

COMP3121 Homework Q3

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1 Answer

Here we have a N computers with M one directional lists connecting different computers. We have to remove some connections to make sure computer 1 is not connected to the computer N . For each connection, there's a cost of removing that connection. Lets first make a network flow graph. In our graph we have computer 1 as source and computer N as the sink. The edges connecting there vertices are the links that connect the computers. Let the edge have capacity equal to the cost of removing it. After we have our graph, we can use Edmond-Karps algorithm on the graph with BFS traversal to get the maximum flow graph between source and sink. After we have gotten our final residual graph, there will be edges which will bottleneck our graph. So lets use a BFS on our final residual graph to get the minimum cut we need to make. When we use BFS, we will see the edges which have been maximally optimised (100 percent flow), and since these edges will have the maximum flow through them, it will be of the minimum cost to remove them from there. Hence after the BFS on final residual graph, we can simply remove the edges which correspond to the minimum cut and we have a network flow in which computer 1 will not be connected to computer N while the cost used up in removing the edges is minimised. Reference for this question was taken for Tutorial 5 question 6.