Course: Intro to Python with Tracy | Module: Moving Tracy Efficiently

Lesson 2.1: Turning Tracy

https://codehs.com/course/4085/lesson/2.1

Description	In this lesson, students will learn how to use the left and right commands in order to move Tracy to more locations on the canvas. They will now have many commands that can be used to have Tracy create more complex graphics.
Objective	Students will be able to: • Use the left and right commands in order to move Tracy around her grid world
Activities	2.1.1 Video: Turning Tracy 2.1.2 Check for Understanding: Turning Tracy 2.1.3 Example: Square 2.1.4 Example: X and Y Axes 2.1.5 Exercise: Rectangle 2.1.6 Exercise: 4 Columns
Prior Knowledge	• North, South, East, West- up corresponds to north, down corresponds to south, right corresponds to east, and left corresponds to west • Right vs. Left • Coordinate system in Tracy's world (400x400 grid where (0,0) is at the center) • Tracy circle command (`circle(radius)`) • Tracy forward and backward commands (`forward(distance)` and `backward(distance)`) • Tracy penup and pendown commands (`penup()` and `pendown()`)
Planning Notes	• There is a handout that accompanies this lesson. It can be used as an in class activity or a homework assignment. Determine if and how this handout will be used and make the appropriate number of printouts prior to the class period. • If students are struggling (or they are expected to struggle) with right and left, go through some sample problems where a volunteer stands at the front of the room and is given multiple turning commands, have students predict which direction the student will be facing at the end of the commands.

	• Encourage students to break down problems into smaller steps.
Standards Addressed	

Teaching and Learning Strategies	**Lesson Opener:**
	• 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]
	Activities:
	• Watch video as a class or individually and have students complete the quiz. [5-7 mins]
	• Walk through the examples from this lesson as a class or have students examine the examples in pairs. [5-10 mins]
	  ◦ Direct pairs to tell their partner in their own words how the program works.
	• Students complete the *Rectangle* exercise individually or in pairs. [5-7 mins]
	  ◦ If students will be pair programming, you may want to make use of the *Pair Programming Guide* handout that accompanies this lesson.
	• Students complete the *4 Columns* exercise individually or in pairs. [7-15 mins]
	• Students complete the *Drawing Letters* handout activity in pairs. The activity can be finished for homework if not enough time is available. [7-15 mins]
	Lesson Closer:
	• Have students reflect and discuss their responses to the end of class discussion questions. [5 mins]

Discussion Questions	**Beginning of Class:**
	• Using only the commands we have learned up to this point, decide if it is possible to get Tracy to the following coordinate points:
	  ◦ (100, 0)
	  ▪ *Yes*
	  ◦ (0, 100)
	  ▪ *No*
	  ◦ (-50, 0)
	  ▪ *Yes*
	  ◦ (0, -50)
	  ▪ *No*
	• What do you notice about all the coordinate points Tracy cannot reach with our given commands?
	  ◦ *We cannot move Tracy off the x-axis (anywhere with a y-coordinate other than 0)*
	• Think of a way we could move Tracy to all these coordinate points.

	◦ *Allow her to turn left or right. Combined with the forward command, she will then be able to reach any coordinate point on the grid.* **End of Class:** • How many ways are there to get Tracy to face the top of the canvas from her starting position? ◦ *An unlimited amount! (left(90), right(-90), right(270), and any alteration of these where 360 degrees are added or subtracted)* • Is it necessary to have both a left and right command? ◦ *No, any turn we use the left command for can also be accomplished using the right command (ex: left(90) and right(-90))* • Why do you think a left and right command can be used when programming Tracy? ◦ *It makes it easier for the programmer to write code/ more difficult to make mistakes*
Resources/Handouts	Drawing Letters (student) Drawing Letters (teacher) Pair Programming Guide

Vocabulary

Term	Definition
right(degrees)	Command that tells tracy to turn right and in between parentheses, how many degrees to turn right.
left(degrees)	Command that tells tracy to turn left and in between parentheses, how many degrees to turn left.

Modification: Advanced	Modification: Special Education	Modification: English Language Learners