

Level 3B: High School - Specializing (Grades 11-12)

COMPUTING SYSTEMS 3B-CS

- 1 Categorize the roles of operating system software. 3B-CS-01
- 2 Illustrate ways computing systems implement logic, input, and output through hardware components. 3B-CS-02

NETWORKS AND THE INTERNET 3B-NI

- 3 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology). 3B-NI-03
- 4 Compare ways software developers protect devices and information from unauthorized access. 3B-NI-04

DATA AND ANALYSIS 3B- DA

- 5 Use data analysis tools and techniques to identify patterns in data representing complex systems. 3B-DA-05
- 6 Select data collection tools and techniques to generate data sets that support a claim or communicate information. 3B-DA-06
- 7 Evaluate the ability of models and simulations to test and support the refinement of hypotheses. 3B-DA-07

ALGORITHMS AND PROGRAMMING 3B-AP

- 8 Describe how artificial intelligence drives many software and physical systems. 3B-AP-08
- 9 Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem. 3B-AP-09
- 10 Use and adapt classic algorithms to solve computational problems. 3B-AP-10
- 11 Evaluate algorithms in terms of their efficiency, correctness, and clarity. 3B-AP-11
- 12 Compare and contrast fundamental data structures and their uses. 3B-AP-12
- 13 Illustrate the flow of execution of a recursive algorithm. 3B-AP-13
- 14 Construct solutions to problems using student-created components, such as procedures, modules and/or objects. 3B-AP-14

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- 15** Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution. **3B-AP-15**
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- 16** Demonstrate code reuse by creating programming solutions using libraries and APIs. **3B-AP-16**
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- 17** Plan and develop programs for broad audiences using a software life cycle process. **3B-AP-17**
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- 18** Explain security issues that might lead to compromised computer programs. **3B-AP-18**
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- 19** Develop programs for multiple computing platforms. **3B-AP-19**
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- 20** Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (code documentation) in a group software project. **3B-AP-20**
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- 21** Develop and use a series of test cases to verify that a program performs according to its design specifications. **3B-AP-21**
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- 22** Modify an existing program to add additional functionality and discuss intended and unintended implications (e.g., breaking other functionality). **3B-AP-22**
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- 23** Evaluate key qualities of a program through a process such as a code review. **3B-AP-23**
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- 24** Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems. **3B-AP-24**
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**IMPACTS OF
COMPUTING** **3B-IC**

- 25** Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society. **3B-IC-25**
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- 26** Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society. **3B-IC-26**
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- 27** Predict how computational innovations that have revolutionized aspects of our culture might evolve. **3B-IC-27**
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- 28** Debate laws and regulations that impact the development and use of software. **3B-IC-28**