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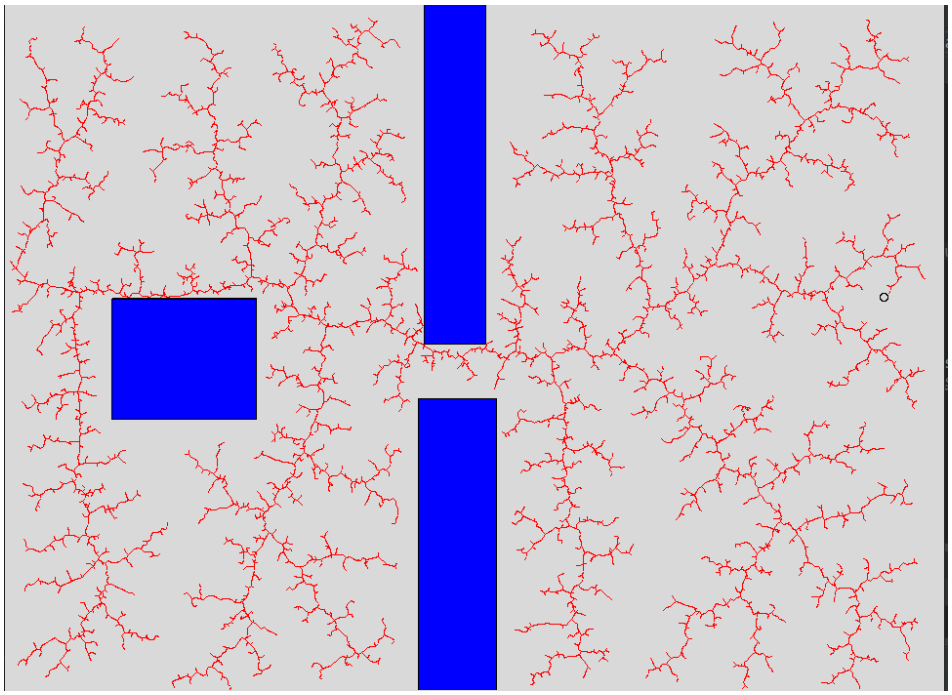
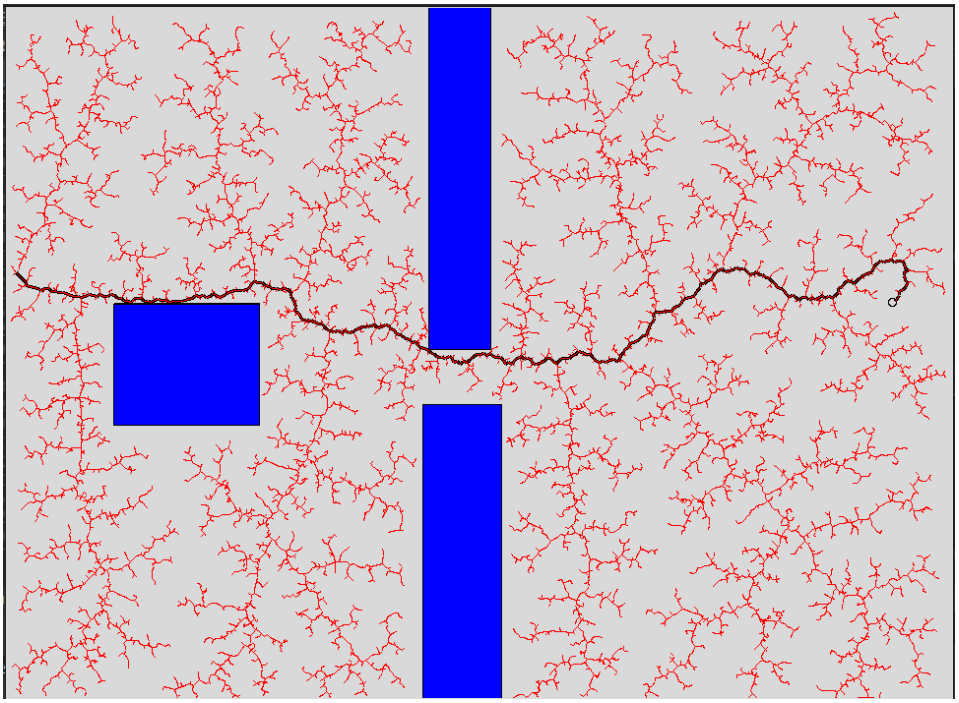
RRT PLANNER REPORT

UNIFORM DISTRIBUTION:

Planning Phase:



