Coding: Conditionals

“If, Else If and Else”

Learn more about this topic! Each section gives more detail on one of the lyrics from the song. Read each section, and then respond by answering the question or taking notes on key ideas.

1. Code for the Flocabulary website in Python

A program is a series of steps to complete a task that a computer can understand. Computers don’t understand languages like English, Chinese or Spanish. Instead, there are many coding languages, or programming languages, that computers are able to use to carry out tasks. These languages include Python, JavaScript, Java, PHP and Ruby. Coding is the action of writing instructions for a computer in one of these languages that it can understand.

Each coding language has a different syntax. A syntax is a set of rules for how the language is written, or how the words and symbols are laid out. Though coding languages have different syntaxes, we use the same basic concepts to write in all of them. The actual code will look a little different depending on the language you’re using. But languages all carry out instructions in similar ways.

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Control flow statements in code give the program flexibility.

Unless it is given instructions to do otherwise, a program will carry out your code line by line from the top of the screen to the bottom. But often, we don’t want the program to do that. Instead, we might want it to carry out different actions depending on what else is happening in the program. Maybe we want it to carry out a certain line of code again. Or, maybe we want it to carry out two different lines of code in different situations.

Control flow statements are pieces of code that direct the program to run in different ways depending on what else is happening. They determine which code is being carried out at a given time and give the program the flexibility to go down more than one path. Conditional statements are a type of control flow statement.

Conditionals carry out different actions depending on whether a condition turns out to be true or false.

Conditional statements are pieces of code that only run “under certain conditions.” Another way of saying this is “when something is true.” A condition is something that has to be true in order for an action to be carried out. A condition will evaluate to, or turn out to be, true or false. Conditional statements allow the program to carry out different actions depending on how the condition evaluates. For example, some websites require you to pay a fee to play their games. The condition is the fact that you’ve paid the fee. When you go to the website, it will let you play the games if the condition evaluates to be true—meaning that you’ve paid. But if the conditional evaluates to be false—meaning that you haven’t paid—the website won’t let you play any games.
Can you spot the **if statement** on line 114 of the code?

We can write conditionals using **if statements**. If statements are written with the word “if,” followed by the condition that the program is going to check, followed by the action that the program will take if the condition is true. Here’s the structure:

```
if condition, action
```

This means “if the condition is true, do this action.” In the example where a website only lets you play games if you’ve paid, the if statement (in English) would be “If the person has paid, let him/her play the games.” (It will look different in actual code.)

Notice the **else** on line 424 of the code.

Often, we want the code to take another specific action when the if condition is false. To do this, we use the **else**. The else will come below the if statement. It includes the word “else,” followed by the action we want the program to take:

```
else, different action
```

This translates to “or else, do this other action.” Else is a catch-all for every other situation besides the one where the if condition is true. Else says, “If the if condition isn’t true, no matter what else is true, do this other action.” Some conditionals only have an if statement and do not include an else. This means that the programmer doesn’t want the program to take any specific action when the if condition turns out to be false.
6. Pseudocode for an **if** statement in Wizards of Cheese.

Pseudocode is language that is more precise than English but less precise than a coding language that a computer can understand.

Pseudocode is somewhere between English and a coding language. Programmers use it to figure out the logic and flow of their programs without having to worry about the exact syntax of a specific language. Computers cannot carry out pseudocode. Once the flow of the program is determined, the pseudocode must be translated in a coding language.

On line 67, the variable “page_title” is set equal to ‘Songs & Videos.’ This is code for the page flocabulary.com/subjects/, where the title at the top of the page is “Songs & Videos”!

In the game we show, how does the program tell what level the player is on? The player’s level is stored in a variable, which is a placeholder for a piece of information that can change. It’s like a bucket for holding information. You may recognize variables from expressions and equations in math class. In programming, variables can be written as letters, like “x” or “y,” or with longer words, like “player_level.”

In our game, the program will check if the value of the variable that’s storing the player’s level is equal to 1. If it is, the condition “player’s level equals 1” will evaluate to true: “1 equals 1” is a true statement. So, the game will summon a porcupine. But if the player is on a level other than 1 — like level 3 — the expression will evaluate to false: “3 equals 1” is a false statement.
The conditional on lines 80-89 contains three “else if” statements.

If the if condition evaluates to be false, a program does not always have to move on and do the action for else right away. It can first check to see if another condition is true and carry out another action if it is. This condition is called the else if condition. The else if condition is helpful when we want a conditional to be able to carry out more than just two specific actions. You can also have more than one else if statement in your conditional. A program can check as many else if conditions and carry out as many specific actions as you want before moving on to the else.

In Python, the `!=` symbol means “not equal to.” So, the condition on line 300 is “tab is not equal to ‘beats.’”

A condition can be any expression that can evaluate to true or false. The condition can be that “the value of a variable is equal to another value or variable.” For example, “the player's level equals 1.” Or, the condition can be that the value is not equal to, less than, less than or equal to, greater than, or greater than or equal to another variable or value. For example, “temperature is greater than 75 degrees.” The condition can also be something like “it’s a certain day or time, like “today is Friday.”

Wizards of Cheese conditional statement written in Python

Python is a coding language that is often used to create websites and mobile apps. It's considered a good language for beginning programmers because it's easier to read than some other coding languages and looks more like English than some other coding languages do. Remember how each language has its own syntax? In Python, the word “elif” is used for the else if condition. In a different language called JavaScript, this same condition is written as “elseif” instead.