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Subject : AAC

Expt no : 6

Aim : Write a program to
implement and Analysis Ford-
Fulkerson Algorithm

Aim:

Write a program to Implementation and Analysis of Ford-Fulkerson's algorithm

Objectives:

- Initialization and insertion of element in graph using C/Java/python programming language.
- Finding Max Flow in a graph.

Methodology:

Given a graph which represents a flow network where every edge has a capacity. Also given two vertices *source* 's' and *sink* 't' in the graph, find the maximum possible flow from s to t with following constraints:

- Flow on an edge doesn't exceed the given capacity of the edge.
- Incoming flow is equal to outgoing flow for every vertex except s and t.

Time Complexity:

When the capacities are finite integers, the runtime complexity of Ford-Fulkerson's algorithm is bounded by $O(Ef)$ where E is the number of edges in the graph and f is the maximum flow in the graph.

Reference Paper:

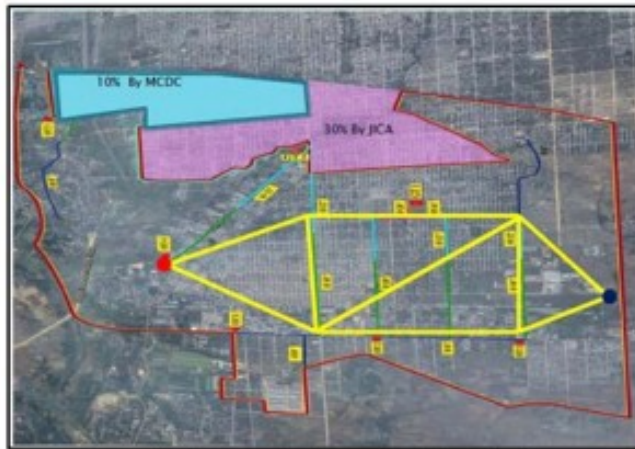
Paper Title : Application of Ford-Fulkerson Algorithm to Maximum Flow in Water Distribution Pipeline Network.

Authors: Myint Than Kyi*, Lin Lin Naing**

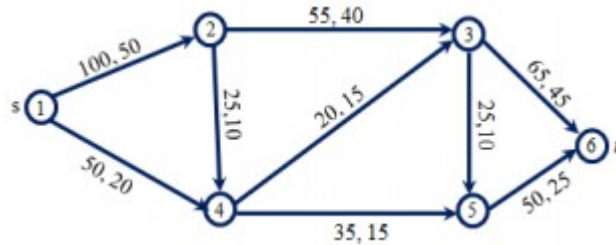
Publication : International Journal of Scientific and Research Publications, Volume 8, Issue 12, December 2018

Overview : In this paper Ford-Fulkerson algorithm in graph theory is used to calculate the maximum flow in water distribution pipeline network of Pyigyitagon Township in Mandalay, Myanmar from single-source to single-sink.

Geographical view:



Graph: The following graph shows the capacity and current flow in pipeline. Same graph is also use as input in implemented algorithm.



Results:

```
saeem@saeem-Inspiron-3558:~/Desktop/college/aac/expt6$ python3 fordFulkerson.py
```

For the given graph:

```
[0, 100, 0, 50, 0, 0]
```

```
[0, 0, 55, 25, 0, 0]
```

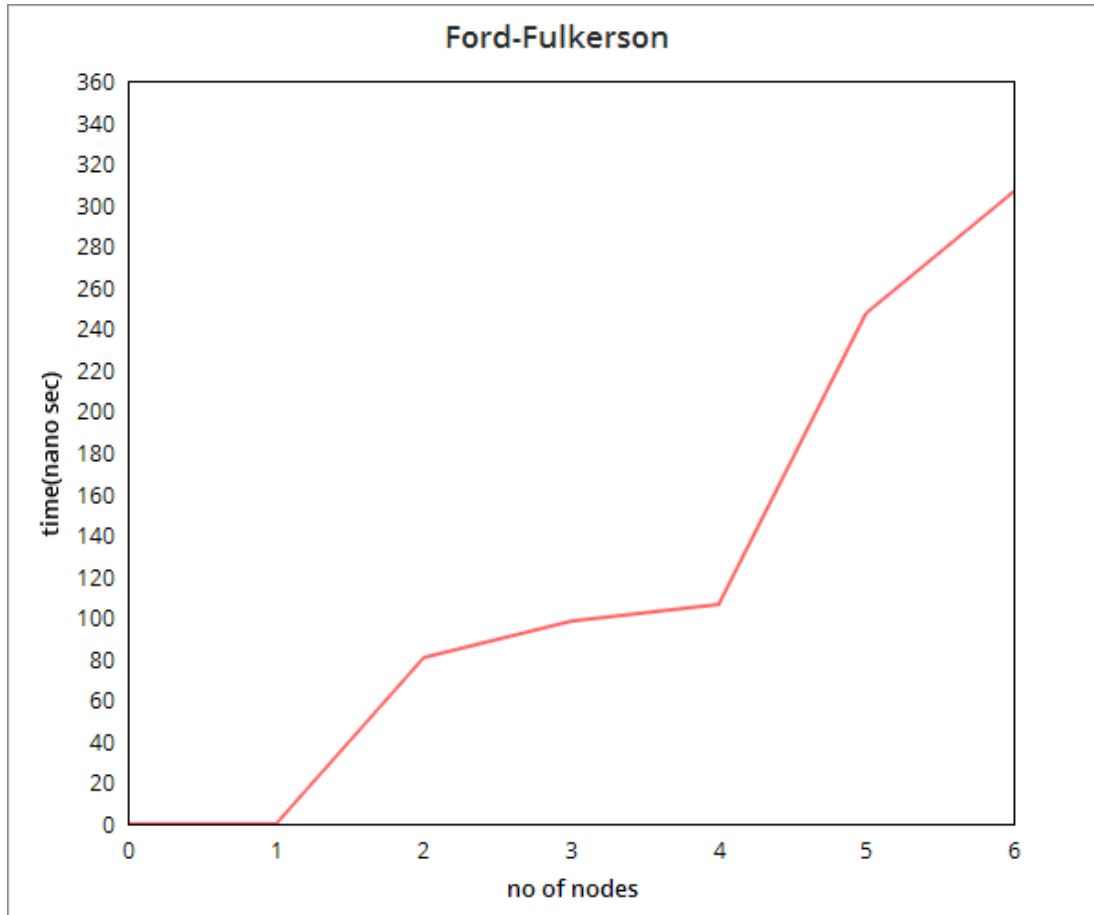
```
[0, 0, 0, 0, 25, 65]
```

```
[0, 0, 20, 0, 35, 0]
```

```
[0, 0, 0, 0, 0, 50]
```

```
[0, 0, 0, 0, 0, 0]
```

The maximum possible flow is 110



Conclusion:

Here we can conclude that ford-fulkerson's algorithm is used to calculate maximum flow in a network. Time complexity of this algorithm is directly propotional to the no of nodes in network and max capacity.