

Industrial Robotics Pre-Competition

Activity

Task Descriptions

Task

The task is about programming your robot to accurately move a known distance. Accuracy and repeatability is important in robotics.

You need to be able to start your robot in exactly the same position. This can be done with sensors reading walls or with a jig.

Mark out a meter length on the floor and program your robot to drive forward for a meter and stop. Repeat this to find out how accurate your robot is. Mark out a 180, 90, 45 degree angles and program your robot to turn to the specified angle.

Once you can accurately drive one meter and turn, write a program to drive the robot in a square (please see figure 1) once you can accurately drive in a square shape try a pentagon shape (please see figure 2). Once you have successfully completed the two shapes, add a distance sensor to stop a set distance away from an object (please see figure 3).

The aim is to write code which is easily changeable and for the robot to stop in the same position consistently after it has executed the program.

Robot

Design and build an autonomous robot with a perimeter of ≤ 1500 mm \pm 2 mm and height of ≤ 350 mm \pm 2 mm.

Add an emergency stop button placed on the top of the robot where it is safely accessible. The robot should be triggered by pulling a cord with a length of at least 500 mm. This cord will not stay attached to the robot after it has started.

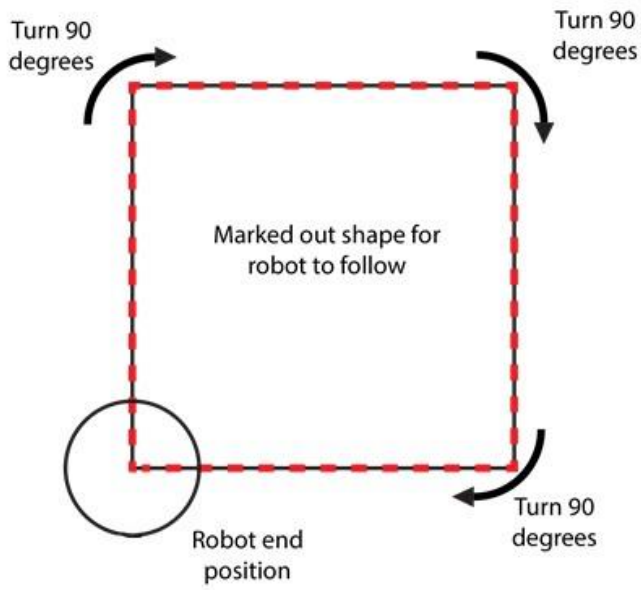


Figure 1

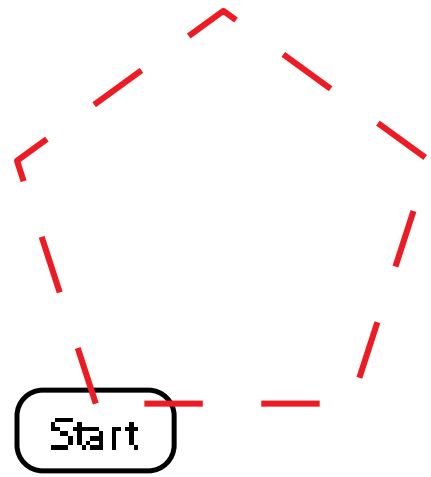


Figure 2

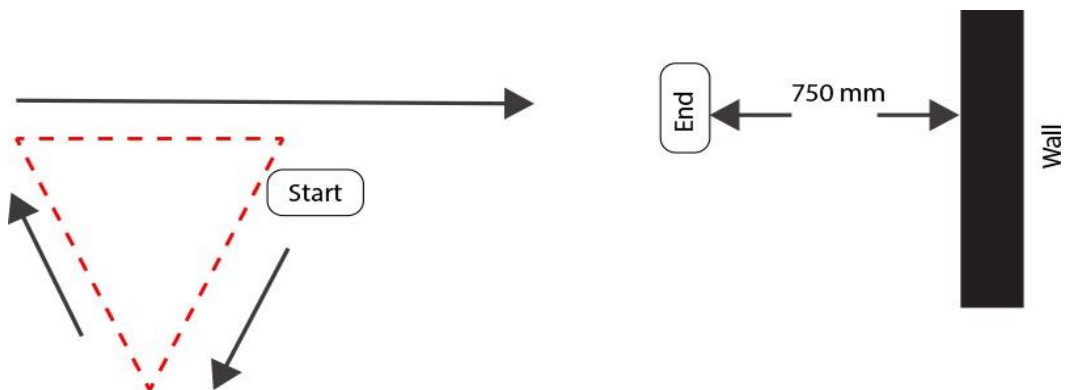


Figure 3

Competition Marking Form - **Objective**

Robotics

Competitor Name/Number:

Aspect ID	Description	Tolerance/ Requirement	Max Mark	Mark Awarded
A1	Square - 1 straight and 1 corner	Y/N?	2.00	
A2	Square - 2 straights and 2 corners	Y/N?	4.00	
A3	Square - 3 straights and 3 corners	Y/N?	6.00	
A4	Square - 4 straights and 4 corners	Y/N?	8.00	
A5	Square accuracy (+- 20mm/° = 4, +- 15mm/° = 6, +- 10mm/° = 8, +- 5mm/° = 10)	Y/N?	10.00	
A6	Pentagon - 1 straight and 1 corner	Y/N?	1.00	
A7	Pentagon - 2 straights and 2 corners	Y/N?	2.00	
A8	Pentagon - 3 straights and 3 corners	Y/N?	3.00	
A9	Pentagon - 4 straights and 4 corners	Y/N?	4.00	
A10	Pentagon - 5 straights and 5 corners	Y/N?	5.00	
A11	Pentagon accuracy (+- 30mm/° = 3, +- 20mm/° = 6, +- 15mm/° = 9, +- 10mm/° = 12, +- 5mm/° = 15)	Y/N?	15.00	
A12	Triangle- 1 straight and 1 corner	Y/N?	3.00	
A13	Triangle- 2 straights and 2 corners	Y/N?	6.00	
A14	Triangle- 3 straights and 3 corners	Y/N?	9.00	
A15	Triangle accuracy (+- 15mm/° = 4, +- 10mm/° = 7, +- 5mm/° = 10)	Y/N?	10.00	
A16	Stop distance (+- 15mm = 4, +- 10mm = 7, +- 5mm = 12)	Y/N?	12.00	

100

Robotics Marking Form

Competitor Name/Number:

Aspect ID	Description	Max Mark	Mark Awarded
A	Navigation	100	
		100	