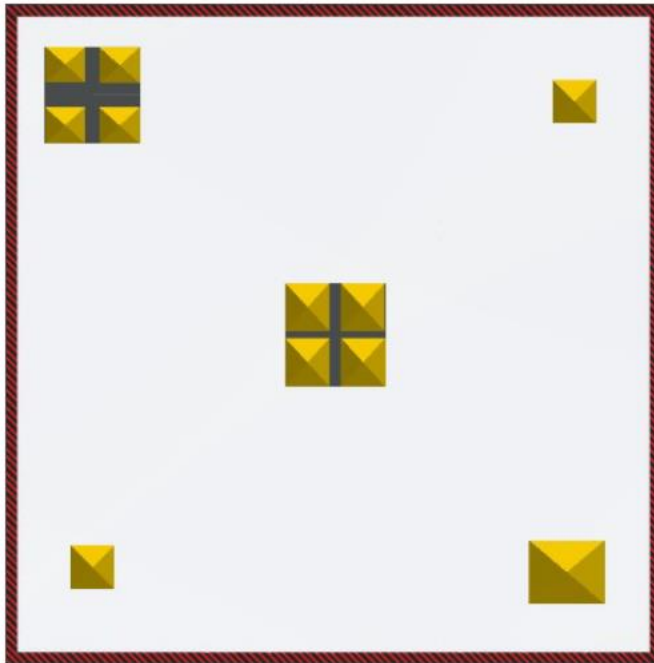Fall 2020

CISC 1003 – Obstacle Avoidance

We will be using the VR.VEX environment for our class: https://vr.vex.com/

Playground: Castle Crashe

Program requirements:
One of the main navigational tasks that robots perform is obstacle avoidance. In the previous lab, we used a bump (or touch sensor) which detected when the robot made contact with an object. Sensors to detect object can be contact or non-contact. As a car driving on the road, you do not want to be touching the car in front of you to determine that you about to crash. Therefore, a non-contact sensor is required for a self-driving car. A distance sensor using light or ultrasound, is perfect for a self-driving car since it is a non-contact sensor. Therefore, in this lab we will be using a distance sensor that reports the distance to the object in front of the robot.

The robot should move up until it is close to the obstacle and wiggle it's way around it.When it is close to the obstacle, it needs to pass around it by doing the following: 1.Turn to the left2.Back up a bit.3.Turn back to 0 degrees facing forward4.Move forward until close to the object and repeat

Eventually once the obstacle is not seen, you should turn facing 0 degrees (up on the screen) and move forward.

You can get the angle you are facing from this block. This will then allow you to adjust your position if needed. Make use of the distance sensor.
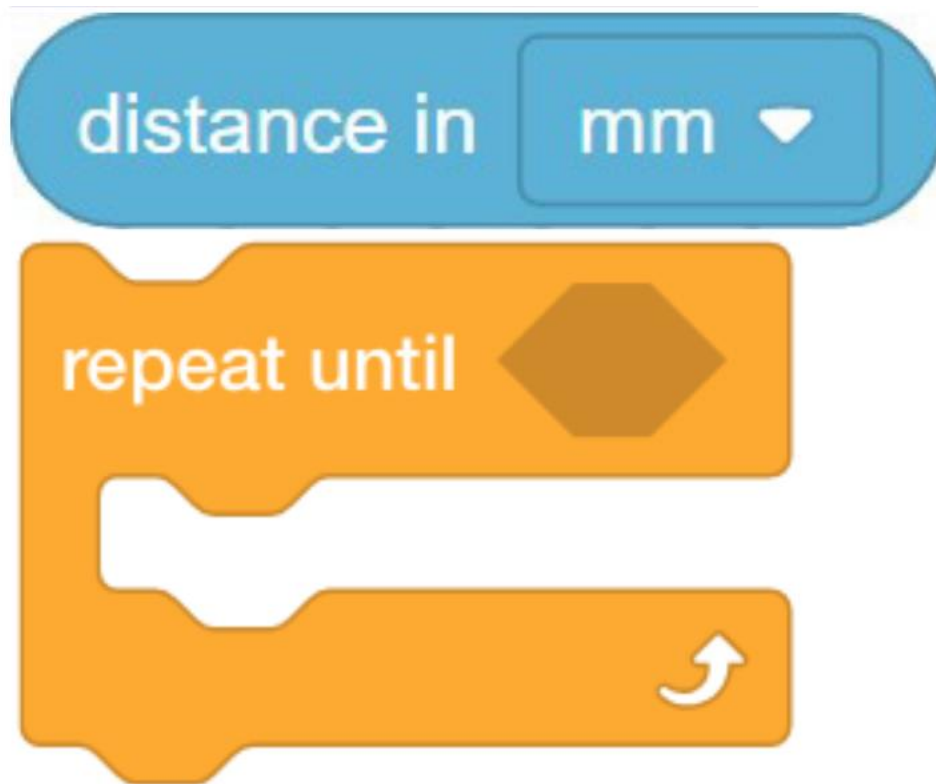
If the robot is too close into an object, have the robot go around the object. Have a threshold to see if the distance is below a certain amount that is considered close. Do not bump into an object.

