

Lesson 8: Boolean Expressions and “if” statements



Adapted from code.org curriculum

Objectives: You will be able too...



- ✧ Write and test conditional expressions using comparison operations
- ✧ Given an English description write code (if statements) to create desired program logic
- ✧ Use the comparison operators ($<$, $>$, $<=$, $>=$, $==$, $!=$) to implement decision logic in a program.
- ✧ When given starting code add if, if-else, or nested if statements to express desired program logic

When vs. If



- ❧ In everyday conversation, it is common to interchange the words “when” and “if,” as in “If the user presses the button, execute this function.”
- ❧ The English language is tricky. We often say “if” the button is clicked when really we mean “when” a button is clicked.
- ❧ This can cause confusion because “if” has a well-defined meaning in programming.

When vs. If



- ❧ How are conditionals (if statements) different from events? Here is one way to think about it:
 - ❧ Events are setup by a programmer, but triggered by the computer at any moment in time.
 - ❧ If statements are a way a programmer can have her code make a decision during the normal flow of execution to do one thing or another.
- ❧ As we have already seen in prior lessons, an if statement is evaluated when the code reaches a particular line and uses a true/false condition (like a comparison between values e.g., `score == 5`), to decide whether to execute a block of code.

Flow Charts



∞ Flow Charts – Activity Guide

App Lab: Boolean Expressions and if-statements



Stage 8 in Code Studio

Wrap-up:



- ☞ “You’ve now had experience reasoning about if-statements on paper with the “Will it Crash?” activity, and now actually writing if-statements in working code. Compare and Contrast these experiences.
- ☞ For “Will it Crash” - what was easy? what was hard?
- ☞ For this lesson, writing if-statements - what was easy, what was hard?
- ☞ If there was one thing you wish you understood better at this point, what would it be?

Nested If Statements



☞ “The last problem (“it’s the weekend”) was tricky. What made it hard? How did you end up solving it?”

Nested If Statements



- ❧ “The last problem (“it’s the weekend”) was tricky. What made it hard? How did you end up solving it?”
- ❧ What made it hard was that you needed to check more than one condition at the same time. You needed to say “it’s Saturday OR Sunday”. That’s more than one condition to check.
- ❧ So a solution (using only what we know so far...) is to nest if-statements.
- ❧ Nesting if statements is one way to check more than one condition at a time.

Vocabulary:



- ❧ **Boolean** - A single value of either TRUE or FALSE
- ❧ **Boolean Expression** - in programming, an expression that evaluates to True or False.
- ❧ **Conditionals** - Statements that only run under certain conditions.
- ❧ **If-Statement** - The common programming structure that implements "conditional statements".
- ❧ **Selection** - A generic term for a type of programming statement (usually an if-statement) that uses a Boolean condition to determine, or select, whether or not to run a certain block of statements.