Washington Computer Science

Grades 9, 10

Adopted 2016

Algorithms and Programming

3A-A-2-1. Design and develop a software artifact working in a team. 3A-A-2-1

3A-A-2-2. Demonstrate how diverse collaborating impacts the design and development of software products (e.g., discussing real-world examples of products that have been improved through having a diverse design team or reflecting on their own team's development experience). 3A-A-2-2

3A-A-7-3. Compare and contrast various software licensing schemes (e.g., open source, freeware, commercial). 3A-A-7-3

3A-A-5-4. Design, develop, and implement a computing artifact that responds to an event (e.g., robot that responds to a sensor, mobile app that responds to a text message, sprite that responds to a broadcast). 3A-A-5-4

3A-A-5-5. Use user-centered research and design techniques (e.g., surveys, interviews) to create software solutions 3A-A-5-5

3A-A-5-6. Integrate grade-level appropriate mathematical techniques, concepts, and processes in the creation of computing artifacts. 3A-A-5-6

3A-A-4-7. Understand the notion of hierarchy and abstraction in high-level languages, translation, instruction sets, and logic circuits. 3A-A-4-7

3A-A-4-8. Deconstruct a complex problem into simpler parts using predefined constructs (e.g., functions and parameters and/or classes). 3A-A-4-8

3A-A-4-9. Demonstrate the value of abstraction for managing problem complexity (e.g., using a list instead of discrete variables). 3A-A-4-9

3A-A-3-10. Design algorithms using sequence, selection, and iteration. 3A-A-3-10

3A-A-3-11. Explain and demonstrate how modeling and simulation can be used to explore natural phenomena (e.g., flocking behaviors, queueing, life cycles). 3A-A-3-11

3A-A-6-12. Use a systematic approach and debugging tools to independently debug a program (e.g., setting breakpoints, inspecting variables with a debugger). 3A-A-6-12

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Computing Systems	**3A-C-7-13.**	**Develop and apply criteria (e.g., power consumption, processing speed, storage space, battery life, cost, operating system) for evaluating a computer system for a given purpose (e.g., system specification needed to run a game, web browsing, graphic design or video editing).** 3A-C-7-13
	3A-C-5-14.	**Create, extend, or modify existing programs to add new features and behaviors using different forms of inputs and outputs (e.g., inputs such as sensors, mouse clicks, data sets; outputs such as text, graphics, sounds).** 3A-C-5-14
	3A-C-4-15.	**Demonstrate the role and interaction of a computer embedded within a physical system, such as a consumer electronic, biological system, or vehicle, by creating a diagram, model, simulation, or prototype.** 3A-C-4-15
	3A-C-4-16.	**Describe the steps necessary for a computer to execute high compilation to machine language, interpretation, fetch-decode-execute** 3A-C-4-16
Data and Analysis	**3A-D-5-17.**	**Create computational models that simulate real-world systems (e.g., ecosystems, epidemics, spread of ideas).** 3A-D-5-17
	3A-D-4-18.	**Convert between binary, decimal, and hexadecimal representations of data (e.g., convert hexadecimal color codes to decimal percentages, ASCII/Unicode representation).** 3A-D-4-18
	3A-D-4-19.	**Analyze the representation tradeoffs among various forms of digital information (e.g., lossy versus lossless compression, encrypted vs. unencrypted, various image representations).** 3A-D-4-19
	3A-D-3-20.	**Discuss techniques used to store, process, and retrieve different amounts of information (e.g., files, databases, data warehouses).** 3A-D-3-20
	3A-D-3-21.	**Apply basic techniques for locating and collecting small- and large-scale data sets (e.g., creating and distributing user surveys, accessing real-world data sets).** 3A-D-3-21
Impacts of Computing	**3A-I-2-22.**	**Debate the social and economic implications associated with ethical and unethical computing practices (e.g., intellectual property rights, hacktivism, software piracy, diesel emissions testing scandal, new computers shipped with malware).** 3A-I-2-22
	3A-I-7-23.	**Compare and contrast information access and distribution rights.** 3A-I-7-23
	3A-I-7-24.	**Discuss implications of the collection and large-scale analysis of information about individuals (e.g., how businesses, social media, and government collect and use personal data).** 3A-I-7-24

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	3A-I-7-25.	**Describe how computation shares features with art and music by translating human intention into an artifact.** 3A-I-7-25
	3A-I-1-26.	**Compare and debate the positive and negative impacts of computing on behavior and culture (e.g., evolution from hitchhiking to ridesharing apps, online accommodation rental services).** 3A-I-1-26
	3A-I-1-27.	**Demonstrate how computing enables new forms of experience, expression, communication, and collaborating.** 3A-I-1-27
	3A-I-1-28.	**Explain the impact of the digital divide (i.e., uneven access to computing, computing education, and interfaces) on access to critical information.** 3A-I-1-28
	3A-I-6-29.	**Redesign user interfaces (e.g., webpages, mobile applications, animations) to be more inclusive, accessible, and minimizing the impact of the designer's inherent bias.** 3A-I-6-29
Networks and the Internet	**3A-N-7-30.**	**Describe key protocols and underlying processes of Internet-based services (e.g., http/https and SMTP/IMAP, routing protocols).** 3A-N-7-30
	3A-N-4-31.	**Illustrate the basic components of computer networks (e.g., draw logical and topological diagrams of networks including routers, switches, servers, and end user devices; create model with string and paper).** 3A-N-4-31
	3A-N-1-32.	**Compare and contrast multiple viewpoints on cybersecurity (e.g., from the perspective of security experts, privacy advocates, the government).** 3A-N-1-32
	3A-N-3-33.	**Explain the principles of information security (confidentiality, integrity, availability) and authentication techniques.** 3A-N-3-33
	3A-N-3-34.	**Use simple encryption and decryption algorithms to transmit/receive an encrypted message.** 3A-N-3-34
	3A-N-6-35.	**Identify digital and physical strategies to secure networks and discuss the tradeoffs between ease of access and need for security.** 3A-N-6-35