Reflection:

Each component of the PID controller has a different effect on the intended trajectory of my car:

The P controller determines the angle with which the controller corrects for Cross Track Error (CTE) in the car's desired trajectory. The D controller compensates or decreases the severity of the angle correction of P so there is a more smooth transition in CTE correction. And the I controller compensates for PD controllers never being able to truly get the CTE to Zero. This occurs if there is a systematic bias preventing the system from reaching the zero value.

I manually tuned the hyper-parameters: p_error, i_error and d_error. The way I did this was to first tune or adjust the p_error value (keeping all other values zero), until the car stayed on the track for an extended period of time. I reasoned from above that the P controller corrects for the CTE and this first needs to be correct first. After I obtained a sufficient p_error value of .1 I began adjusting the d_error so that as the car corrects for the CTE in the simulator it does so with a minimum amount of weaving. I adjusted this amount to 3.0. Finally, I adjusted the i_error but since the system is an emulator it most likely isn't showing any systematic bias. So I started real low with .001 and then kept lowering it until I achieved drivability .0000005.