MP6 Dijkstra's Algorithm Test Plan
Cameron L Burroughs
ECE 2230, Fall 2020

The test script used for performance evaluation tested the time it took for the shortest path algorithm to work for both a random and strongly connected graph as well as how long it took for the network diameter function to find the diameter on the random graph.

```
echo "Show O(n^2) performance strongly connected graph"
    ./lab6 -g 3 -h 1 -n 11000 -s 0 -d 10999
    ./lab6 -g 3 -h 1 -n 5500 -s 0 -d 5499

echo "Show O(n^2) performance random graph"
    ./lab6 -g 4 -a 20 -h 1 -n 9700 -s 0 -d 9699
    ./lab6 -g 4 -a 20 -h 1 -n 5500 -s 0 -d 5499
```

for the shortest path test, the same source settings and operation settings were used, however the graph type and number of vertices and destination were changed. For the diameter test, again an average adjacency of 20 was used, however the operation was changed to -h 2 and the number of vertices was again changed to achieve ~1s run time.

To test node density, ten different seed values were fed into the same command line argument repeatedly to produce a sample set of graphs and determine the probability of a graph being connected or disconnected. For the condition -a 7 the graphs were mostly disconnected while -a 20 resulted in all connected graphs.

```
for seedNum in $seeds ; do
    ./lab6 -g 4 -h 2 -n 100 -r $seedNum -a 7
done
```

To test the Multiple-link disjoint paths, various average adjacencies were fed into the same command line argument to produce a varying number of paths. For this specific test R = (10, 20, 50, and 100) was used.

```
for R in $Rvalues ; do
    ./lab6 -g 4 -h 3 -n 1000 -s 0 -d 999 -a $R
done
```

For R = 10, the real average adjacency was 9.6, for R = 20 it was 18.8, For R = 50 it was 44.1, and finally for R = 100 it was 85. Each of these are slightly larger than the input, however this was to be expected from the construction of the program.