Final Path:



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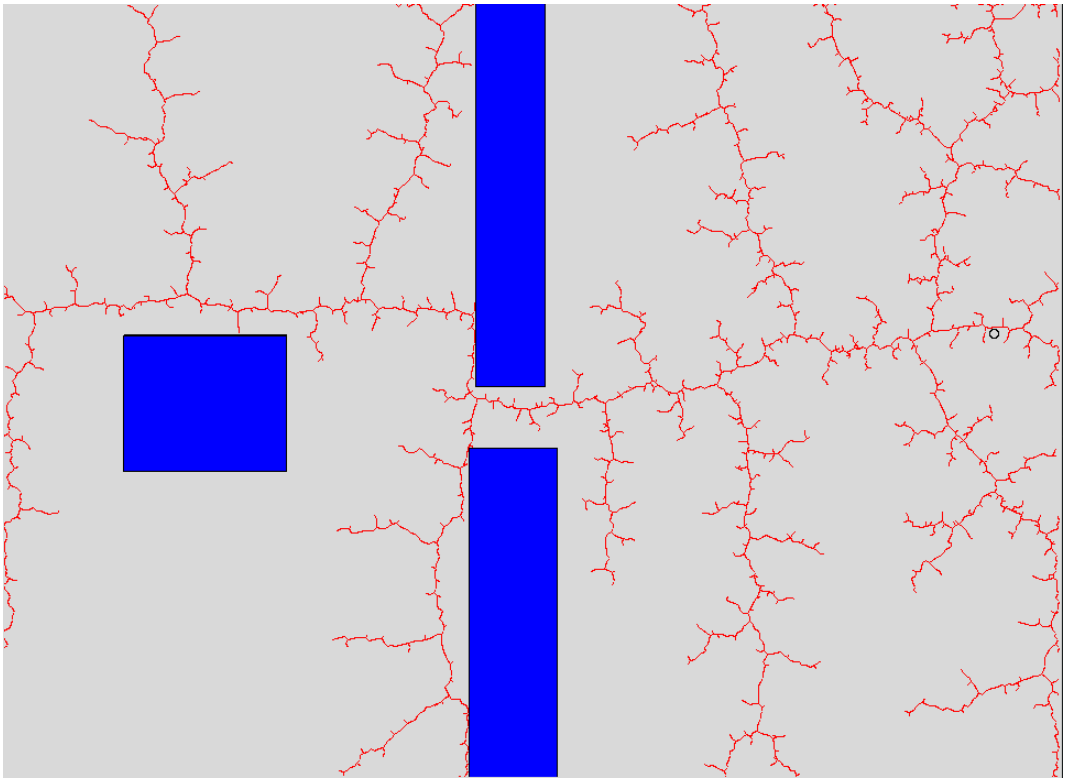
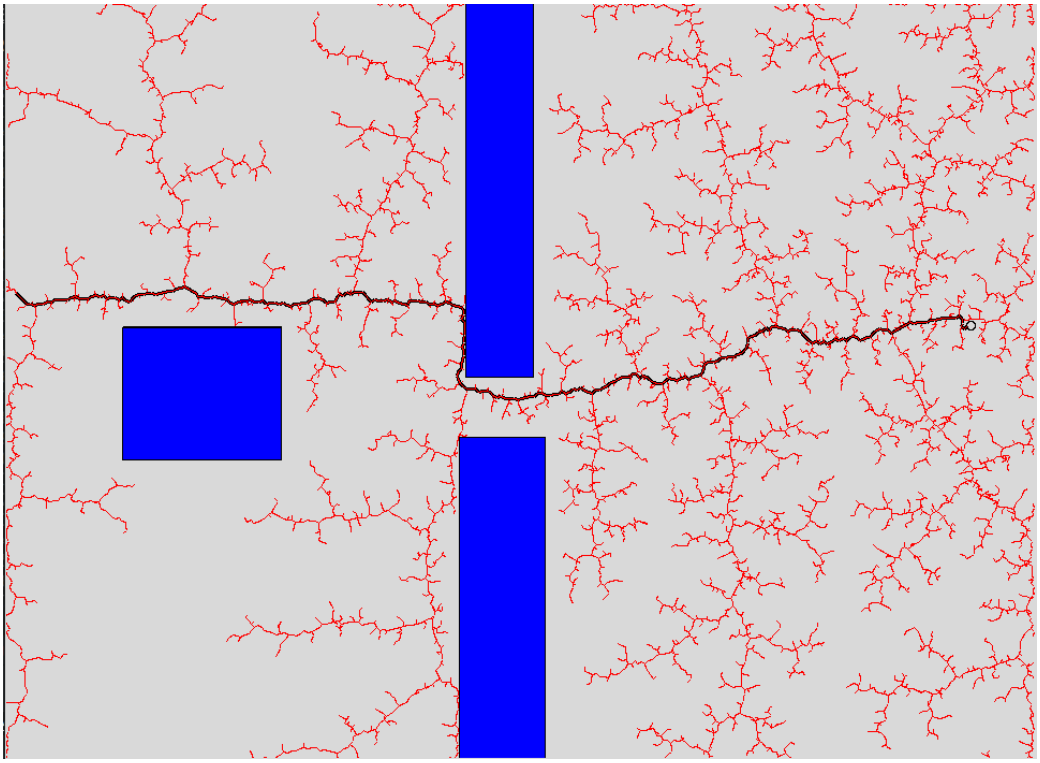
GAUSSIAN DISTRIBUTION:

