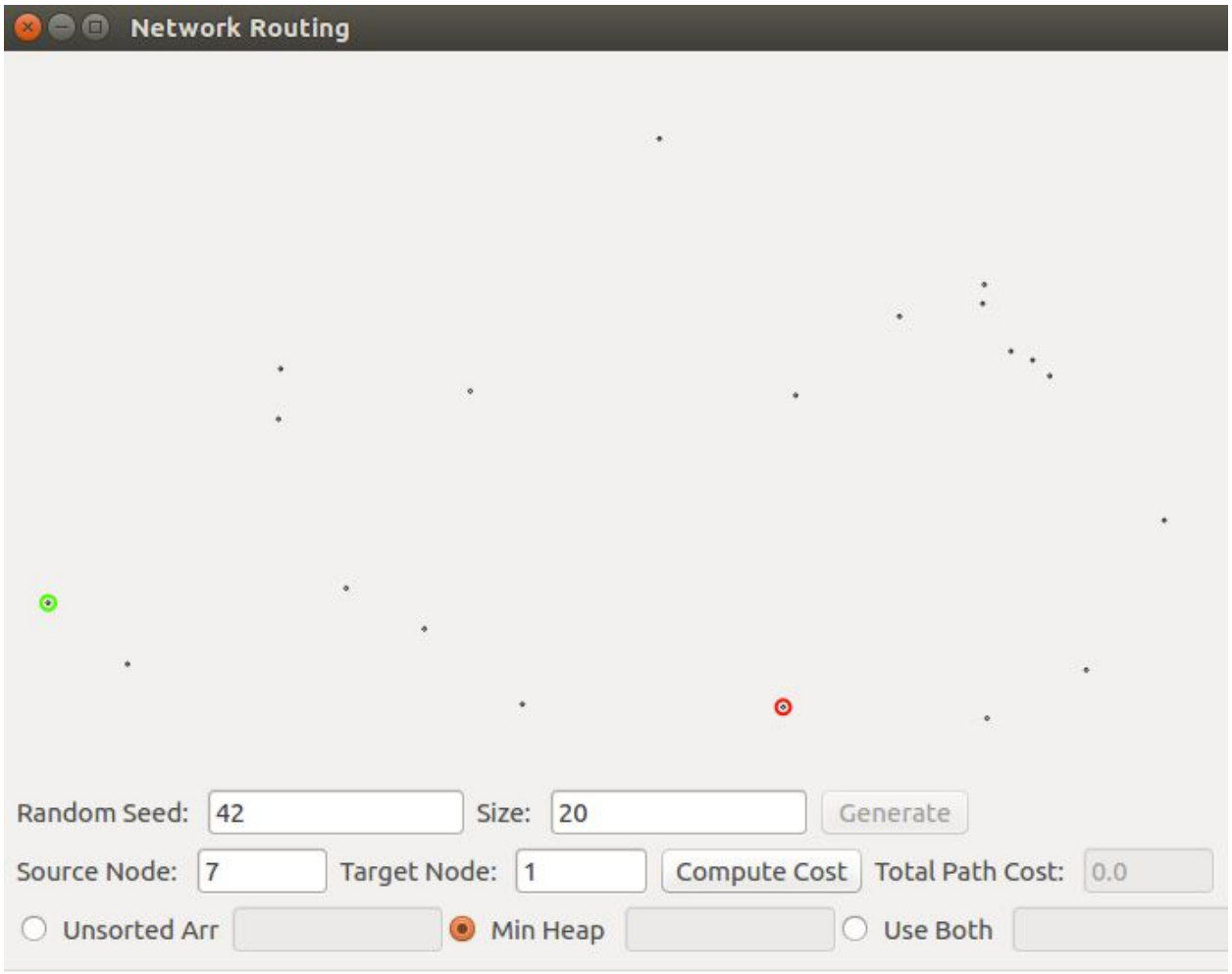
