

## Path planning report

### 1. Speed limit:

The maximum speed limit for the lane is 50 mil ,therefore the car's speed is set as 49.5mil.

### 2. Collision prevention:

The greatest danger in the process of driving comes from collision,by sensor's data,get the speed and position of the vehicle in front,if the safe distance is small,set up danger flag,and if the safe distance is large on the left and right lanes,change lane,otherwise the slowdown speed ,see code's (line ).

### 3. Minimum jerk trajectory:

Build trajectory with spline library functions:

Step1:Create a vector table, add the last two points of the current path, and the angles at which the cars are traveling(tangent to these points).

Step 2: Add the d coordinate of the distance increment of 30 meters, 60 meters, 90 meters

Step 3: Transform coordinates, and the reference point is 0 degrees.

Step4:build a spline.

Step 5: Convert global coordinates.

### 4 The highest speed within 50mil:



5. Slow down when you are close to the car in front of and cannot change lanes.



6. Slow ahead, change lane1



7. Slow ahead, change lane0



8. Change lanes, stay in the middle lane.

