IEOR 140 Project 1 Report
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In project 1, we built and programmed a robot that was able to trace simple polygons and circles on the ground using the DifferentialPilot class from the Lejos API. This robot used open loop control to carry out a sequence of commands in order rather than using sensors to respond to its environment.

The most difficult part of the project was accounting for the difference between theory and actual application. For example, the resistance on one of our motors was significantly greater than the resistance on the other, causing one wheel to drag. In theory, the code itself should take at most 5-10 minutes to code, but having to actually account for resistances makes for a flurry of tweaking.

The most interesting part of the project was (besides the throwback to our childhood) actually being able to see software play out on hardware. Actually seeing code affect the behavior of a physical robot that we built was extremely rewarding in itself and made for a very fun experience.

We've found that when our robot completes one circuit of the square, it is approximately half an inch from its starting point. When we have the robot try to navigate the square backwards, it's off by a significantly larger margin. This is probably due to the difference in resistance between the two motors. Many sources of uncertainty contribute to this error, the largest of which would definitely be the resistances both separately within the two motors, along with different resistant surfaces. Additionally, variability becomes an issue because we sometimes need to test in different areas of the hall or with other similar variations, which means that even calibrating differently after one run may yield different results on a second trial.