



Online Courses for High School Students
1-888-972-6237

Course Name	Adv Pl Computer Science A
Subject	Computer Science
Estimated Completion Time	2 semesters / 36 weeks
Course Description	<p>Students will play the role of a "Survivor" while they work their way through the course material. AP Computer Science A is a college level computer course covering the applications of computing within the context of programming methodology, algorithms, and data structures. This is a one year course and students will be able to take The College Board Computer Science A examination in May. The computer language that will be used is Java, which is a free download for either a Macintosh or a Windows platform.</p>
Scope & Sequence	<p>Week 1 - Survivor Island Download and setup your environment. Run your first Java program.</p> <p>Week 2 - Introduction to Object Orientated Programming Classes and Objects, Messages and Methods, Objects in software, and compiling and running a program.</p> <p>Week 3 - Objects and Classes The first Java application, program components, Object declaration, creation, and message sending, Class diagrams, and the difference between Objects and Classes.</p> <p>Week 4 - Data Types in Java Identifiers in Java, basic data types in Java , declaring and initializing variables in Java, printing variables using the System.out object , ASCII code values and character data, assignment statements and math operators.</p> <p>Week 5 - Simple I/O Reading input with the ConsoleIO Class, multiple line stream</p>

output expressions, formatting output, String Objects, and String input.

Week 6 - Math Functions and Constants

Standard math functions, precedence of math operators, assignment operators, increment operators, and named constants.

Week 7 - Defining and Using Classes

Designing a Class, determining Object Behavior, Instance variables, implementing Methods, Constructors, and using Classes.

Week 8 - More about Methods

Writing Methods in Java, parameters and returning values, the signature of a Method, lifetime, initialization, and scope of variables.

Week 9 - If Else Control Structures

Structured programming, control structures, relational operators, logical operators, precedence and associative order of operators, if-else statements, compound statements, nested if-else statements, and boolean identifiers.

Week 10 - WHILE Loops

While loop, loop boundaries, and conditional loop strategies.

Week 11 - FOR DO WHILE & NESTED Loops

The for loop, nested loops, do-while loop, and choosing loop control structures.

Week 12 - Switch Statements

Multi-way selection tool, switch.

Week 13 - Object References

Reference variables. These variables refer to objects (as opposed to holding a primitive data value.)

Week 14 - String Class

String class is technically not an actual part of the Java language. A standard String class is provided with Java by Sun Microsystems, Inc.

Week 15 - Inheritance

A major component of object-oriented-programming. Single Inheritance, Class Hierarchies, Using Inheritance, Method overriding, and Interfaces.

Week 16 - Recursion

Recursion and the pitfalls of recursion.

Week 17 - Text File I/O

Standard ASCII text files, saving text files to disk using FileOutputStream, reading text files from disk using FileInputStream, streams and filters.

Week 18 - Review and Semester Exam

Week 19 - Exceptions

Exceptions, handling exceptions, exception messages, and throwing exceptions.

Week 20 - Boolean Algebra - Loop Boundaries Negations of Boolean Assertions, Boolean Algebra and DeMorgan's Laws.

Week 21 - Single Dimension Arrays

Data structures and algorithms, array declarations, applications of arrays, arrays as parameters, and arrays algorithms.

Week 22 - ArrayList

Array implementation of a list, the ArrayList Class, Object casts, and the Wrapper Classes.

Week 23 - Quadratic Sorting Algorithms

Bubble sort, selection sort and insertion sort.

Week 24 - Merge and Mergesort

Non-recursive mergesort, and recursive mergesort.

Week 25 - Array of Objects

Object-Array elements, comparing Objects, and using an Array of Objects.

Week 26 - Searches: Sequential and Binary

Sequential search, binary search, and recursive vs. non-recursive algorithms.

Week 27 - 35 Review for AP exam

Week 36 - Final Exam

Course
Objectives

- Design and implement solutions to problems in a variety of application areas in Java.

- Use the standard Java library classes from the AP Java subset. Marine Biology Case Study in Java.
- Identify major hardware and software components of a computer system.
- Consider ethical and social implications of computer use.

Grading Policy Grades will be based upon the quality of the student submissions, participation in discussions, and the ability to maintain consistent communication with the instructor. The grading scale that is used for this course is as follows:

- A 90-100
- B 80-89
- C 70-79
- D 60-69
- F 59 or below

All forms of academic dishonesty are prohibited. This includes, but is not limited to, plagiarism, cheating, furnishing false information, forgery, alteration or misuse of documents or software, and misconduct during a testing situation. Any student cheating on an exam will receive a zero on the exam and may be withdrawn from the class at the instructor's discretion.

Communication/
Participation
Requirements Only through continuous communication can students be successful in an online course. Within each course the instructor outlines the weekly minimum work requirements. It is essential that the student and instructor maintain regular contact. Failure to complete assignments on a consistent basis will result in students being removed from the course.

Required
Materials Online subscription included.