Planning Phase:

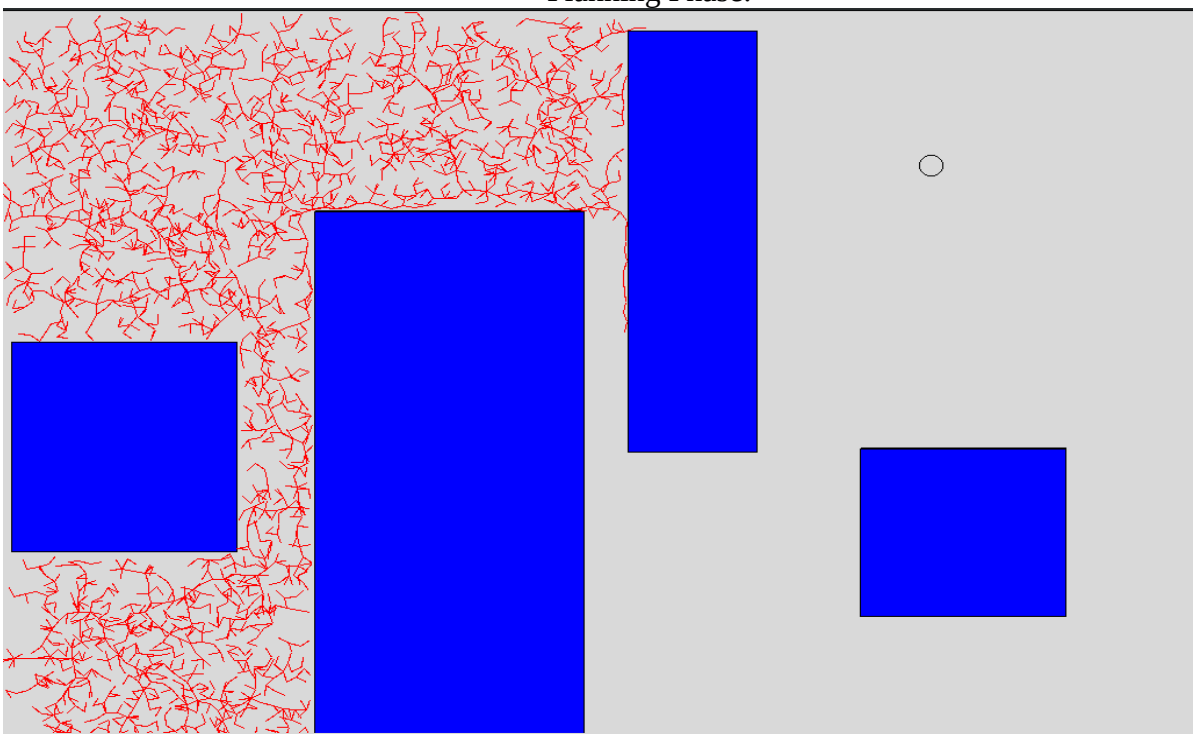


Final Path:

