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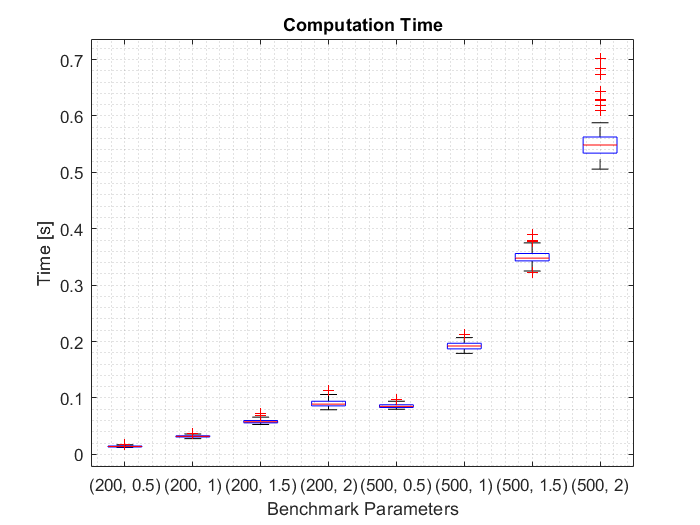
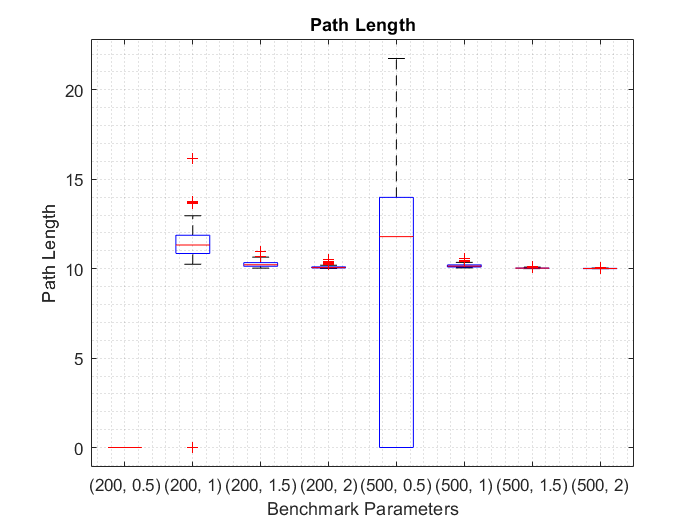
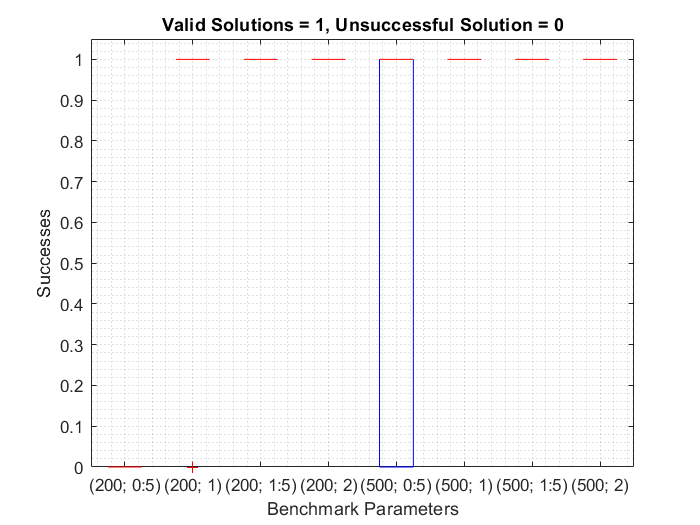
Homework #7

Exercise 1

1. A picture containing graphical user interface

   Description automatically generated  
     
   i) Roadmap Plot

ii) Benchmark Box Plots



iii) To maximize number of successful paths found while minimizing the path length and computation time, I found that n = 200 and r = 2 is the optimal configuration. With this configuration, the PRM algorithm always found a path with relatively (with respect to the other path lengths) short path lengths and small variance. This configuration does have a slightly higher average runtime, but I believe finding a short path is much more important than computation time within reason. For n = 500 and r = 2 , PRM was always successful in finding a short/low variance path, but the average run time was roughly 850% longer than the n = 200, r = 2 configuration with only a 0.69% decrease in path length.

**NOTE:** if a path was not found, the path length for that run was set to 0. I could have also gone the other way and made the path length for unsuccessful paths a very large number.

iv)