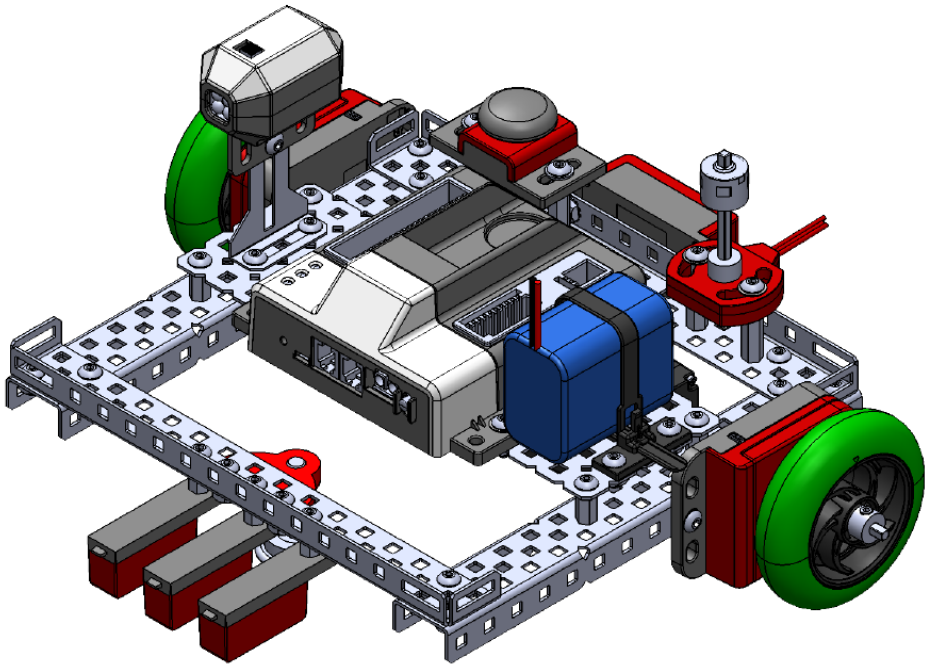
Two Wheeled Rover Challenges



Activity 3.1.1 Inputs and Outputs (myPLTW)

- Complete the Activity 3.1.1 Inputs and Outputs using the Two Wheeled Rover instead of the test bed.
- Get signed off by your instructor.

For the Following Programs (TWR1 – TWR4)

- The PLTW Template should always be used
- The information in the PLTW Template should be filled in completely.
- You must complete the Pseudo code
- You must comment your code.

TWR_1 Timed Motion

TWR_1a Blink Once

- Have the rover wait for the button to be pushed and then turn the red LED on for 1 sec and then turn the LED off

TWR_1b Forward 3 seconds

- Have the rover wait for the button to be pushed then turn on the green LED, drive forward in a straight line for 3 seconds, turn off green LED, stop, and turn on the red LED for 1 second.

TWR_1c Forward and Back

- Have the rover wait for the button to be pushed then turn on the green LED, drive forward in a straight line for 3 seconds, stop, turn around 180°, drive back to the start, stop and turn on the red LED for 1 second.

TWR_1d Obstacle Avoidance (Time)

- Have the rover wait for the button to be pushed then turn on the flashlight and travel from the start box to the end box while going around the X. The rover should stop and turn off the flashlight when properly in place in the end box.

TWR_2 Loops and Variables

TWR_2a Loops

- Use a while loop to program the rover to make the yellow LED blink. Turn on the yellow LED for one second and then off for half a second, repeat infinitely.

TWR_2b Variables

- Use variables to program the rover to make the yellow LED blink 10 times. Turn on the green LED for one second and then off for half a second, repeat 10 times.

TWR_2c If Else

- Use an If Else statement to write a program so that the green Led will turn on and stay on when the button is pushed. Then if the potentiometer is less than 2500 the yellow LED will be on and if the potentiometer is greater than or equal to 2500 the red LED will be on. This program should run infinitely.

TWR_2d Forward Back Again

- Have the rover wait for the button to be pushed then turn on the green LED, drive forward in a straight line for 3 seconds, stop, turn around 180°, drive back to the start, stop, turn around 180°. Do this 3 times using variables. At the end turn on the red LED for 2 seconds.