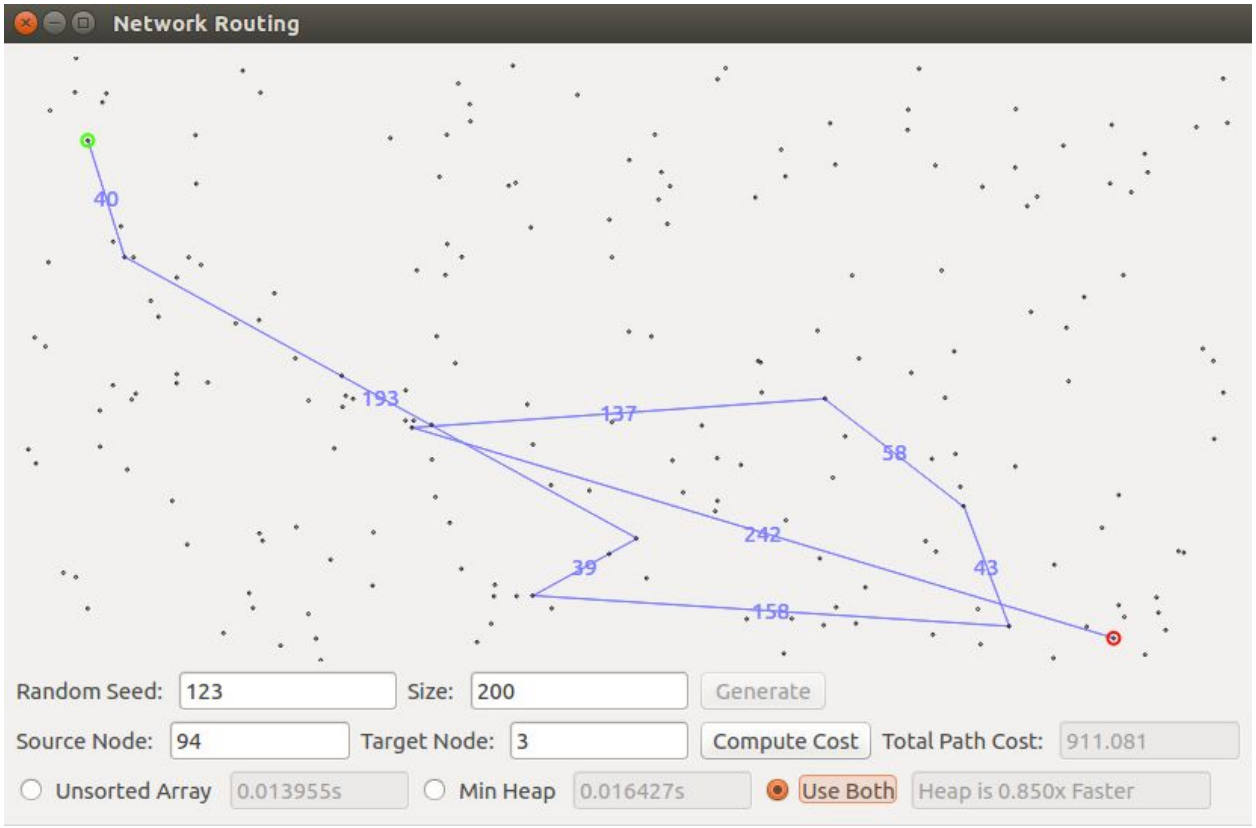
PART 4

