



Hour of Code: Teacher Guide

Before the Hour of Code:

- Make sure student computers have an up-to-date browser (Chrome, Safari, or Firefox).
- Read through teacher notes in this document. Download notes to have exercise solutions ready.

During the Hour of Code:

1. Direct students to codehs.com/hoc_turtle
2. Allow students to work through Hour of Code at their own pace, providing encouragement and support when needed. See tips below for handling student questions.
3. Tweet pictures or stories at @CodeHS #ReadWriteCode #HourOfCode!
4. If time allows at the end of the period, facilitate a discussion around the Hour of Code using the following guiding questions:
 - Before today, what did you think about programming or coding?
 - Did any of these ideas change during the Hour of Code?
 - What was your favorite part of the Hour of Code?
 - Did any parts of the Hour of Code challenge you? How?

Hour of Code Tips:

If students get stuck or have questions, it is okay if you don't have the answer! Ask questions to activate their problem-solving skills such as:

- What can we try differently?
- What do you want the program to do? What are you telling the program to do?
- How can we break this problem into smaller steps?

Thank you for your dedication to Computer Science Education!

**Interested in going beyond the Hour of Code?
Reach out to us at hello@codehs.com.**

Programming with Tracy Teacher Notes

In this Hour of Code, students will begin to recognize programs as sequences and groups of commands. Students will write simple programs to create drawings, implementing basic commands and loops.

Objective

Students will be able to ...

- Write commands to instruct Tracy to create images
- Use loops to manage program complexity

Link to Activity: codehs.com/hoc_turtle

Discussion Questions

- What is programming?
- How are instructions used to execute simple tasks?

Exercise Solutions

Square	
Description	Write a program that makes Tracy draw a square with sides of length 50. Tracy should end up back in the starting location, facing to the right.
Motivation	This exercise allows students to familiarize themselves with basic Turtle Graphics functions. It also introduces the concept of associating turns with a 90 degree rotation.
Solution	<pre>forward(50) left(90) forward(50) left(90) forward(50) left(90) forward(50) left(90)</pre>

Programming with Tracy Teacher Notes

Common Questions	<p>Misspelled commands or missing parenthesis</p> <p>In order for the program to run, every command must be spelled correctly and must be all lowercase. Each forward and left command must have a parameter surrounded by parenthesis</p> <p>Using right instead of left</p> <p>While using right will make a square, the square will not be in the correct location. Notice that the turtle ends on top of the square rather than at the bottom of the square.</p> <p>Turning the wrong number of degrees</p> <p>In order to make the right angles of a square, the turtle must rotate 90 degrees. Rotating more or less degrees will not create a square.</p>
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Staircase	
Description	<p>Write a program that draws a staircase. The staircase should have two stairs, and each stair should have a height and a depth of 30.</p>
Motivation	<p>This exercise challenges students to develop a more sophisticated algorithm. Students must think from the perspective of the turtle to decide whether to turn left or right as Tracy “climbs” the stairs.</p>
Solution	<pre> left(90) forward(30) right(90) forward(30) left(90) forward(30) right(90) forward(30) left(90) </pre>
Common	Misspelled commands or missing parenthesis

Programming with Tracy Teacher Notes

Questions	<p>In order for the program to run, every command must be spelled correctly and must be all lowercase. Each forward and left command must have a parameter surrounded by parenthesis.</p> <p>The stairs are going the wrong direction</p> <p>If the stairs end up going in the wrong direction, then challenge the student to think about the first thing that Tracy must do – turn left! In this case, Tracy has gone forward before turning.</p> <p>The stairs are lopsided</p> <p>If one part of the stairs looks too long, then Tracy has moved forward too far. Beware of copy/paste errors. It is also critical that students learn to read their code carefully and analyze the output to make sure that the result is what they expect. Every forward command should look like forward(30).</p> <p>Rotating the wrong number of degrees</p> <p>In order to turn correctly, Tracy has to make a right angle turn, meaning Tracy must rotate by 90 degrees. Rotating by a different number of degrees may result in the stairs not having right angles.</p>
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Alternating Colors	
Description	Draw a square whose edges alternate between red and black. The edges should be of length 50. Make sure Tracy is facing east at the end!
Motivation	This exercise allows students to practice changing colors. Students will have to decide when Tracy needs to change colors.
Solution	<pre> color("red") forward(50) left(90) color("black") </pre>

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	<pre>forward(50) left(90) color("red") forward(50) left(90) color("black") forward(50) left(90)</pre>
Common Questions	<p>Misspelled commands or missing parenthesis</p> <p>In order for the program to run, every command must be spelled correctly and must be all lowercase. Each forward and left command must have a parameter surrounded by parenthesis</p> <p>Forgetting to put colors in quotes</p> <p>The value given to the color function must be surrounded in quotes. color(red) will not work! (The technical reason is color expects a string variable, which are created by using quotation marks.)</p> <p>Tracy is still facing down (or south) at the end</p> <p>In order to get Tracy to face to the east, students must remember to have the very last left(90) command. This should be fairly simple for the student to fix.</p>

Rainbow	
Description	<p>Write a program that has Tracy draw a line that looks like a rainbow. The colors Tracy should use are: red, orange, yellow, green, blue, indigo, violet. Every color should be used, in that order. Each segment in the rainbow should be of length 20.</p>

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Motivation	This exercise allows students to practice developing an algorithm to solve a problem.
Solution	<pre>color("red") forward(20) color("orange") forward(20) color("yellow") forward(20) color("green") forward(20) color("blue") forward(20) color("indigo") forward(20) color("violet") forward(20)</pre>
Common Questions	<p>Misspelled commands or missing parenthesis In order for the program to run, every command must be spelled correctly and must be all lowercase. Each forward and left command must have a parameter surrounded by parenthesis</p> <p>Forgetting to put colors in quotes The value given to the color function must be surrounded in quotes. color(red) will not work! (The technical reason is color expects a string variable, which are created by using quotation marks.)</p> <p>The line is too long or too short If the line is not the right length, then one or more of the forward commands must have</p>



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	<p>the wrong number in it. Students might have a copy/paste error from copying over commands from previous assignments. They may have missed the instructions stating that each segment should be 20 spaces long. Either way, each forward command should look like forward(20)</p>
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Get Creative	
Description	<p>You've now learned some basic Python concepts with Tracy the turtle. This exercise is a chance for you to use your knowledge and your creativity to have Tracy do something cool!</p>
Motivation	<p>Students apply what they have learned in making a creative program.</p>
Solution	<p>Answers Vary</p>
Common Questions	<p>Misspelled commands or missing parenthesis In order for the program to run, every command must be spelled correctly and must be all lowercase. Each forward and left command must have a parameter surrounded by parenthesis</p> <p>Forgetting to put colors in quotes The value given to the color function must be surrounded in quotes. color(red) will not work! (The technical reason is color expects a string variable, which are created by using quotation marks.)</p> <p>The line is too long or too short If the line is not the right length, then one or more of the forward commands must have the wrong number in it. Students might have a copy/paste error from copying over commands from previous assignments. They may have missed the instructions stating that each segment should be 20 spaces long. Either way, each forward command should look like forward(20)</p>