

Scribbler Robot Shape Drawer

To: Dr. Morton
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Subject: SE 101 (Introduction to Methods of Software Engineering)

Project Description:

The goal of this project is to program the Scribbler Robot to draw shapes through movement. The user will have to interact with the Scribbler Robot by selecting a shape on a generated interface. The robot will process this information, and then the robot will call the shape through its speakers. Then the robot will begin to draw out the shape through forward movement and rotations to change direction.

Features:

The two main robot features this project utilizes are its motors and speakers. The speakers will be used to call the shape that the user will select through the interface. Then after selection, movement will occur. The motors of the Scribbler robot will manipulate its movement and direction, through the forward, turnLeft, turnRight, move, and motors functions, in order to draw out shapes like squares, rectangles, triangles, circles, etc. Figure 1 shows the Scribbler Robot drawing out a triangle.

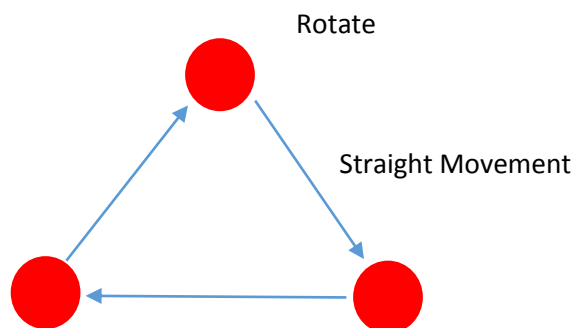


Figure 1

Design Challenge:

One of the main challenges that arise in this project is the choice of how long the robot should move for each line segment, and also how long it should take to rotate to make special angles, such as 30, 60, and 90 degrees. The time the robot takes to move linearly can be calculated depending on the desired x and y component that the end position should be relative to its starting position. Calculating the time it takes to move a unit vector will have to be calculated through trial and error, and then the

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time it takes to move to its desired location is just the scalar of the unit vector multiplied by the calculated time.

Furthermore, the ability to draw circles can be a difficult maneuver since circular motion occurs when rotation and movement is occurring simultaneously, but there is an excellent report written by Princeton University on the complications of this subject and how to properly deal with it, and execute circular motion [2].

Time Estimate:

Task:	Time:
Voice Integration	1 hour
Interface Design	6 hours
Optimization of vector components of each shape	2 hours
Optimization of angles related to rotations	2 hours
Optimization of simultaneous movement and rotation for circles and ovals	3 hours

References:

**No authors were listed for both sources

[1] (2013, April 23) *Myro Reference Manual* [Online] Available:

http://wiki.roboteducation.org/Myro_Reference_Manual

[2] (2012, March 12) *Laboratory 3: Controlling the Robot* [Online] Available:

http://www.cs.princeton.edu/courses/archive/spr06/cos116/COS_116_Lab_3.pdf