

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT



AP Computer Science A

Board Approval Date: January 23, 2025	Course Length: 2 Semesters
Grading: A-F	Credits: 5 Credits per Semester
Proposed Grade Level(s): 11, 12	Subject Area: Elective Elective Area (if applicable): Career Tech Education
Prerequisite(s): Recommended: Exploring Computer Science	Corequisite(s): N/A
CTE Sector/Pathway: Information & Communications Tech / Systems Programming	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (c) Mathematics	
Graduation Requirement: No	
Course Intent: District Course Program (if applicable):	
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COURSE DESCRIPTION:

AP Computer Science is a course that introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language.

The CodeHS AP Computer Science A course is a year-long course designed to help students master the basics of Java and equip them to successfully pass the College Board AP Computer Science A Exam at the end of the school year.

Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises, adding up to over 100 hours of hands-on programming practice in total. Several units have free response questions that have students consider the applications of programming and incorporate examples from their own lives.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Primitive Data Types	How are variables declared and initialized in Java, and why does scope matter? How do arithmetic operations and casting affect primitive data? How do we choose the appropriate data type for storing different kinds of data?	● Online or paper-based worksheets and practice sets ● Quizzes ● Threaded discussions	● Exams (unit, semester and final) ● Essays, research papers, and other writing assignments ● Presentations
Unit 1 Essential Standards: 9-12.DA.8 Translate between different representations of data abstractions of real-world phenomena 9-12S.DA.7 Select and use data collection tools and techniques			
2. Using Objects	What is an object, and how does it relate to classes in Java? What are constructors, and how do they initialize object data? How does encapsulation benefit object-oriented programming? How do methods define the behaviors of objects,	● Online or paper-based worksheets and practice sets ● Quizzes ● Threaded discussions	● Exams (unit, semester and final) ● Essays, research papers, and other writing assignments ● Presentations

	and how are they called?		
Unit 2 Essential Standards: 9-12.AP.20 Iteratively evaluate and refine a computational artifact 9-12.DA.11 Refine computational models to better represent the relationships among different elements of data			
3. Boolean Expressions and if Statements	What role do conditional statements play in controlling the flow of a program? Why is understanding Boolean logic and DeMorgan's Law important for writing efficient, readable code? What are the ethical repercussions of data sets chosen for AI training?	• Online or paper-based worksheets and practice sets • Quizzes • Threaded discussions	• Exams (unit, semester and final) • Essays, research papers, and other writing assignments • Presentations
Unit 3 Essential Standards: 9-12.IC.23 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. 9-12.AP.12 Design algorithms to solve computational problems			
4. Iteration	How does iteration improve efficiency in solving repetitive tasks? What are the different types of loops, and when is each type most useful? How do you combine loops with conditional statements to control flow within a loop? Understanding initialization, condition checks, and updates for each type of loop. Search algorithms Sorting algorithms	• Online or paper-based worksheets and practice sets • Quizzes • Threaded discussions	• Exams (unit, semester and final) • Essays, research papers, and other writing assignments • Presentations
Unit 4 Essential Standards: 9-12.IC.29 Explain the privacy concerns related to the collection and generation of data 9-12.AP.16 Decompose problems into smaller subproblems 9-12.AP.12 Design algorithms to solve computational problems			
5. Class Design	How do classes contribute to code reusability, readability, and maintainability?	• Online or paper-based worksheets and practice sets	• Exams (unit, semester and final)

	What attributes and methods should be included in a class? How do we determine what behaviors belong in each class? What is encapsulation, and why is it important in class design?	• Quizzes • Threaded discussions	• Essays, research papers, and other writing assignments • Presentations
Unit 5 Essential Standards: 9-12.CS.1 Describe ways in which abstractions hide the underlying implementation 9-12S.AP.17 Construct solutions to problems using student-created components			
6. Array	How do arrays help us store and manipulate data efficiently? What are common algorithms and patterns for working with arrays (such as traversal, searching, and sorting)? Bounds Checking.	• Online or paper-based worksheets and practice sets • Quizzes • Threaded discussions	• Exams (unit, semester and final) • Essays, research papers, and other writing assignments • Presentations
Unit 6 Essential Standards: 9-12S.AP.12 Implement searching and sorting algorithms to solve computational problems. 9-12.AP.16 Decompose problems into smaller subproblems			
7. ArrayList	What is an ArrayList, and how does it differ from an array in Java? Why use an ArrayList instead of an array, and what are the advantages of an ArrayList? How does an enhanced for loop work with ArrayLists?	• Online or paper-based worksheets and practice sets • Quizzes • Threaded discussions	• Exams (unit, semester and final) • Essays, research papers, and other writing assignments • Presentations
Unit 7 Essential Standards: 9-12.DA.9 Describe tradeoffs associated with how data elements are organized and stored. 9-12.AP.13 Create more generalized computational solutions using collections			
8. 2D Array	How do we access elements at specific positions using two indices? How do you traverse through rows and	• Online or paper-based worksheets and practice sets • Quizzes • Threaded discussions	• Exams (unit, semester and final) • Essays, research papers, and other

	columns using nested loops?		writing assignments ● Presentations
Unit 8 Essential Standards: 9-12.DA.10 Create data visualizations to help others better understand real-world phenomena. 9-12S.AP.14 Compare and contrast fundamental data structures and their uses.			
9. Inheritance	How does inheritance promote code reuse and organization? How can a subclass override or extend the functionality of a superclass? What is the role of the super keyword?	● Online or paper-based worksheets and practice sets ● Quizzes ● Threaded discussions	● Exams (unit, semester and final) ● Essays, research papers, and other writing assignments ● Presentations
Unit 9 Essential Standards: 9-12S.AP.18 Demonstrate code reuse by creating programming solutions using libraries and APIs.			
10. Recursion	Base case: The condition under which the recursion ends. Recursive case: The condition under which the function calls itself. Trace of Recursion: Being able to manually trace recursive calls and understand the order of execution. What are the advantages and disadvantages of recursion?	● Online or paper-based worksheets and practice sets ● Quizzes ● Threaded discussions	● Exams (unit, semester and final) ● Essays, research papers, and other writing assignments ● Presentations
Unit 10 Essential Standards: 9-12S.AP.15 Demonstrate the flow of execution of a recursive algorithm.			

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):

Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.

<https://www.cde.ca.gov/be/st/ss/documents/finaelacssstandards.pdf>

Link to Framework (if applicable):

Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

<https://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp>

Link to Subject Area Content Standards (if applicable):

Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.

<https://www.cde.ca.gov/ci/ct/sf/documents/ctescrpflyer.pdf>

Link to Program Content Area Standards (if applicable):

Program Content Area Standards apply to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

<https://www.cde.ca.gov/ci/ct/sf/documents/infocomtech.pdf>

TEXTBOOKS AND RESOURCE MATERIALS:

Textbooks

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
Yes		<i>AP Computer Science A</i>	<i>K12/Stride</i>	K12 Stride		2023