Unit 03: Boolean Expressions & if Statements

Content Area: **Computer Science**
Course(s):
Time Period: **Marking Period 1**
Length: **3-4 Weeks**
Status: **Published**

Summary

Algorithms are composed of three building blocks: sequencing, selection, and iteration. This unit focuses on selection, which is represented in a program by using conditional statements. Conditional statements give the program the ability to decide and respond appropriately and are a critical aspect of any nontrivial computer program. In addition to learning the syntax and proper use of conditional statements, students will build on the introduction of Boolean variables by writing Boolean expressions with relational and logical operators.

Revision Date: July 2021

LA.W.11-12.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
CS.9-12.8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
CS.9-12.8.1.12.AP.2	Create generalized computational solutions using collections instead of repeatedly using simple variables.
CS.9-12.8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
CS.9-12.8.1.12.CS.2	Model interactions between application software, system software, and hardware.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).
TECH.8.2.12.E.CS1	Computational thinking and computer programming as tools used in design and engineering.
TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Essential Questions & Essential Understanding

- How are compound Boolean expressions formed in Java?
- How do computer programs "think"?
- How many paths can a decision have?
- What is the difference between comparing primitives and objects?

- Why is selection a necessary part of programming languages?

Objectives

Students Will Know

- how to plan and build a decision into a program to solve a problem based on input.
- how to compare primitives and objects.

Students Will Be Skilled At

- recognizing multiple correct methods for comparing the same items.
- testing their programs with enough data to ensure it functions exactly as intended no matter the input.

Learning Plan

Lecture and demonstration on decisions and control structures using primitives.

Pair programming exercises to determine results given input.

Lecture and demonstration on comparing objects. Discussion on String class.

Pair programming lab assignments on writing programs to test decision making with primitives and objects.

CollegeBoard Lab - MagPie

Assessment

Assessments

- Formative: Daily assessments using examples from class notes and CodeHS.com, AP Classroom/Albert Checks for Understanding
- Summative: Teacher-created assessments/projects and CodeHS Computer Science Projects, AP Classroom/Albert Unit Assessments
- Benchmark: Check for understanding benchmark assessments on CodeHS, AP Classroom/Albert/Khan Academy Diagnostics
- Alternative Assessments: Student-centered activities such as a doorbell coding project, game design projects, and other activities involving real world applications

complete performance tasks:

- Students will be able to design programs using appropriate code.
- Students will be able to write programs using appropriate code.

complete quizzes/tests:

- if/else statements
- if/else if/else statements
- Switch
- Compound Boolean Expressions
- Comparing Objects

complete sample AP multiple choice questions.

Materials

District Approved Textbook
Java Concepts for AP Computer Science Study Guide
CollegeBoard AP Classroom Website
CollegeBoard AP Computer Science A Website

Suggested Strategies for Modifications

Possible accommodations/modification for AP Computer Science A