COMP3121 21T2 Assignment 4 Q1

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Let computer 1 which has the virus as source, computer N which cannot receive the virus as sink, and all other $N-2$ computers $2, 3, ..., N-1$ can be treated as vertices for virus transmission. In order to prevent computer N to be infectious with virus, all possible links have to be disconnected. Hence, we could utilise maximum flow and minimum cut strategy to determine the minimum cost of removing all possible links. Assuming all one-directional links which connect pairs of computers have infinite capacities, since transmitting virus do not cost any capacity. The maximum flow can be determined by implementing Edmons-Karp algorithm in the computer network. the result can leads to construction of the last residual network flow, the minimum cut solution can be found by examining the possible links from source. The links have been included into the cut solution are the edges should be removed, and the number of these links are the minimum cost. Overall, the time complexity is $O(V \times E^2)$ based on Edmons-Karp algorithm, where V is the total number of vertices and E is the total number of edges.