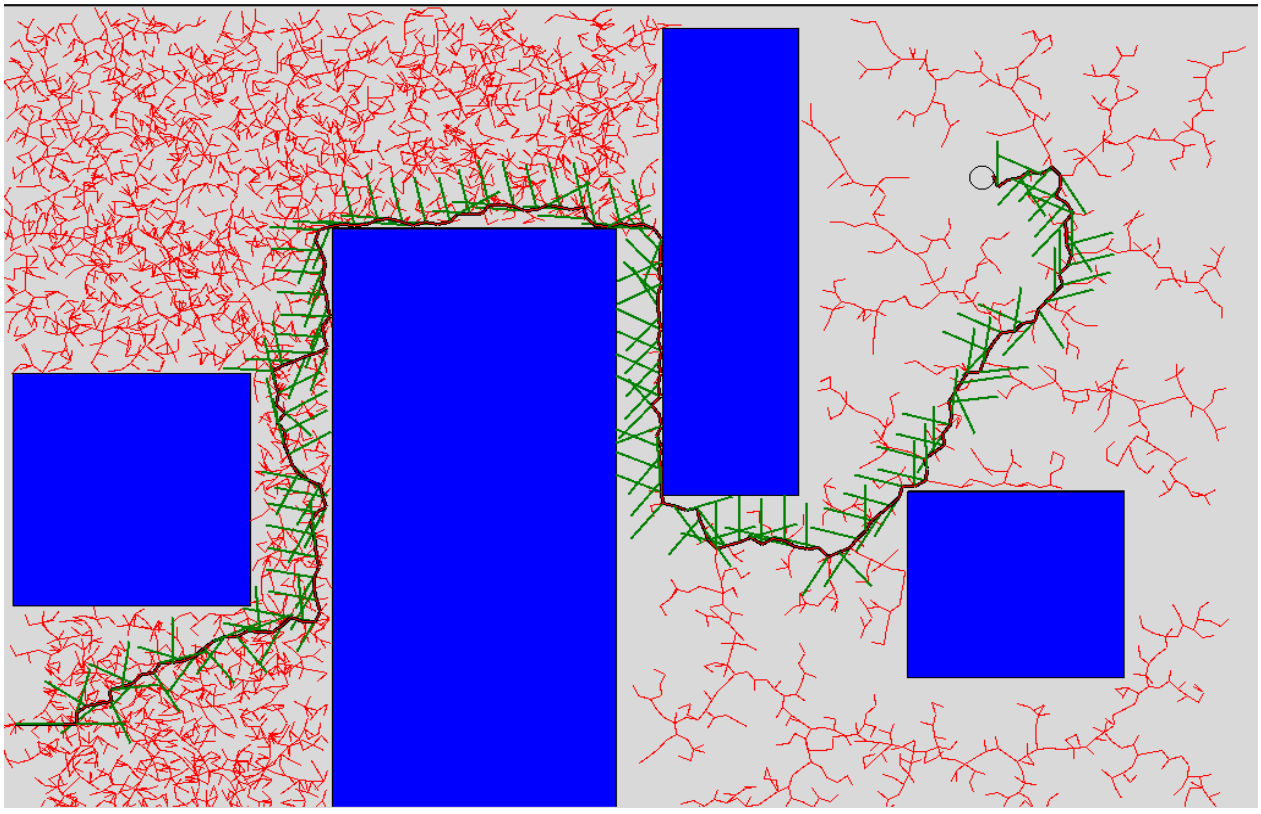


2. LINE-ROBOT:

Planning Phase:



Final Path:



