

CSCI 3110 Tutorial 4

Reviewed June 7, 2019

1. We are given a directed graph $G = (V, E)$ on which each edge $(u, v) \in E$ has an associated value $r(u, v)$, which is a real number in the range $0 \leq r(u, v) \leq 1$ that represents the reliability of a communication channel from vertex u to vertex v . We interpret $r(u, v)$ as the probability that the channel from u to v will not fail, and we assume these probabilities are independent. Give an efficient algorithm to find the most reliable path between two given vertices.
2. A server has n customers waiting to be served. The service time required by each customer is known in advance: it is t_i minutes for customer i . So if, for example, the customers are served in order of increasing i , then the i th customer has to wait $\sum_{j=1}^i t_j$ minutes.

We wish to minimize the total waiting time

$$T = \sum_{i=1}^n (\text{time spent waiting by customer } i).$$

Describe an efficient algorithm for computing the optimal order in which to process the customers and give a brief justification of its running time and correctness.