



Lesson 4.2: If Statements

<https://codehs.com/course/20394/lesson/4.2>

Description	In this lesson, students will review how to use If and if/else statements. These statements allow programmers to use conditions to determine how their code should run.
Objective	Students will be able to: <ul style="list-style-type: none"> • Use if statements for control flow in their programs
Activities	4.2.1 Video: If Statements 4.2.2 Check for Understanding: If Statements 4.2.3 Example: Your First If Statement 4.2.4 Example: If/Else Statement 4.2.5 Debugging: Fix This Program 4.2.6 Exercise: Is It Raining? 4.2.7 Badge: Conditional Badge
Prior Knowledge	<ul style="list-style-type: none"> • Sequentially- in order • Control flow- the order in which instructions are executed
Planning Notes	<ul style="list-style-type: none"> • This lesson may be paired with the previous one if time allows. • Students have seen this content in the Tracy module, so it will be helpful to make constant references to that material. Students are slowly being reintroduced to this concept but it will benefit them to remember the complex programs they were able to create when implementing this control structure.
Standards Addressed	
Teaching and Learning Strategies	<p>Lesson Opener:</p> <ul style="list-style-type: none"> • Have students brainstorm and write down answers to the discussion questions listed below. Students can work individually or in groups/pairs. Have them share their responses. [5 mins] <p>Activities:</p> <ul style="list-style-type: none"> • Review Tracy if and if/else statements with the class. Pull up sample code from earlier, such as the Rating exercise. Have students discuss in small groups how if and if/else statements in Tracy worked, and what they were used for. <ul style="list-style-type: none"> ◦ Inform students that if statements are actually part of every programming language, and we can use them in Python as well! • Watch video as a class or individually and have students complete the quiz. [5-7 mins] • Students explore the <i>Your First If Statement</i> example. [3 mins] <ul style="list-style-type: none"> ◦ <i>Optional Extension:</i> What happens when <code>has_dog</code> is set to <code>False</code>? • Students explore the <i>If/Else Statement</i> example. [3 mins] <ul style="list-style-type: none"> ◦ <i>Optional Extension:</i> What happens when <code>has_dog</code> is set to <code>False</code>? • Students complete the <i>Fix This Program</i> exercise individually. [3-5 mins] • Students complete the <i>Is It Raining?</i> exercise individually. [5-7 mins]

	<p>Lesson Closer:</p> <ul style="list-style-type: none"> • Have students reflect and discuss their responses to the end of class discussion questions. [5 mins]
<p>Discussion Questions</p>	<p>Beginning of Class:</p> <ul style="list-style-type: none"> • What is something you only do if you are wearing a helmet? What is something you only do if you are outdoors? Create propositional statements: “If __, then __” <ul style="list-style-type: none"> ◦ <i>If I am wearing a helmet, then I can ride a bike, ride a skateboard. If I am outdoors outdoors, then I can play frisbee, go in the ocean.</i> • Write out these statements in code using boolean variables. <pre>if(wearing_helmet): bike() if(outside): play_frisbee()</pre> <ul style="list-style-type: none"> • Why are if statements useful? <ul style="list-style-type: none"> ◦ <i>They allow us to direct a program to make a decision.</i> • What is a program, app, or website you use that only does something if you input a certain value, or perform a certain action? Write out an example of the if statement that makes this happen. <ul style="list-style-type: none"> ◦ <i>Many programs use if statements. For example, ‘if user clicks button, perform action.’ This can be seen with almost any app or program students use.</i> <pre>if(button_click): perform_action</pre> <p>End of Class:</p> <ul style="list-style-type: none"> • What is an if/else statement? <ul style="list-style-type: none"> ◦ <i>A programming construct that allows programs to behave differently, depending on what the user does.</i> • Why is it important to think about sequence when programming? <ul style="list-style-type: none"> ◦ <i>We need to know exactly what actions are being performed and in what sequence in order to predict the outcome of our programs.</i> • Why must an if condition evaluate to a boolean? <ul style="list-style-type: none"> ◦ <i>The commands indented inside an if statement are only performed if the condition of the if statement evaluates to true. Otherwise, those commands are skipped.</i> • Describe how you would write code that only executes if the user inputs a number greater than 10. <ul style="list-style-type: none"> ◦ <i>Use the condition <code>number > 10</code>.</i>
<p>Resources/Handouts</p>	<p>If Statements Examples Exploration (teacher)</p> <p>If Statements Examples Exploration (student)</p>

Vocabulary

Term	Definition	
<p>Modification: Advanced</p>	<p>Modification: Special Education</p>	<p>Modification: English Language Learners</p>
	<ul style="list-style-type: none"> • Pair programming with another student • Print out video slides for students to reference 	<ul style="list-style-type: none"> • Print out video slides and have students use dictionary to translate unknown vocabulary

- Pair programming with another student