PID Controller

Describe the effect each of the P, I, D components had in your implementation.

The proportional (P) component of the PID controller determines the magnitude of steering the car will react to the cross track error (CTE). If P is set too low then the car will not steer as hard as it should if the car comes across a sharp corner, and understeer and run off the road. If P is set too high then the car will have big steering movements even with a small CTE, like in a fairly straight line, and the car will very quickly over steer itself off the road.
The integral (I) component is used to mitigate any bias in steering, such as steering drift, wheel misalignment, strong cross wind, uneven road surface and other situations. Since this is a simulated environment, there is no such situation and the wheels are assumed to be perfectly aligned. Therefore this component parameter is set to 0.
The derivative (D) component is for making steering smooth. If this is set too small then the controller would essentially become a P controller, which means the car would simply fish tail back and forth on the road. But if this is set too high then the counter steering component would overwhelm the steering effort, and the car would steer to the opposite direction of what it should steer into.

Describe how the final hyperparameters were chosen.

I chose my final parameters with manual tuning. I left the I component 0 and made the others really big to see the effects, then reduced them to make the car stay on the road. I also increased the throttle to allow the car go faster. The end result is that the car can go around the track without going off the road, and can get up to 60 mph.