TWR_3 Measured Distance

TWR_3a Ten Inches Away

- Have the rover wait for the button to be pushed then turn on the green LED, drive forward unit 10 inches from the wall then turn off the green LED, stop, turn on the red LED for 2 seconds. The rover will be placed different distance from the wall each time. Hint use the ultrasonic sensor.

TWR_3b One Wheel Rotation

- Have the rover wait for the button to be pushed then drive forward for one rotation of the wheel. How far did the rover travel forward? How does this compare to the circumference of the wheel?

TWR_3c Forward 2 feet

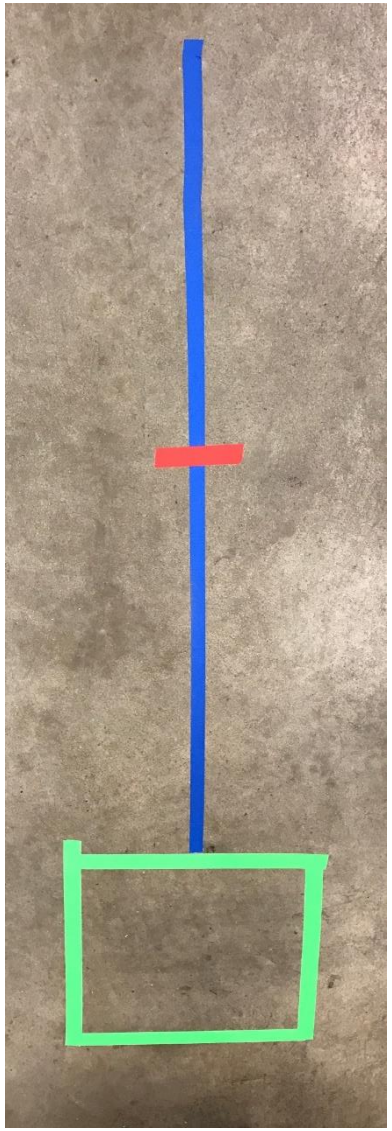
- Have the rover wait for the button to be pushed then turn on the green LED, drive forward in a straight line for 2 feet, turn off green LED, stop, and turn on the red LED for 2 seconds.

TWR_3d Obstacle Avoidance (Encoders)

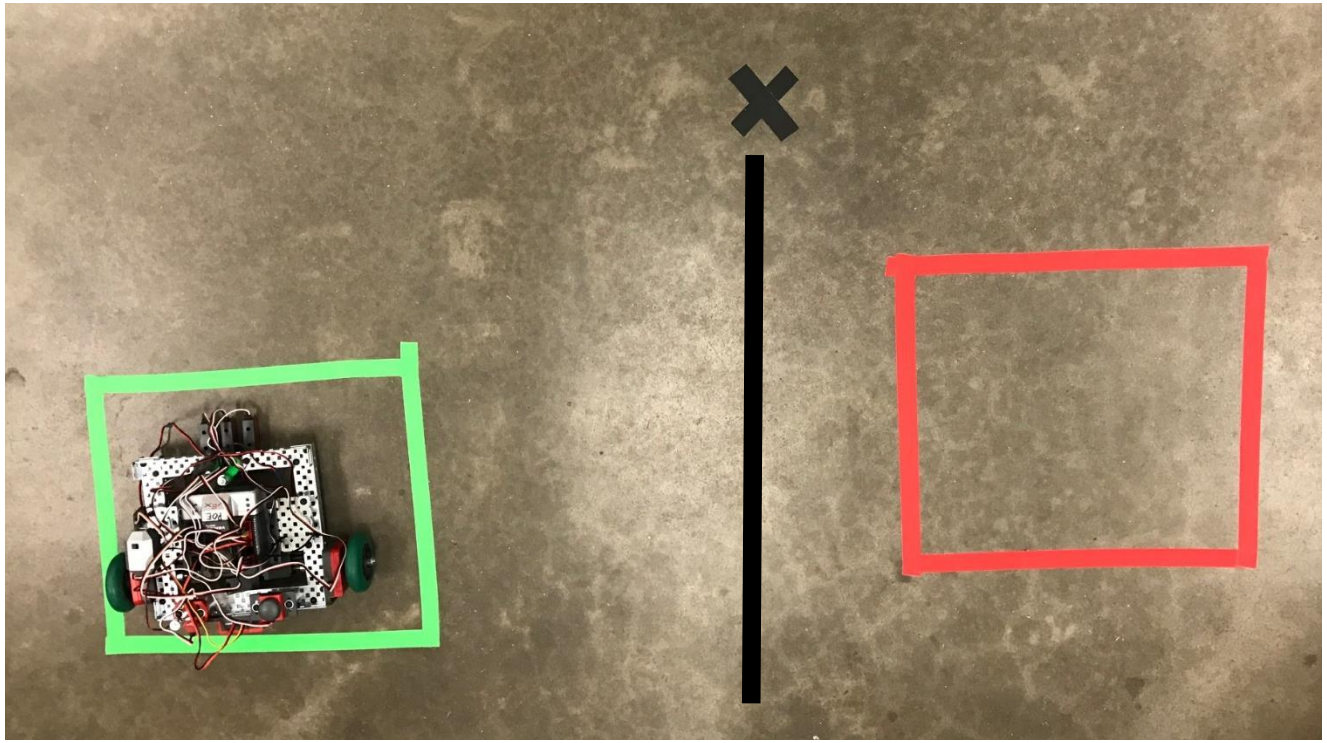
- Have the rover wait for the button to be pushed then turn on the flashlight and travel from the start box to the end box while going around the X. The rover should stop and turn off the flashlight when properly in place in the end box.

