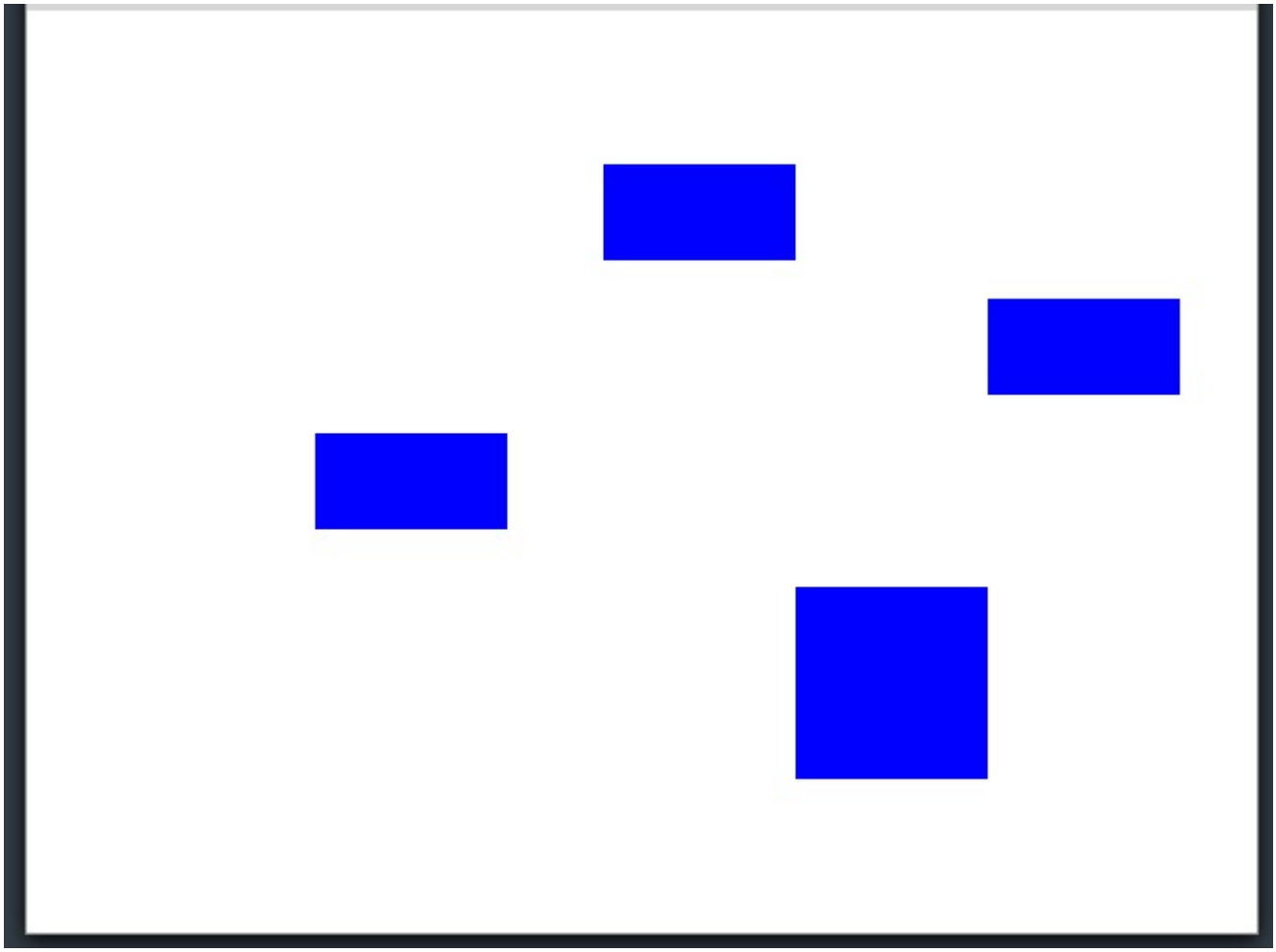
Bi-RRT Report

Implementation specifics:



- Pygame environment with rectangular obstacles; start point on the top left and goal on the bottom right.
- Step size=7
- Source tree: Extend; Goal Tree: Connect
- Convergence radius: 1

Results:

A significant boost in performance can be observed in bi-RRT because of the goal tree. For the above map, the average solving time is 2.915 sec which is just 7.3% of the time taken by conventional RRT of 39.9 sec and 3.5% of the time taken by RRT* which takes 81 sec. Below are the plots showing the running times and path lengths for 10 iterations.

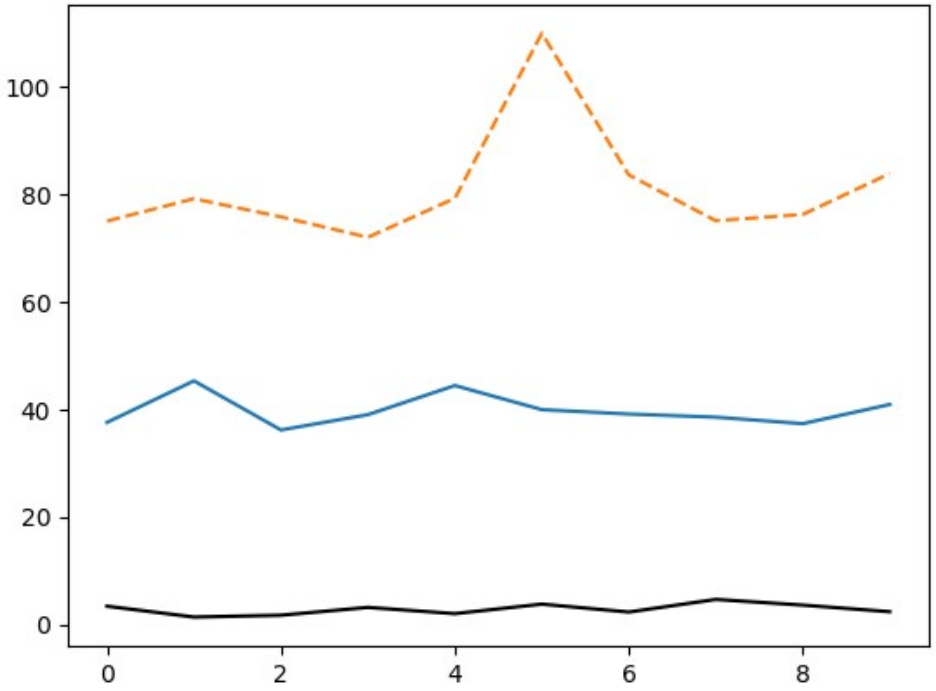


Figure 1: Running Time Comparison

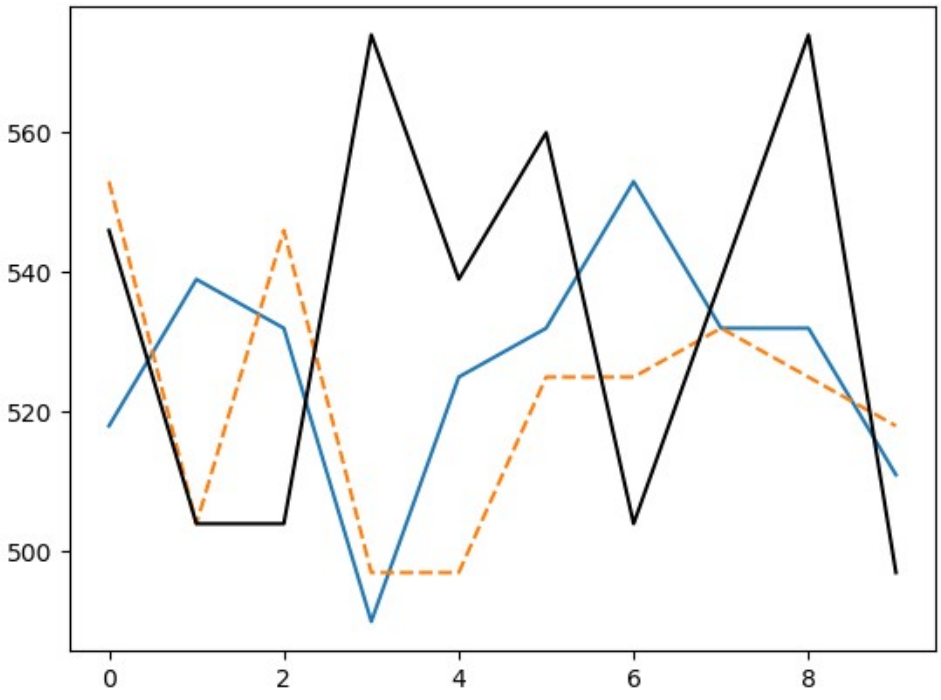


Figure 2: Solution Path Length Comparison

Key:
Black: Bi-RRT
Blue: RRT
Dotted yellow: RRT*

Solution Screenshots

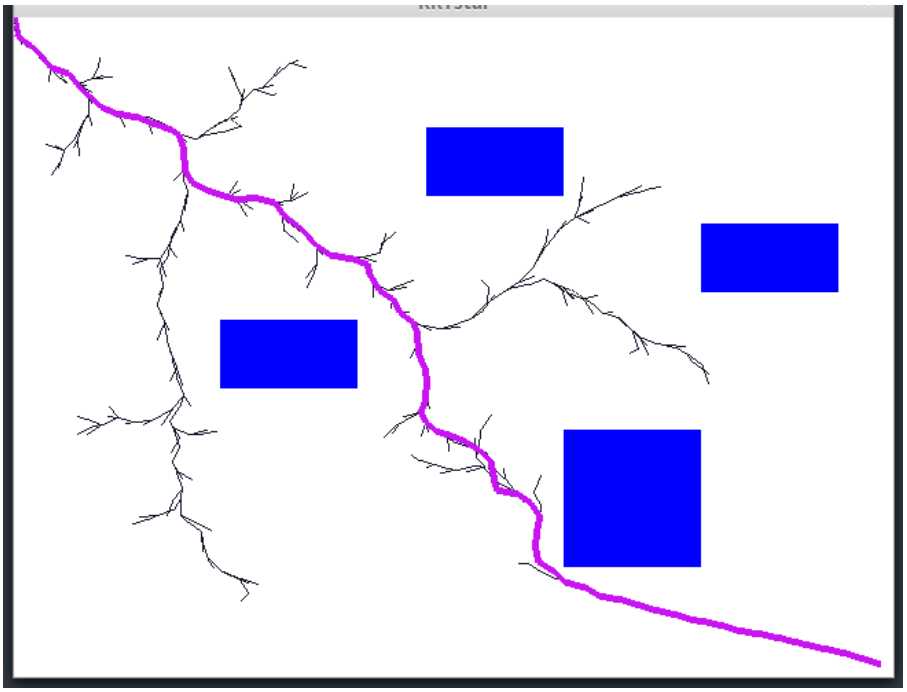


Figure 1: Bi-RRT (Converged for 2000 nodes)

