

Name _____

Project 6. Programming loops

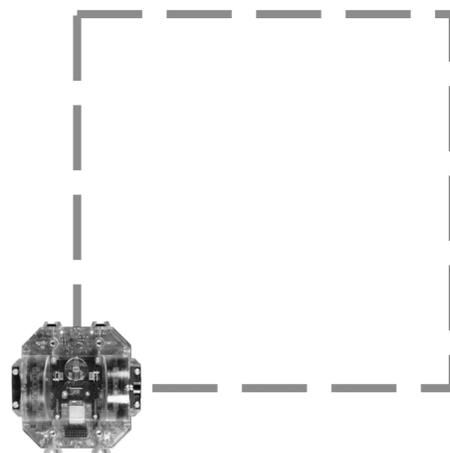
Question	How do you program a robot to repeat a set of behaviors?
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One common feature of programming languages is the ability to create loops. A loop allows a section of commands to be repeated over and over without needing to retype the commands. This results in a shorter, clearer program. Loops are used to program a robot to exactly repeat a desired behavior.

Materials: ErgoBot, protractor

Part 6a: Create a square

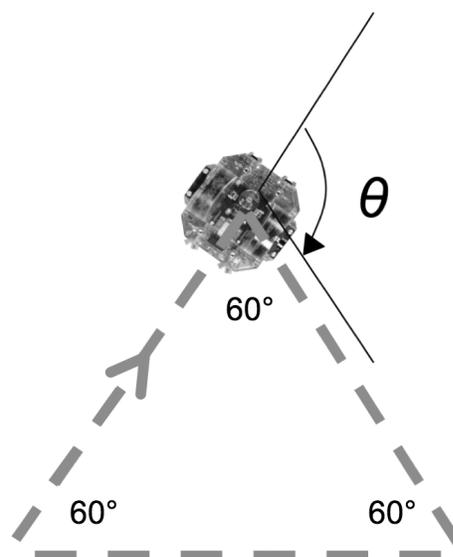
1. Program the ErgoBot to travel in a square path and return to its starting position and heading.
2. Use a loop so that the program includes the fewest possible commands.
3. Include comments and use white space to display the code clearly.
4. Print your program or record it below.



Part 6b: Program a hexagon

To move the ErgoBot in a triangle, the loop must repeat three times. What turn angle is needed in order for an ErgoBot to travel in an equilateral triangle? Use what you learn to program a hexagonal path.

1. Program the ErgoBot to travel in a triangle and return to its starting position and heading.
2. Use the fewest possible commands.
3. Edit your program to produce a hexagonal path.
4. Include comments and use white space to display the code clearly.
5. Print or record your program for the hexagon.



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Questions

- a. What turn angle is needed in order for an ErgoBot to travel in an equilateral triangle? The three interior angles are each 60° .

- b. As the ErgoBot completes the triangle, what is the total angle it turns through to get back to its starting position and heading? Explain.

- c. What total angle must the ErgoBot turn through in order to complete a hexagonal path and get back to its original position and heading?

- d. What turn angle is needed in order for an ErgoBot to travel in a hexagon?

Print your program for the hexagon, or record it below.

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Part 6c: Join the dance

1. With a partner, program a brief motion routine for a pair of ErgoBots.
2. The routine must have two sections, separated by a beep:
 - a section in which the ErgoBots execute the exact same moves; and
 - a section in which they perform opposite moves.
3. Each section must begin with a beep.
4. Include at least one loop in your program.
5. Include a comment line with the name and date of your program, and comment lines for each section of the dance.

The “dancers” may begin in any position.



Applying new knowledge

1. What is a programming loop?
 - A. a set of commands that is continually repeated until a certain condition is reached
 - B. the area on a computer chip where programs are stored, erased, and rewritten
 - C. a set of commands that causes the ErgoBot to drive in a closed path
 - D. a continual cycle of sensing, processing, and responding to sensor feedback
 - E. communications from the computer to the robot and back to the computer
2. Find the syntax errors in this example of an ErgoBot program.

<pre>start right (20) Do left (0.5) forward (-2.0) loop stop</pre>	
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3. Write a program that will cause the ErgoBot to pace back and forth 5 times. Use as few commands as possible. Do include a comment line.