



CodeHS

AP Java (Mocha) K-12 CS Framework Alignment Overview

The AP CS A (Java) course is an introductory college-level computer science course introducing the basics of programming with Karel the Dog and Java, object-oriented programming, data structures, and algorithms and recursion. Important Note: The AP CS A (Java) course is aligned to the College Board Framework, but also supports the vision of the K-12 CS Framework's concepts and practices.

K-12 CS Framework Practices

Fostering an Inclusive Computing Culture

Through collaborative projects, students learn to include a diverse set of perspectives in the development process and functionality of their computational artifacts.

Collaborating Around Computing

This course provides several opportunities for students to create computational artifacts both individually and in teams. Several small group and full class activities are included in the curriculum. CodeHS provides guidance for implementing pair programming in the classroom.

Recognizing and Defining Computational Problems

As the problems in the course get more and more complex, the course teaches students to break down large, complex problems into manageable subproblems that can be solved independently. The course continually emphasizes decomposition and top down design.

Developing and Using Abstractions

The AP CS A (Java) course teaches students to develop abstractions to manage the complexity of their programs. Students develop and use their own abstractions to generalize their solutions and simplify the development process. Students learn about both procedural abstraction and data abstraction in this course. Students develop their own abstractions through the development of classes and related instances and methods.

Creating Computational Artifacts

This course has a huge emphasis on creating computational artifacts. In each lesson of the course, students develop their own computational artifacts both for creative expression as well as to solve computational problems. Students create programs, digital images, websites, and digital presentations in the AP CS A (Java) course.

Testing and Refining Computational Artifacts

Testing and refining computational artifacts is an important part of the development process that is emphasized in the AP CS A (Java) course. The course teaches students to test their solutions, identify and fix errors, use debugging tools, and consider all edge cases when developing and testing their programs.

Communicating About Computing

This course gives students several opportunities to communicate their ideas and solutions to others. Students are encouraged to describe and justify their solutions to their teachers and their peers. Students are also required to document their code to communicate how it works. There are multiple research projects in this course that require students to research a computing topic of their choice and communicate their research through multiple forms of media.

K-12 CS Framework Concepts

Computing Systems

Computing Systems is a core concept throughout the AP CS A (Java) course. Students learn about various computing devices and how humans interact with them, including devices that extend the capabilities of humans. Students learn about computer organization including the relationship between hardware and software. Troubleshooting computing systems is a core concept of the AP CS A (Java) course as well. Computing systems might not work as expected because of problems in the software. Students are expected to identify problems in their programs and fix them.

Networks and the Internet

In AP CS A (Java) students learn that the combination of hardware, software, and their programming practices control access to data and systems within the networks they work in.

Data and Analysis

The AP CS A (Java) course teaches students how data is stored in a computer as an abstract representation. Students learn about classes where data in variables can be encapsulated and data structures, in general.

Algorithms and Programming

Algorithms and programming are central to the AP CS A (Java) course. Students learn the core principles of developing their own algorithms and implementing them in the Java programming language. Algorithms, variables, control, modularity, classes, object-oriented programming, recursion, and program development are all taught in this course.

Impacts of Computing

Computing has had significant impacts in several fields. In this course, students learn about the positive and negative impacts computer ethics. Students also learn the ethical considerations of sharing their code with others, and finding solutions to CodeHS exercises online.