Steps

As per shown in the walkthrough videos of the project. I systematically followed the steps and understood the concepts about ROS and its implementation.

1) I started with the waypoint updater node partial implementation. First, I subscribed to the /base_waypoints and /current_pse topics and published the /final_waypoints.

2) I implemented the DBW node. I was able to successfully maneuver the complete track as you can see in the video in the google drive link – https://drive.google.com/drive/folders/12drY9JorlwXwj6rPmrJHQUjBOmAKO5Ib?usp=sharing
I have explained the issues faced by me and the corrective measures that tried to fix the various issues in the later part of this document. I implemented PID controller on the steering output as well to align the vehicle with the waypoints on similar lines of the implanted for the throttle controller.

3) I implemented the Traffic Light Detection node. I subscribed to the /base_waypoints, /image_color and /current_pose topics and published the waypoints closest to stop line corresponding to the traffic light. I have not implemented my personal traffic light classifier. Instead I used "return light.state" to check my program initially. It seems to be working as demonstrated in the walkthrough video.

4) In the final step of the project I updated the waypoint updater node to first subscribe to /traffic_wapoint topic and use it to determine whether to stop or proceed, depending upon the state of the traffic light and the published waypoint by Traffic light detection node.

Issues on Udacity's GPU enabled workspace

1) Till the implementation of Traffic light detection node, I was able to run my code on the **Udacity's GPU enabled workspace**.
2) As you can see in the attached video using my code, I was able to successfully navigate the track.
3) Later after implementing the traffic light detection node I faced lot of latency issue. My **Udacity's GPU enabled workspace** workspace gave me this error –
"GET /socket.io/?EIO=4&transport=websocket HTTP/1.1" 200 0 45.359629"
I tried to google the solution and used this link to implement the solution
https://github.com/udacity/self-driving-car-sim/issues/97
https://github.com/llSourcell/How_to_simulate_a_self_driving_car/issues/34#issuecomment-445077710
I updated my python-socketio using the commands
pip install --upgrade python-socketio
this updated my python-socketio from 1.6.1 to the latest version 3.1.1
But still I didn't have much luck. It seems like on the link most of the people were able to solve the problem by merely updating the python-socketio. But it didn't help me much.

4) I observed in the video whenever my car covered the green waypoints and if they disappeared after my car was past them, I didn't have any issues, but when there was a time delay between the disappearance of the waypoints after my car was over them, I got the aforementioned error and my car swerved off the tracks.
5) As mentioned in the DBW node walkthrough I tried to go through the Libwaypointfollower.cpp and pursuit.cpp and pursuit_core.cpp. I saw that there is a flag which continuously checks if we are following the waypoints or not. I am not sure how it affects the code, but I tried changing the rospy.rate to 100Hz but still didn't have much luck. I reverted back to the original values afterwards.

Issues on Local VM

1) As mentioned in the point number 4 in the above topic I saw similar problem on my local VM setup for the project. I setup the local VM as per in the instructions given in Lesson 18: Introduction to ROS Topic 13. Your Virtual Machine.
2) I was never able to run my code on my local VM setup after implementing the DBW node I kept getting the same error –
   "GET /socket.io/?EIO=4&transport=websocket HTTP/1.1" 200 0 45.359629"
3) I tried similar fixes of updating python-socketio to latest version 3.1.1 but on my local machine it fails somehow
   pip install python-socketio==3
   It shows that it successfully installed 3.1.1 but when I run the following command
   pip show pyhon-socketio
   it shows the version as 1.6.1 I am not able to figure out this issue. I would appreciate if you could help.

   You can see the couple of outputs from my terminal window-
   "
   Installing collected packages: six, python-engineio, python-socketio
   Successfully installed python-engineio-3.3.1 python-socketio-1.6.1 six-1.10.0
   You are using pip version 8.1.1, however version 19.0.2 is available.
   You should consider upgrading via the 'pip install --upgrade pip' command.
   student@udacity:~/CarND-Capstone$ pip show python-socketio
   ---
   Metadata-Version: 2.0
   Name: python-socketio
   Version: 1.6.1
   "