Challenge Fields

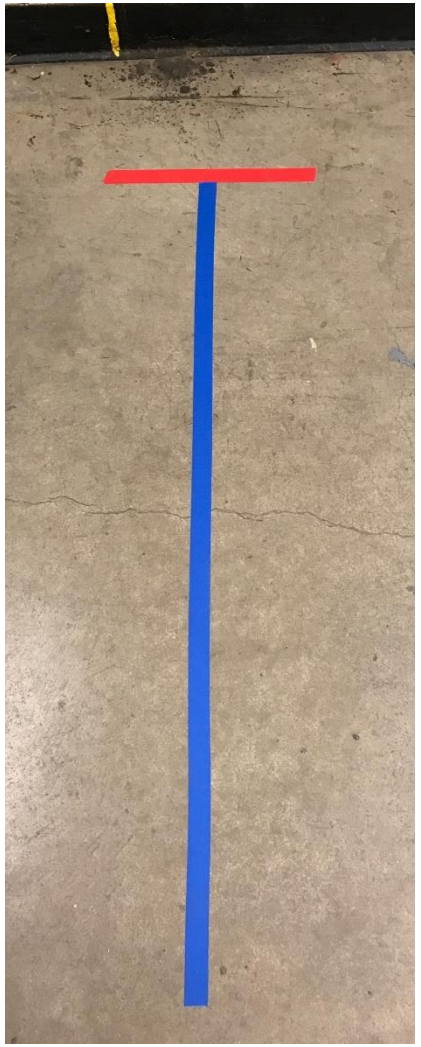
Forward
Forward Back
Forward 2 ft



Obstacle Avoidance



10 Inches
Away



TWR_4 Follow the Line

TWR_4a Have the rover wait for the button to be pushed then follow the Black line around the loop. The rover should indicate line location with the 3 LEDs; Red Right, Yellow Center, Green Left. All LEDs on indicate the rover is waiting for the button to be pushed.

Bonus Challenges:

TWR_4b Have the rover wait for the button to be pushed then the rover should follow the Black line around the loop, stop at the intersection and wait for the button to be pressed and then proceed around the loop. The rover should indicate line location with the 3 LEDs; Red Right, Yellow Center, Green Left. All LEDs on indicate the rover are waiting for the button to be pushed.

TWR_4c Have the rover wait for the button to be pushed then the rover should follow the Black line around the loop, stop at the intersection and wait for the button to be pressed and then proceed around the loop. The speed of the rover can be adjusted using the potentiometer. The rover should indicate line location with the 3 LEDs; Red Right, Yellow Center, Green Left. All LEDs on indicate the rover is waiting for the button to be pushed.

TWR_4d Have the rover wait for the button to be pushed then the rover should follow the Black line around the loop, stop at the intersection and wait for the button to be pressed and then proceed around the loop exactly twice. The speed of the rover can be adjusted using the potentiometer. The rover should indicate line location with the 3 LEDs; Red Right, Yellow Center, Green Left. All LEDs on indicate the rover is waiting for the button to be pushed.