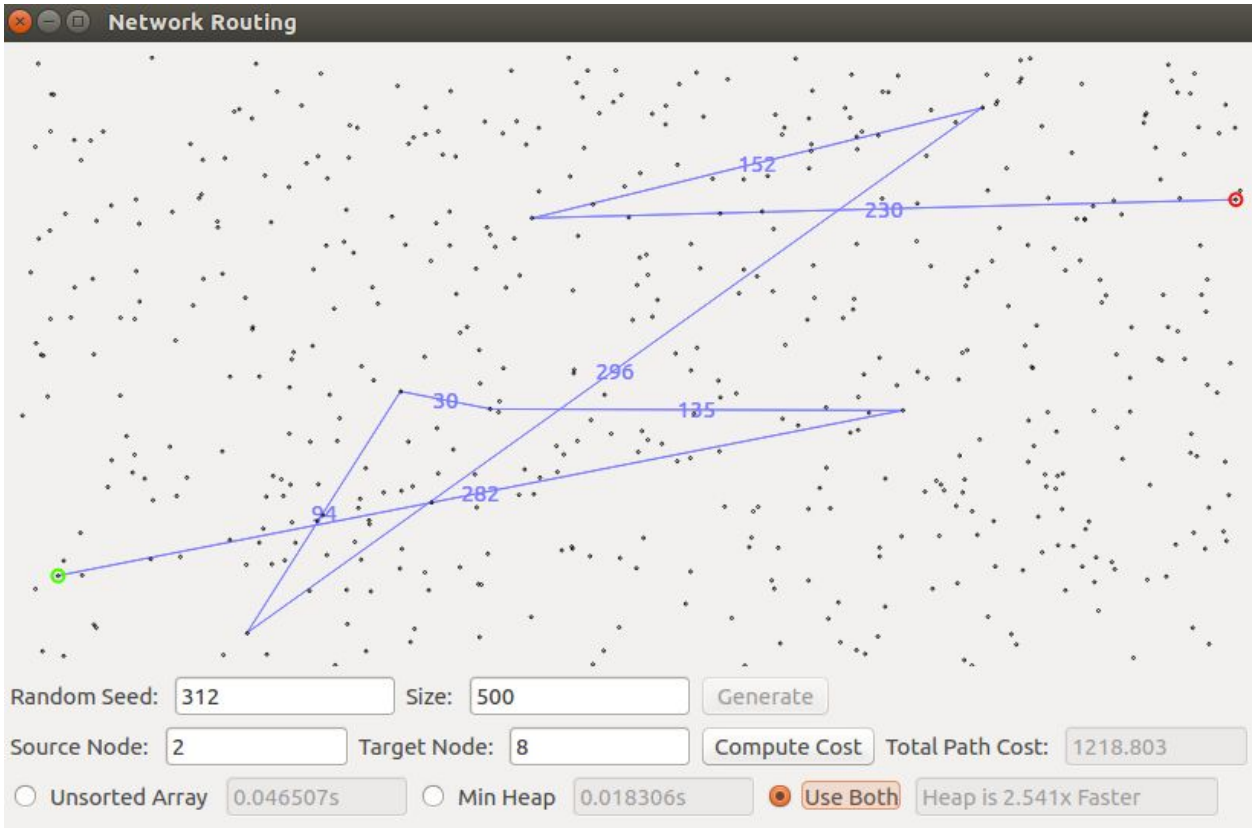
1. NO PATH



2.


Network Routing
40
193
137
58
242
39
43
158
Random Seed: 123
Size: 200
Generate
Source Node: 94
Target Node: 3
Compute Cost
Total Path Cost: 911.081
Unsorted Array
0.013955s
Min Heap
0.016427s
Use Both
Heap is 0.850x Faster

3.



PART 5

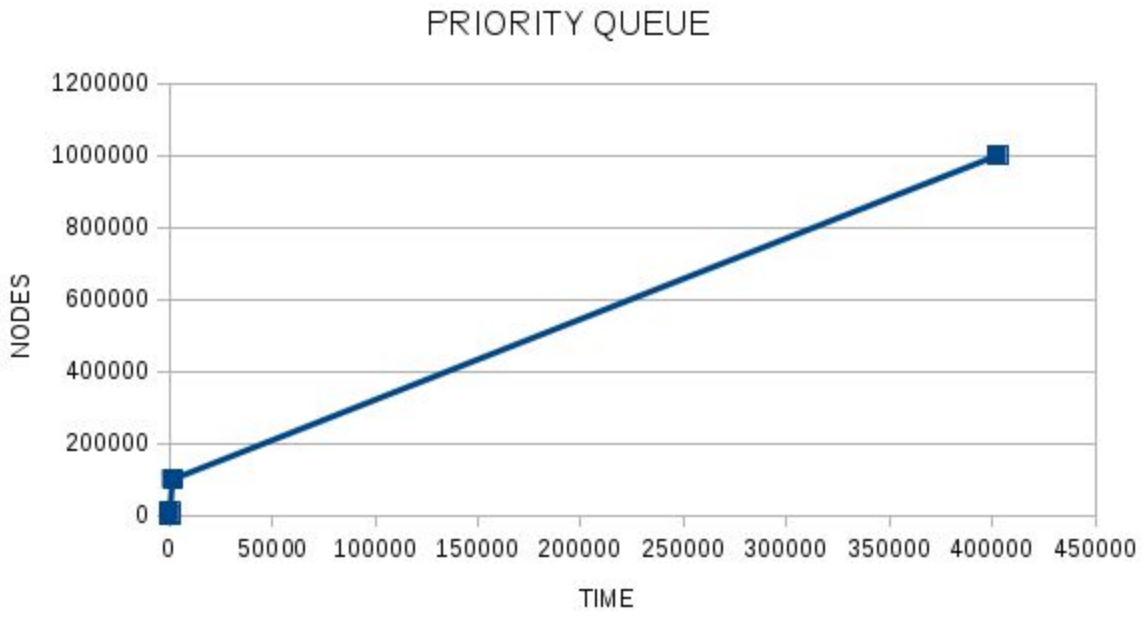
Priority Queue		Binary Heap	
SIZE	TIME	SIZE	TIME
100	0.001673	100	0.008945
100	0.003256	100	0.004461
100	0.003418	100	0.010407
100	0.003341	100	0.009097
100	0.001593	100	0.015003
AVERAGE	0.0026562	AVERAGE	0.0095826
DIFFERENCE	PQ is 0.277x faster (0.00692 seconds)		
Priority Queue		Binary Heap	
SIZE	TIME	SIZE	TIME
1000	0.120491	1000	0.041702
1000	0.128539	1000	0.042485

