UNIVERSITY OF WESTMINSTER

INFORMATICS INSTITUTE OF TECHNOLOGY

Informatics Institute Of Technology

Algorithms: Theory, Design and Implementation

5SENG001W

Module Leader(s) Name –Mr. Achala Chathuranga Aponso

First name: Ramiiyan
Surname : Sriraguhan

UOW ID: W1697828
Student ID: 2017380

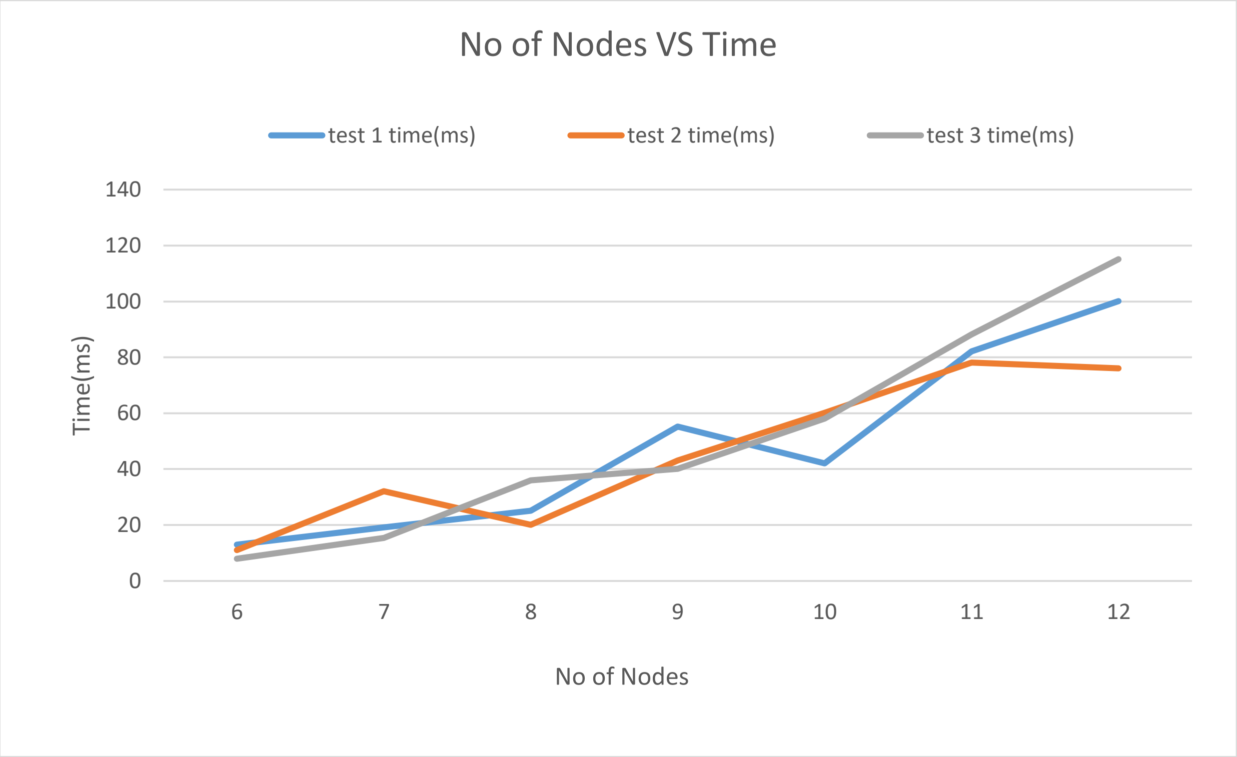
Introduction

The scope of the Course work is finding maximum of flow network. This flow network is directed and weighted graph, here I'm using Idea of Edmond-Karp Algorithm with Ford-Fulkerson Implementation. I re-create the algorithm to representable as graph. I use Python Language with Networkx and Matplot libraries. To find maximum flow, I used own Breadth First Search (Method called bfs(resGraph, s, t, pathMap)) to reduce the time.

Analysis of Performance

In python there are so many libraries that helps to do reduce the time of the algorithm.

The Following graph speaks to the Empirical studies on the Algorithm. The time increments with the expansion of vertex. In view of the distinctions in limit and edges network there were diverse results of time for a similar vertex tally.



The graph of Vertex VS Time says that the capacity of edges and numbers nodes plays huge role in this maximum flow finding algorithm.

Growth of Classification

For my algorithm, maximum flow can the Big-O Notation address.

Affecting Factors on my Algorithms are,

- Generating Random 2d list(Matrix)
- Breadth First Search – bfs()
- Adjacent representation of Matrix

So, in my Algorithm generating random matrix give O (n^2).In bfs () from Source to Sink (in my scenario e.g. 0-5 nodes named integers) passing through all the nodes and making map for the flow and on dictionary (Key: Value used in Python).so, from the map finding the Flow path and calculating Residual Capacity. This bfs () will happen until the path of the edges are closed. (Edges becoming 0).

For this bfs (), the worst case scenario of Big-O Notation is O (n^2).

Following that making new residual graph with new capacities, the Important Thing is, while making new residual graph subtracting flow path from all edges and also adding flow path for reverse Edges.

So, in my algorithm this functionalities give Big-O Notation of worst case is O (n^3).

So All over this Algorithm of Worst case scenario of Big-O Notation is O (n^3).

This Scenario consider many factors mainly time complexity.