The edges of the grid have a red line.
- If you go too far you will fall off the grid.
- If the Down Eye sees red, you have reached the end of the screen, so you can stop the robot.
- Do not go too fast, or you will not see the red line.

Submitting Projects/HW:

When submitting your assignments, please submit the following:
- PDF of the code
- VEXcode Project
- Screenshot of the playground after the program has stopped.

Your submission should include these three files, Name your document file using your Last name.Firstname and The lab name. E.g., Doe.Jane.obstacleavoidance.pdf, etc..
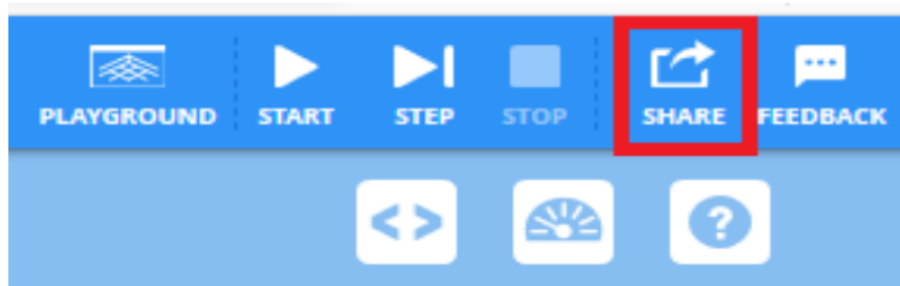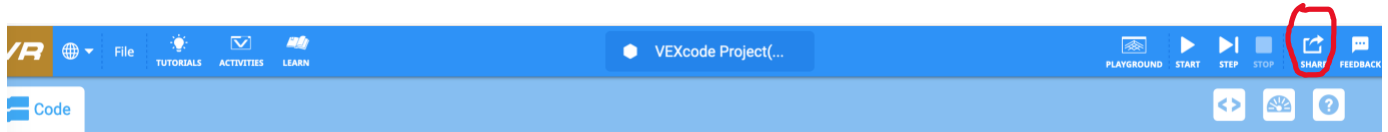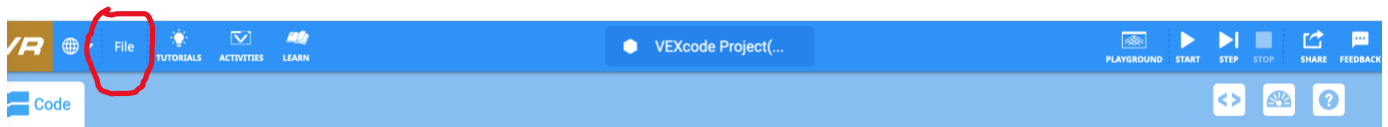
How to get these items:

- PDF of the code: share the code to get the PDF image of the program

- VEXcode Project: In the VEX code project go to: File, Save to Your Device

- Save a screen shot of the robot playground that showed what the robot after the program is complete:
  https://www.theverge.com/2019/11/8/20953522/how-to-take-screenshot-mac-windows-pc-iphone-android

- Adapted from material by Prof. Lawrence Goetz