**Goal:**

1. Develop understanding of DC motor behavior and its control.
2. Ability to effectively use an IR sensor as input data.
3. Ability to utilize previous knowledge to optimize drive time and distance error.

**Materials and Setup:**

* A computer with Matlab software. Note that you can receive a free license through Penn State. Here is the link: <https://softwarestore.psu.edu/all-products/browse/keyword/matlab>

**Procedure:**

1. Go to Canvas and open the “Speed Parking” folder under “Remote Lab 02”. Download the “script\_simRobotSpeedParking2.m” file and the “fcn\_simRobot2.p” file to the same folder. If they are downloaded in a zip folder, make sure to unzip it.
2. Open the .m file in MatLab. Although it is optional to change the torque going into the left wheel and the right wheel, it significantly enhances your robot’s performance to adjust the torque so that the robot drives straight in a fast manner.
3. It is also optional adjust the IR sensor location with respect to the robot. Referring to the IR sensor datasheet may help you decide on the sensor location.
4. The goal is to park the robot as close to the finish line as quickly as possible without crossing it. Your responsibility is to design an algorithm and a series of commands to achieve this goal. Example approaches include but not limit to: if statements, P control, PD control, PID control, and time counting. However, you can be creative to come up with different approaches.
5. Your solution is assessed on the distance from the finish line (mm) and the total time taken (s), which is automatically calculated in the command window. Iteratively perform step 2-4, if necessary, to make your score as low as possible.

**Report:**

1. Submit your code (with comments) in your report.
2. Take a screenshot of your robot stopping right before the finish line. Make sure to zoom in so the gap between the robot and the line is readable.
3. Take a screenshot of your command window where shows your score.
4. Discuss what approach you took and why you took this approach.

**Extra Credit:**

The scores from all the students will the ranked after submission deadline. The lowest scores are the winners of the Speed Parking contest. Note that late submissions are not eligible to participate in the contest.

*1st place: 3 extra exam credits*

*2nd place: 2 extra exam credits*

*3rd place: 1 extra exam credits*