8

9 Describe tradeoffs associated with how data elements are organized and stored. 9-12.DA.9

Collection Visualization & Transformation

10 Create data visualizations to help others better understand real-world phenomena. 9-12.DA.10

Inference & Models

11 Refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process. 9-12.DA.11

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Algorithms & Programming

Algorithms

12 Design algorithms to solve computational problems using a combination of original and existing algorithms. 9-12.AP.12

Variables

13 Create more generalized computational solutions using collections instead of repeatedly using simple variables. 9-12.AP.13

Control

14 Justify the selection of specific control structures by identifying tradeoffs associated with implementation, readability, and performance. 9-12.AP.14

15 Iteratively design and develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions. 9-12.AP.15

16 Decompose problems into smaller subproblems through systematic analysis, using constructs such as procedures, modules, and/or classes. 9-12.AP.16

Modularity

17 Create computational artifacts using modular design. 9-12.AP.17

Program Development

18 Systematically design programs for broad audiences by incorporating feedback from users. 9-12.AP.18

19 Explain the limitations of licenses that restrict use of computational artifacts when using resources such as libraries. 9-12.AP.19

20 Iteratively evaluate and refine a computational artifact to enhance its performance, reliability, usability, and accessibility. 9-12.AP.20

21 Design and develop computational artifacts working in team roles using collaborative tools. 9-12.AP.21

22 Document decisions made during the design process using text, graphics, presentations, and/or demonstrations in the development of complex programs. 9-12.AP.22

Impacts of Computing

Culture

23 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. 9-12.IC.23

24 Identify impacts of bias and equity deficit on design and implementation of computational artifacts and apply appropriate processes for evaluating issues of bias. 9-12.IC.24

25 Demonstrate ways a given algorithm applies to problems across disciplines. 9-12.IC.25

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26 Study, discuss, and think critically about the potential impacts and implications of emerging technologies on larger social, economic, and political structures, with evidence from credible sources. 9-12.IC.26

Social Interactions

27 Use collaboration tools and methods to increase connectivity with people of different cultures and careers. 9-12.IC.27

Safety Law & Ethics

28 Explain the beneficial and harmful effects that intellectual property laws can have on innovation. 9-12.IC.28

29 Explain the privacy concerns related to the collection and generation of data through automated processes. 9-12.IC.29

30 Evaluate the social and economic implications of privacy in the context of safety, law, or ethics. 9-12.IC.30