 

**INFORMATICS INSTITUTE OF TECHNOLOGY**

**IN COLLABORATION WITH**

**UNIVERSITY OF WESTMINSTER (UOW)**

**B.Eng. (Hons) Software Engineering**

**5SENG002C.2 – Algorithms: Theory Design and Implementation**

**Module Leader: Sudharshan Welihinda**

Coursework - 01

**UOW ID:** w1761265

**Student ID:** 2019281

**Student Full Name**: Mohammed Nazhim Kalam

1. A short explanation of your choice of data structure and algorithm.

* The data structure I choose is a queue. Queue (FIFO – First in First Out) is a data structure with both ends open, indicating that one end is often used to enter data (also known as enqueue) and the other end is often used to exclude data (also known as dequeue).The reason for using Queues is due the searching or traversing algorithm used is BFS (Breadth First Search/Traversal). BFS is an algorithm which is used for traversing a graph and this uses queues to remember to capture the next vertex to start a search. The reason why BFS is used not DFS for finding the augmenting path is that BFS promises to find the shortest possible path from source to sink where as DFS doesn’t.
* Ford Fulkerson is the algorithm that was used. In a given graph, the Ford-Fulkerson algorithm is used to find the maximal flow from the start vertex to the sink vertex. Any edge in a graph has a capacity. Source and Sink are the two key vertices that are given to find the maximum flow between these vertices. The sink vertex will have all inward edges and no outward edges, while the root vertex will have all outward edges and no inward edges. There are also some important constraints to be followed which are the flow on an edge cannot exceed its maximum capacity of flow through that edge and except for the source and sink, any edge's incoming and outgoing flow would be equal.

1. Run of your algorithm on the smallest benchmark example.
2. A performance analysis of your algorithmic design and implementation. (Based of Doubling Hypothesis) also include the suggested order of growth classification (Big-O-notation).