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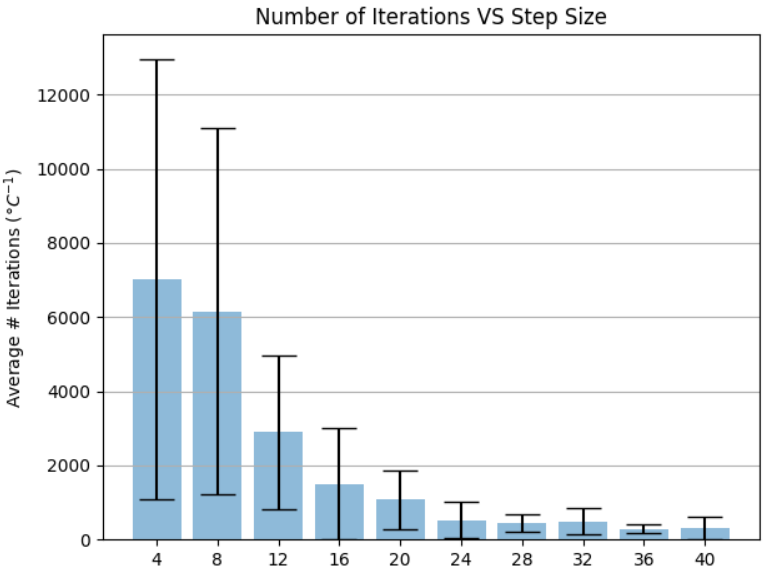
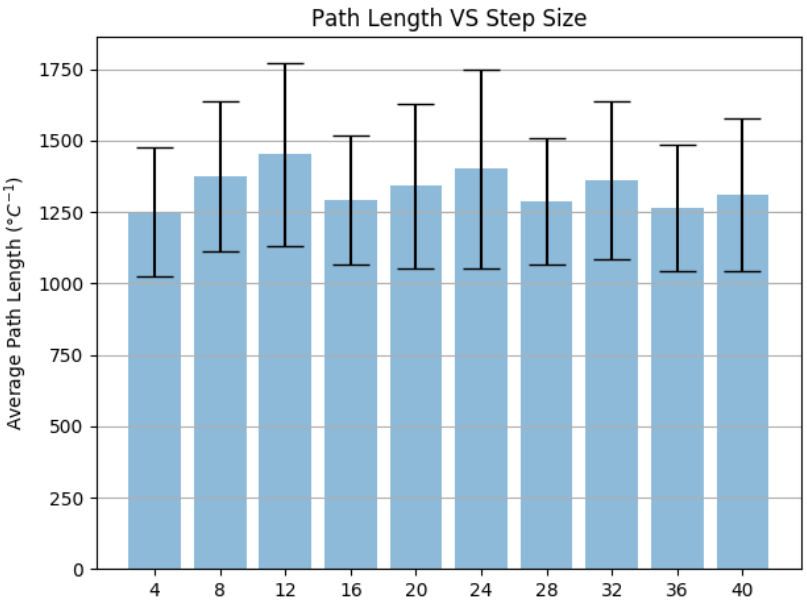
GRAPHS OF GAUSSIAN DISTRIBUTION FOR POINT-ROBOT:





Sampling the world from different distributions for expanding the RRT affects the planner:
By picking sample-free points uniformaly we do not get any closer or further from the goal.
By picking sample-free points using Gaussian Distribution around the goal, there is a higher chance of being steered towards that goal. TheRRT expands faster around the goal allowing to reach it in less iterations.

As the step-size in portion increases, the number of iterations decreases exponantialy. On the other hand, the path length seems to be unaffected by it which makes sense since this algorithm is not optimal and will never produce the shortest path. Hence, bigger stepisizes find paths quicker.

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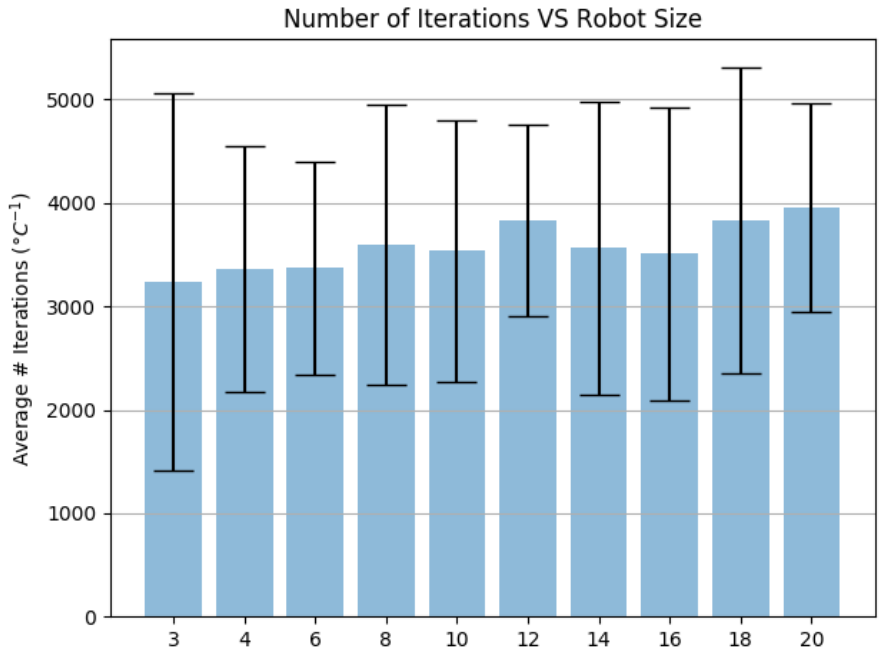
ANALYSIS OF UNIFORM DISTRIBUTION FOR LINE-ROBOT:



Since we only consider the steering that does not contact an obstacle, a longer robot has a higher chance of hitting an obstacle so RRT will have to recalculate (find a new sample-free point).

Hence a shorter robot will be able to fit in more narrow areas and will require less iterations to find a valid next step.

While the robot is rather small, we can see a slight increase in the number of iterations as the length of the robot increases.