**3.3 Track**

**Tester’s names:** *Tianyi Zou* **Test Date:** *03/20/18* **Software Version:** Test track code which make robot rotate about itself by 360 degree

**Hardware Version:** 1.0

**Objective:**

Determine the track value of the robot.

**Procedure:**

1. Charge up the EV3 brick and make sure the robot works at a battery level of 8.0V.
2. Use the test track code that enables the robot rotate about itself by 360 °. Set the rotating speed at 150 to avoid slippage of wheels.
3. Put the robot at a cross line on the testing board. Make sure that the axis of wheels and the middle line of robot are respectively right above the two lines of the cross. Please refer to the Fig3.3.1.
4. Run the code. It is expected that the robot will not rotate exactly by 360 °. There is an angle between the black line and the middle line of robot. Measure the angle by using a protractor.
5. If the robot turns more than 360 °, lower the value of track in the code and repeat step 2 and step3. If the robot turns less than 360 °, higher the value of track in the code and repeat step 2 and step 3.
6. Continue the process until a minimum amount of error is found.

**Expected result:**

We expect that the robot will not turn exactly by 360 °. There would be an error of angle. If the track value we set in the code is greater than the real track, the robot will turn more. Conversely, if the track value is less than the real track, the robot will turn less. We have to tweak the value of track in order to find the most accurate value. We accept an error of angle of 0° ± 3°. Such error is mostly caused by human error and inexactitude of protractor.

**Test Report**:

|  |  |
| --- | --- |
| Track value (cm) | Error of angle (°) |
| 14.0 | 40 |
| 13.0 | 10 |
| 12.8 | 7 |
| 12.7 | 0 |
| 12.6 | -5 |
| 12.5 | -10 |
| 12.3 | -15 |
| 12.0 | -25 |

**Conclusion**:

The smallest error of angle is found when the track is at 12.7 cm, which would be picked as the track value in other parts of code. The measurement of error is still not precise enough due to human errors and inexactitude of protractor. However, it is expected that the light localization can solve such amount of error, resetting the orientation of robot based on the detection of black lines on the board.

**Action**:

Set track value to be 12.7 cm. The value would be changed if the robot design got change.

**Distribution**: Software team