

Engineering Lab

NXT Wait States / Power Level Investigation

Investigation Summary

Part 1

Modify the amount of time that the robot travels by changing the value of line 5 from 500 to 1500, then to 2500, and finally to 3250. In each case, the variable that you are manipulating is the amount of time that the robot "waits" until it does something else. Download and run each version of the program on your robot.

Sample Code

```

1 task main()
2 {
3     motor[motorB] = 60;
4     motor[motorC] = 60;
5     wait1Msec(500);
6 }
```

Part 2

Assume that your LEGO Smart Motors travel 2 rotations per second at 100 percent power.

Measure the diameter of your wheel and calculate the circumference. According to the rule that you've been given, how far should your robot travel in one second at 100 percent power? Test your calculation by uploading the code to your robot, run the robot and measure.

How far should it travel at 60 percent power? Test it and see if there is a proportional relationship to power. Try other power levels with the same test. Can you create a rule for how far your robot should travel?

Measure the distance that the robot travels in 500 milliseconds, then predict how far it will travel in 1500, 2500, and 3250 milliseconds. Run each trial three times and measure the distance traveled, then calculate the average distance traveled. Develop a table similar to the table below. Keep all of your work in your Engineering Journal. Be prepared to present your results.

Use the following equation to calculate the percentage of error:

$$\frac{\text{predicted distance} - \text{actual distance}}{\text{predicted distance}} \times 100\%$$

Chart

Wait State in Milliseconds	Power Level	Predicted Distance	Distance Traveled 1	Distance Traveled 2	Distance Traveled 3	Average Distance	% of error
500							
1500							
2500							
3250							

Is there a proportional relationship between distance traveled and time? If so, what is it?