Alaska Computer Science

High School Level 2

Computing Systems

Hardware and Software

1 Identify the interactions of an operating system between software and hardware. L2.CS.HS.01

Network and the Internet

Network Communication and Organization

1 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology). L2.NI.NCO.01

Cybersecurity

1 Compare and refine ways in which software developers protect devices and information from unauthorized access. L2.NI.C.01

2 Learn detection and prevention methods to respond to attacks on sensitive data. Develop a response plan that enables recovery from such attacks. L2.NI.C.02

Data Analysis

Storage

1 Evaluate and explain the various types of databases, with their specific benefits and limitation. L2.DA.S.01

Collection, Visualization and Transformation

1 Use data analysis tools and techniques to identify patterns from complex real- world phenomena. L2.DA.CVT.01

2 Generate data sets that support a claim or communicates information using a variety of data collection tools and analysis techniques. L2.DA.CVT.02

Inference and Models

1 Use models and simulations to help formulate, refine, and test scientific hypotheses. L2.DA.IM.01

Algorithms and Programming

Algorithms

1 Describe how artificial intelligence drives many software and physical systems (e.g., autonomous robots, computer vision, pattern recognition, text analysis). L2.AP.A.01

2 Develop an artificial intelligence algorithm to play a game against a human opponent or solve a common problem. L2.AP.A.02

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Critically examine and adapt classic algorithms (e.g. selection sort, insertion sort, etc.). L2.AP.A.03

4 Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency, correctness, and clarity. L2.AP.A.04

Variables

1 Compare and contrast simple data structures and their uses (e.g., arrays, lists, stacks, queues, maps, trees, graphs, and databases). L2.AP.V.01

Control

1 Trace the execution of recursive algorithms, illustrating output and changes in values of named variables. L2.AP.C.01

Modularity

1 Construct solutions to problems using student-created components, such as functions, procedures, modules, and/or objects. L2.AP.M.01

2 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. L2.AP.M.02

3 Create programming solutions using code reuse and applied technique with appropriate attribution (e.g., libraries, APIs, collaboration software, and versioning software). L2.AP.M.03

Program Development

1 Compare multiple programming languages and discuss features that make them useful for solving problems and developing systems. L2.AP.PD.01

2 Using the software life cycle process, create software that will provide solutions for a variety of users. L2.AP.PD.02

3 Design software in a project team environment using Agile Development methods (e.g., versioning and collaboration systems). L2.AP.PD.03

4 Explain security issues that might lead to compromised computer programs. L2.AP.PD.04

5 Develop programs for multiple computing platforms. L2.AP.PD.05

6 Develop and use a series of test cases to verify that a program performs according to its design specifications. L2.AP.PD.06

7 Through peer review systematically check code for correctness, usability, readability, efficiency, portability, and scalability (e.g. code review). L2.AP.PD.07

8 Modify an existing program to add additional functionality and discuss intended and unintended implications with appropriate attribution. L2.AP.PD.08

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Community, Global and Ethical Impacts

Culture

1. Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society. L2.CGEI.C.01
2. Based on research, evaluate how computing has revolutionized an aspect of our culture and predict how it might evolve (e.g., education, healthcare, art/entertainment, and energy). L2.CGEI.C.02

Safety, Law and Ethics

1. Debate laws and regulations that impact the development and use of software. L2.CGEI.SLE.1
2. Identify the ethical and moral implications encountered in managing and curating knowledge (e.g., harvesting; information overload; knowledge management; reposting; sharing; summarizing). L2.CGEI.SLE.2
3. Explain how cutting-edge technology may affect the way business is conducted in the future (e.g., eCommerce, entrepreneurship, payment methods, business responsibilities). L2.CGEI.SLE.3