

- What is the complexity of Dijkstra's algorithm implementation in this assignment?
 - The complexity of Dijkstra's algorithm implemented is $O(E \log(V))$
- Run the `TestTime` file (it'll take some time) and analyze the output in accordance with the complexity above.
 - After running our program, we found that the more vertices and edges the graph has, the longer it takes for Dijkstra's algorithm to go through 250 sources (on average).
- Plots:

```
*** Time Test Dijkstra ***
```

```
Loading DC.len...
```

```
Graph size: numVertices = 9559; numEdges = 29818
```

```
Running Dijkstra for 250 sources
```

```
Avg no. of unreachable vertices is 74
```

```
Avg time is 0.015788 secs
```

```
Loading RI.len...
```

```
Graph size: numVertices = 53658; numEdges = 138426
```

```
Running Dijkstra for 250 sources
```

```
Avg no. of unreachable vertices is 3827
```

```
Avg time is 0.06596 secs
```

```
Loading VT.len...
```

```
Graph size: numVertices = 97975; numEdges = 215116
```

```
Running Dijkstra for 250 sources
```

```
Avg no. of unreachable vertices is 6894
```

```
Avg time is 0.12898 secs
```

```
Loading SD.len...
```

```
Graph size: numVertices = 212313; numEdges = 519244
```

```
Running Dijkstra for 250 sources
```

```
Avg no. of unreachable vertices is 13594
```

```
Avg time is 0.333296 secs
```

```
Loading MA.len...
```

```
Graph size: numVertices = 308401; numEdges = 770328
```

```
Running Dijkstra for 250 sources
```

```
Avg no. of unreachable vertices is 19870
```

```
Avg time is 0.486876 secs
```

```
Loading WI.len...
```

Graph size: numVertices = 519157; numEdges = 1270872
Running Dijkstra for 250 sources
Avg no. of unreachable vertices is 12702
Avg time is 0.86998 secs

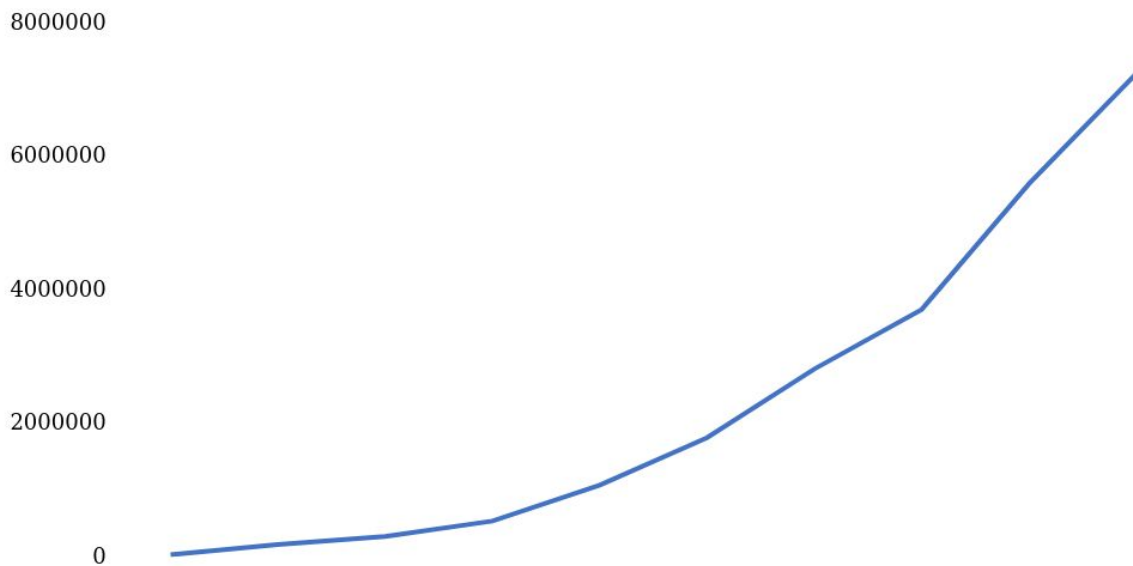
Loading IL.len...
Graph size: numVertices = 793336; numEdges = 2025634
Running Dijkstra for 250 sources
Avg no. of unreachable vertices is 2897
Avg time is 1.50516 secs

Loading FL.len...
Graph size: numVertices = 1048506; numEdges = 2661102
Running Dijkstra for 250 sources
Avg no. of unreachable vertices is 11859
Avg time is 1.853484 secs

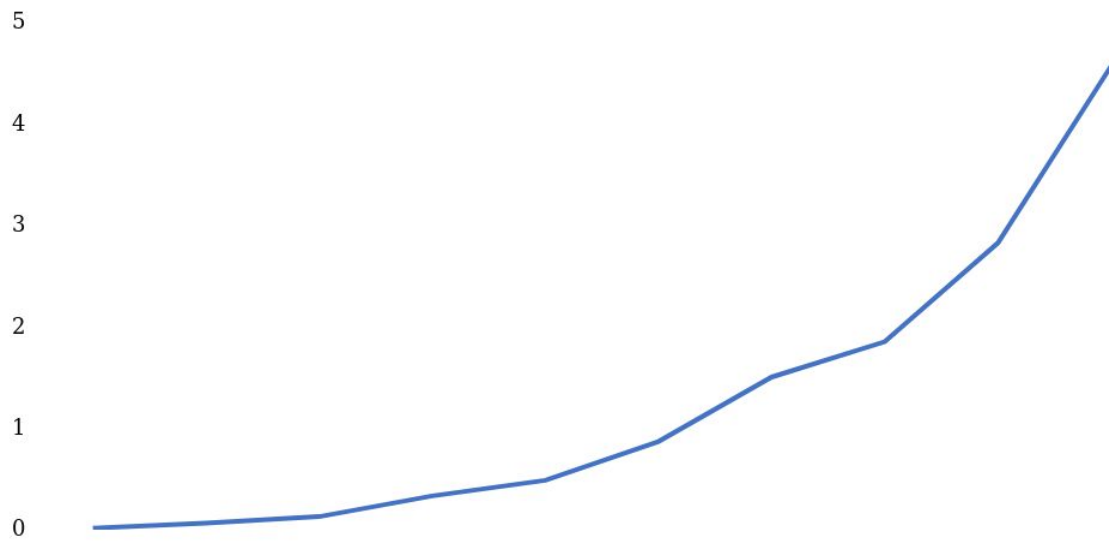
Loading CA.len...
Graph size: numVertices = 1613325; numEdges = 3978298
Running Dijkstra for 250 sources
Avg no. of unreachable vertices is 30512
Avg time is 2.827672 secs

Loading TX.len...
Graph size: numVertices = 2073870; numEdges = 5168318
Running Dijkstra for 250 sources
Avg no. of unreachable vertices is 53011
Avg time is 4.570392 secs

Complexity Plot



Time Plot



- Once you fill in the formula/numbers in the columns above, you should obtain two graphs. Do they look similar or different?
 - The plot looks very similar which means that we've got the complexity of $O(E \log(V))$ correct.