Alabama Digital Literacy and Computer Science

Grades 9-12

Computational Thinking DLCS25.HS.CT

AAD Algorithms, Abstraction, and Decomposition DLCS25.HS.CT.AAD

1 Compare and contrast a generalized algorithm in pseudocode and its concrete implementation in a programming language. DLCS25.HS.1

2 Translate pseudocode, flowcharts, or other planning tools into multiple programming languages. DLCS25.HS.2

3 Explain the characteristics of algorithms, including speed, accuracy, and storage requirements. DLCS25.HS.3

4 Model and adapt classic algorithms, including sorting and searching, to solve computational problems. DLCS25.HS.4

5 Decompose problems into component parts, extract key information, and model levels of abstraction in complex systems. DLCS25.HS.5

6 Compare different data compression algorithms by analyzing their main features, including their compression speed and whether they preserve data exactly (lossless) or reduce data quality for higher compression (lossy). DLCS25.HS.6

7 Create software solutions using libraries and application programming interfaces (APIs) that demonstrate code reuse. DLCS25.HS.7

8 Compare and contrast the major categories of machine learning, including supervised, unsupervised, and reinforcement learning. [AI] DLCS25.HS.8

P Programming DLCS25.HS.CT.P

9 Compare and contrast fundamental data structures and their uses. DLCS25.HS.9

10 Develop and use a series of test cases to verify that a program performs according to its design specifications. DLCS25.HS.10

11 Utilize an iterative and incremental software design process, including learning from mistakes, to improve a program. DLCS25.HS.11

12 Improve existing code by restructuring (refactoring) it to enhance readability and/or increase efficiency without changing its overall behavior. DLCS25.HS.12

13 Select and utilize effective debugging techniques to correct problems in software. DLCS25.HS.13

14 Create a complete program to solve a problem or explore personal interests, using a text-based programming language. DLCS25.HS.14

15 Design and implement a program that processes user input, applies relational and logical operators within conditional logic, maintains program state, and produces appropriate responses. DLCS25.HS.15

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Data Science DLCS25.HS.DS

DCR Data Collection and Representation DLCS25.HS.DS.DCR

16 Create interactive data visualizations to help others understand real-world phenomena. [AI] DLCS25.HS.16

17 Verify the validity of a dataset by identifying missing, out-of-range, inconsistent, or invalid data and distinguishing these from statistical outliers using basic measures such as range, mean, or standard deviation. DLCS25.HS.17

DA Data Analysis DLCS25.HS.DS.DA

18 Correct or remove entries containing missing, out-of-range, inconsistent, or invalid data from a dataset to prepare it for analysis. DLCS25.HS.18

19 Utilize data analysis tools and statistical methods on a dataset to discover useful information, identify patterns, or make an informed decision. DLCS25.HS.19

MS Modeling and Simulation DLCS25.HS.DS.MS

20 Create and utilize models and simulations to help formulate, test, and refine a hypothesis. DLCS25.HS.20

21 Update an existing model to address flaws and improve precision. DLCS25.HS.21

Computing Systems DLCS25.HS.CS

NI Networks and Internet DLCS25.HS.CS.NI

22 Analyze how network infrastructure impacts the speed, reliability, and scalability of services. DLCS25.HS.22

23 Explain how security protocols in networked systems protect or expose data and assess the risks associated with IoT devices and cloud services. DLCS25.HS.23

C Cybersecurity DLCS25.HS.CS.C

24 Explain the tradeoffs when selecting and implementing cybersecurity recommendations, balancing cost, performance, usability, and security. DLCS25.HS.24

25 Summarize the mechanisms and purposes of various tracking technologies and identify strategies to manage them. DLCS25.HS.25

26 Investigate the purpose of and relationship among various computer security measures. DLCS25.HS.26

27 Create a personal cybersecurity plan incorporating the CIA Triad *(confidentiality, integrity, and availability)* to safeguard sensitive information and ensure its trustworthiness and accessibility. DLCS25.HS.27

28 Investigate the motivations behind hacking and examine the associated ethical considerations. DLCS25.HS.28

29 Appraise the trustworthiness of new or unfamiliar resources in order to make safe choices when downloading, installing, and using software. DLCS25.HS.29

Hardware and Software DLCS25.HS.CS.HS

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30 Compare alternative computing architectures, including cluster and quantum computing, to classical computing systems. DLCS25.HS.30

31 Explain the interactions between application software, operating systems, drivers, and hardware. DLCS25.HS.31

32 Compare and contrast the common metadata elements of various file types. DLCS25.HS.32

33 Develop and implement troubleshooting strategies to identify and correct problems with computing devices. DLCS25.HS.33

Impact of Computing DLCS25.HS.IC

CP Career Paths DLCS25.HS.IC.CP

34 Research and explain the impact of computing technology on career pathways across different industries and career fields. DLCS25.HS.34

35 Research and share information regarding current AI applications in various career fields. [AI] DLCS25.HS.35

E Ethics DLCS25.HS.IC.E

36 Analyze the implications of data privacy and consent for making informed decisions about personal data security. DLCS25.HS.36

37 Identify and evaluate the consequences of technology-related laws and policies, including those addressing privacy, accessibility, and intellectual property. DLCS25.HS.37

S Society DLCS25.HS.IC.S

38 Analyze the ethical issues related to AI technologies and evaluate their societal and ecological impacts. [AI] DLCS25.HS.38

ET Emerging Technology DLCS25.HS.IC.ET

39 Predict the transformative effects of hypothetical future technologies. [AI] DLCS25.HS.39

A Accessibility DLCS25.HS.IC.A

40 Follow Americans with Disabilities Act (ADA) standards to design digital artifacts that reduce barriers caused by the digital divide, disability, or bias. DLCS25.HS.40

Digital Proficiency DLCS25.HS.DP

IL Information Literacy DLCS25.HS.DP.IL

41 Research and report potential dangers and unintended consequences of over-reliance on AI tools. [AI] DLCS25.HS.41

DL Digital Life DLCS25.HS.DP.DL

42 Explain how systems learn user preferences and behaviors to deliver personalized content and targeted advertisements. [AI] DLCS25.HS.42

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43 Investigate the mental health risks associated with excessive technology use, including social isolation, anxiety, and depression, and develop strategies to mitigate them. DLCS25.HS.43

DT Digital Tools DLCS25.HS.DP.DT

44 Evaluate the usability of software applications for broad audiences by considering feedback from real-world users. DLCS25.HS.44

45 Identify a problem best solved through human-machine collaboration, decomposing it into tasks suited for each. DLCS25.HS.45