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Exercises

Student Competitions: Mobile Robotics Training

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3. Line Following with a Line Sensor Array

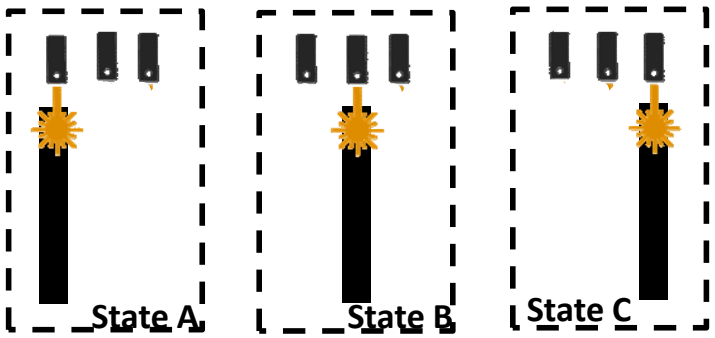
Reference: Video Part 3- Line Following

Task: Design a Stateflow chart for the robot to perform the line following task with a sensor array consisting of 3 line detection sensors.

Steps:

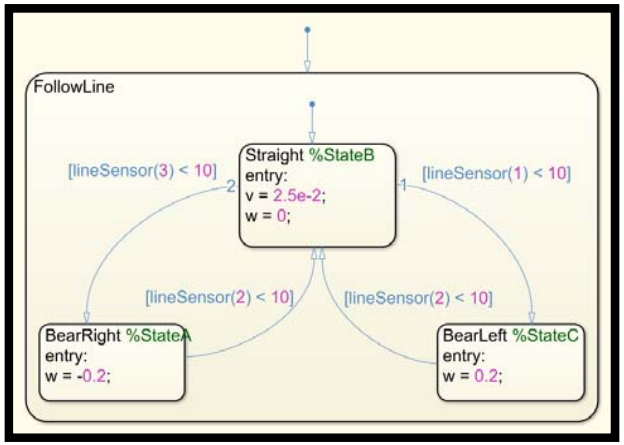
Open the model `lineFollowing_array_start.slx`. The model is already configured to read simulated line data from the 3 sensors and to send the appropriate input values to the robot simulator.

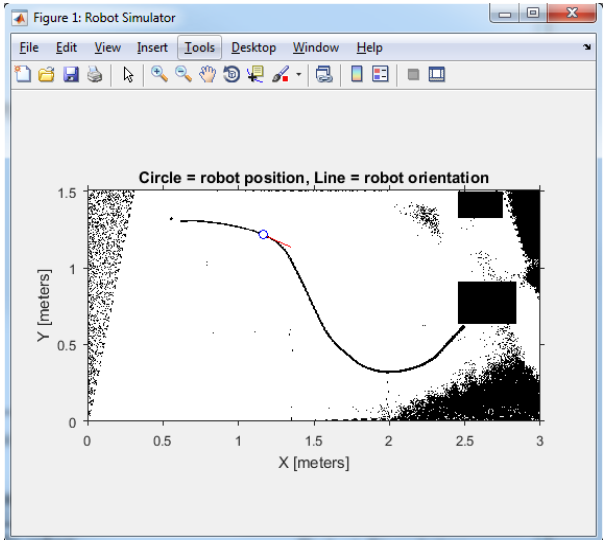
1. Configure the robot simulator block parameters. Use mapForSim variable to use the default map. Optionally, follow **Exercise: Designing Robot Path Map** to create a custom map for line following
2. Configure the line sensor block to define the sensor characteristics or use the default. Set sensor offset as [0.08 0.01;0.08 0;0.08 -0.01]
3. Create a simple state chart comprising of 3 states that take appropriate actions based on which of the three sensors are reading the black line.
   Hint: State A defines actions for sensor #1 being on the line, State B defines for sensor #2, and similar for State C (see images below).
4. Simulate the model and observe its output.
5. Vary the linear (v) and angular (w) velocity values to see how the performance of the state diagram changes during simulation for the same line map. Save the model as `lineFollowing_array.slx`



Solution

```
>> lineFollowing_array_solution.slx
```





Deploy to a VEX EDR Robot

```
>> lineFollowing_array_VEX.slx
```