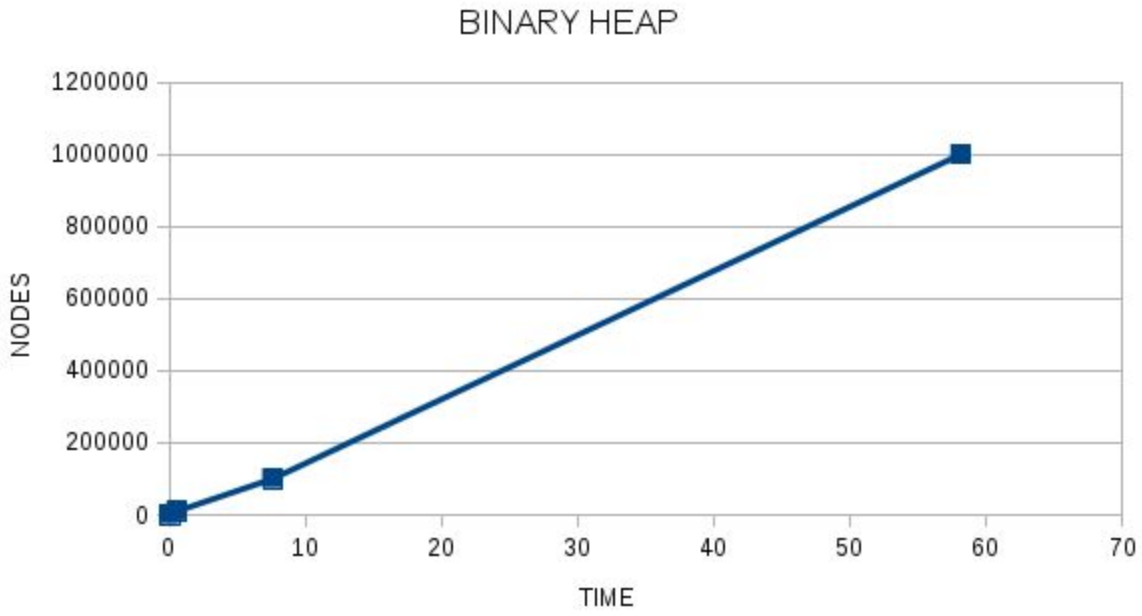
1000	0.129306	1000	0.048553
1000	0.10106	1000	0.034864
1000	0.114837	1000	0.03375
AVERAGE	0.1188466	AVERAGE	0.0402708
DIFFERENCE	BinHeap is 2.95x faster (.07857 seconds)		

Priority Queue		Binary Heap	
SIZE	TIME	SIZE	TIME
10000	9.97225	10000	0.527928
10000	10.409571	10000	0.585677
10000	9.73637	10000	0.594184
10000	10.106268	10000	0.534486
10000	8.994015	10000	0.523188
AVERAGE	9.8436948	AVERAGE	0.5530926
DIFFERENCE	BinHeap is 17.79x faster (9.2906 seconds)		

Priority Queue		Binary Heap	
SIZE	TIME	SIZE	TIME
100000	1568.46985	100000	7.10398
100000	1505.0307	100000	7.007127
100000	1513.728572	100000	8.522945
100000	1339.595443	100000	7.654832
100000	1393.932858	100000	7.610557
AVERAGE	1464.151485	AVERAGE	7.5798882
DIFFERENCE	BinHeap is 193.1626755x faster (1456.57 seconds)		

Binary Heap	
SIZE	TIME
1000000	60.32
1000000	56.476671
1000000	57.425179
1000000	56.925
1000000	59.38257
AVERAGE	58.105884


PRIORITY QUEUE
1200000
1000000
800000
600000
400000
200000
0
NODES
0
50000
100000
150000
200000
250000
300000
350000
400000
450000
TIME


BINARY HEAP
1200000
1000000
800000
600000
400000
200000
0
NODES
0
10
20
30
40
50
60
70
TIME

Priority Queue ESTIMATE		AVG. Time
100	NA~	0.0026562
1000	44.7X longer	0.1188466
10000	82.826x longer	9.843694
100000	148.74x longer	1464.151485
1000000	~275x longer	402641.6584

ESTIMATE FOR P. Queue on 1,000,000 nodes:402,641 seconds

I got this by calculating how much longer it takes to compute the next power of 10.
For example to compute 10^2 it takes .0026562 seconds. To calculate 10^3, it takes .1188466 seconds, which takes 44.7x longer to compute. As displayed in the data above, for every power of 10 increase, the time factor it takes to calculate approximately doubles. I.e (44.7 * 2 =apprx(82.826), 82.826 * 2 = apprx(148.74)).
Because the factor increase appears to be slightly less than 2, I did not approximate 1 million nodes at 296x longer. I made an estimate of where it would more likely be closer to.