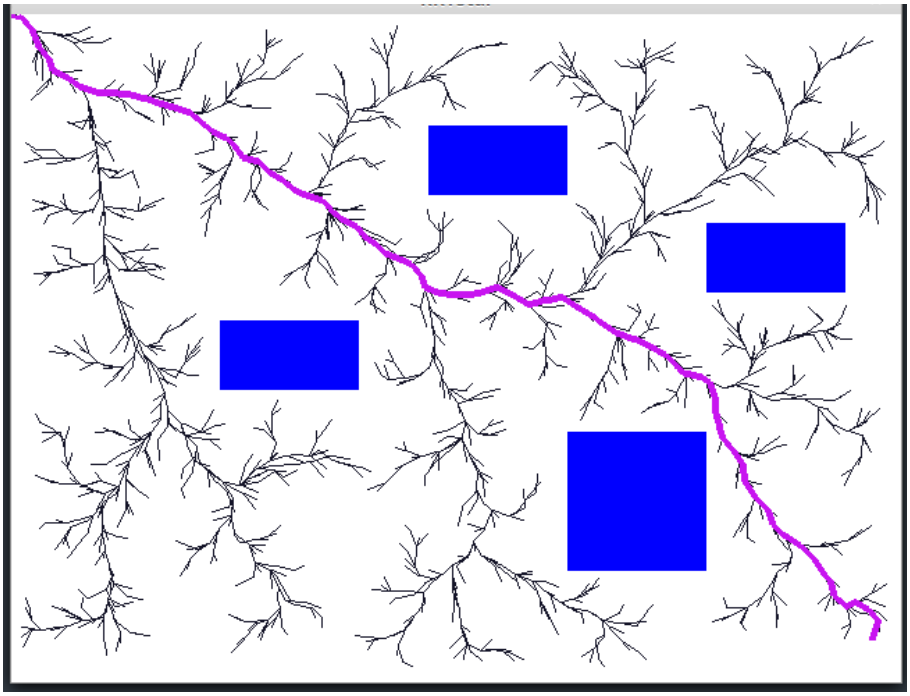


Figure 2: RRT (Didn't converge for 2000 nodes)

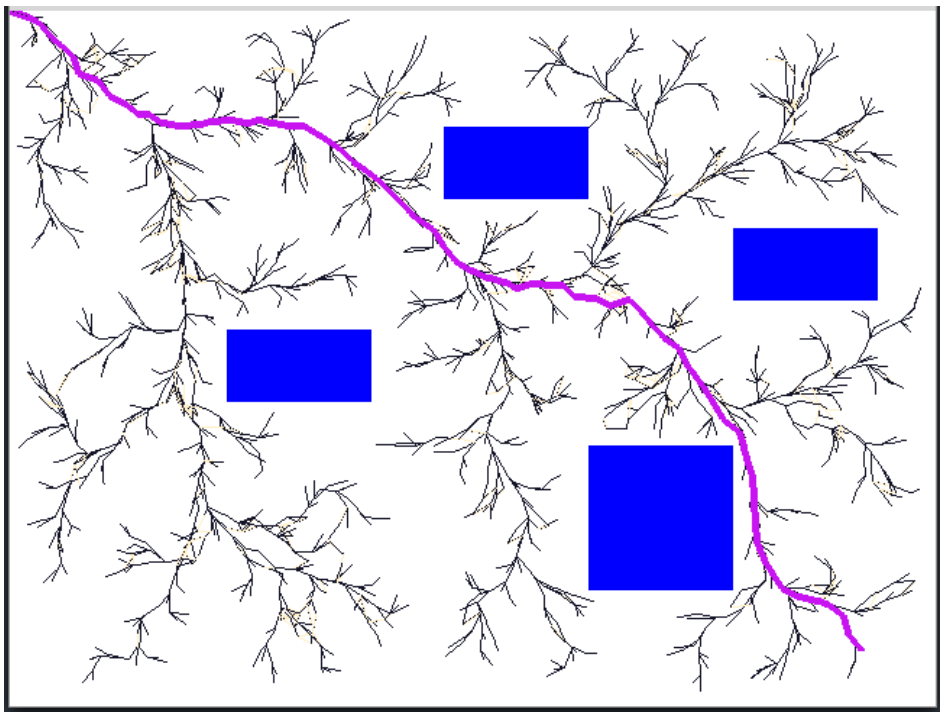


Figure 3: RRT* (Didn't converge for 2000 nodes)