

Performance Analysis - Methodology based on Empirical Study

No of Nodes	Compile Time(millisecond)
6	0.8
12	0.83
24	1.6
48	5
96	20
192	92
384	468
768	1829

Table 1- compile time table

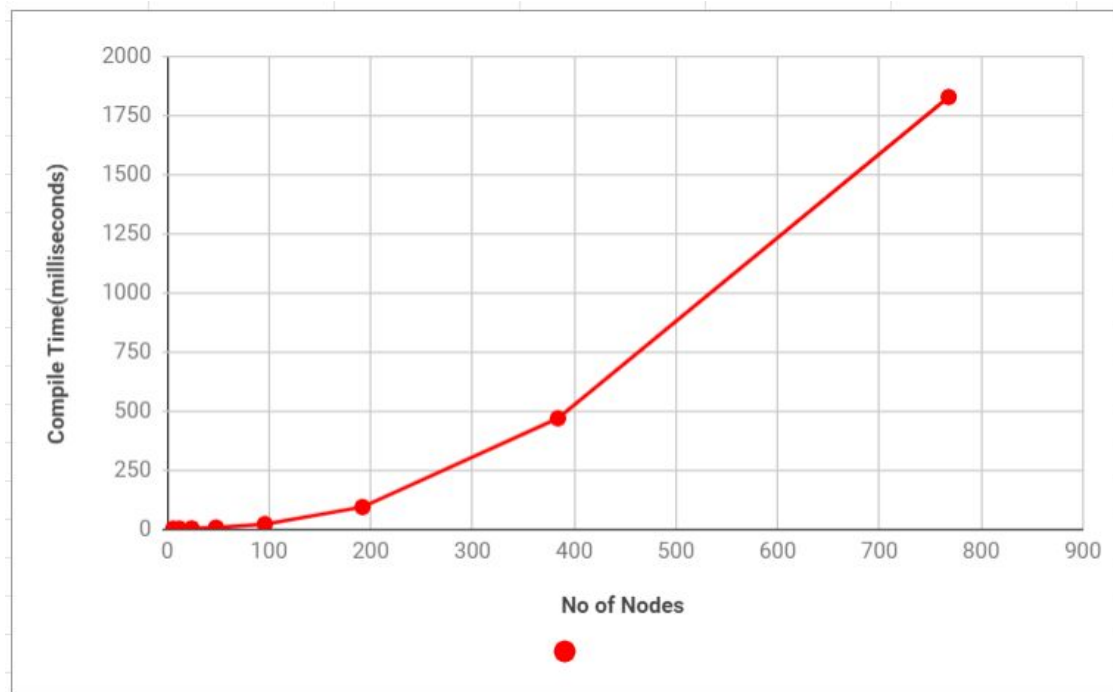


Figure 1 - graph growth of the algorithm

Ford-Fulkerson algorithm is used to find the maximum flow of flow network. Augmented path and bfs(Breadth-first search) are used to visited flows and capacities of the flow network. To generate random graphs, i have considered worst cases depending on the time of executing the algorithms and the number of nodes. To find out the path LinkedList and Array list are used. When we get the maximum flow by using Jgrapht finally we get the required graph.

This graph clearly shows the Maximum flow Algorithm $O(N^2)$. Graph is created by running the programme 8 time and by taking twice the values of inputs from 6 to 768. From the input node values 6 to 384 graph has a normal curve. Then after the input value is 384 till it reaches 768 it has a rapid increase in gradient of the curve. Overall behaviour of the graph is a polynomial.

Appendix

```
1 - Enter nodes manually
2 - Calculate nodes in randomly
2
Nodes :8
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0  18  12  19  19  19  13  5
0  0  20  15  5  9  18  10
0  15  0  5  17  12  20  13
0  8  9  0  11  5  6  14
0  14  15  11  0  16  19  15
0  8  10  6  8  0  15  5
0  15  14  15  9  19  0  10
0  0  0  0  0  0  0  0
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The Possible Max Flow is :72
Execution time in nanoseconds : 684855
Execution time in milliseconds : 0
```

Figure 2 - output

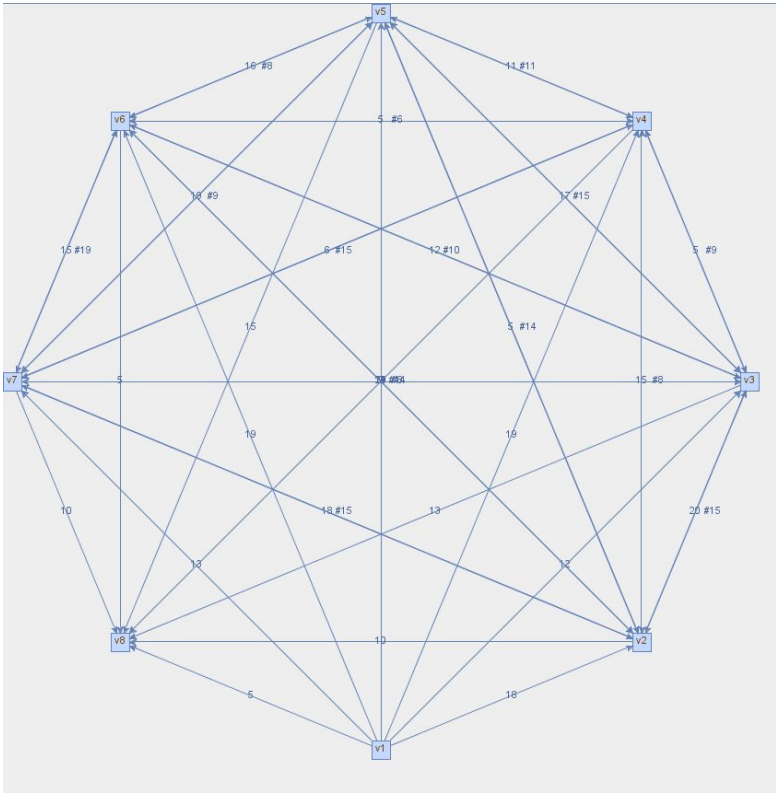


Figure 3 - graph of output