CS 374 Lab 19: More Shortest Paths

Date: April 5, 2016.

1. Let $G = (V, E)$ be a directed graph with edge length $\ell : E \to \mathbb{R}^+$. A subset of the edges $E' \subseteq E$ are considered risky. Describe an algorithm that given $G = (V, E)$, the edge lengths ℓ, the risky subset E', a node s and an integer h finds for each node $v \in V$ the shortest path distance from s to v among all paths that contain at most h risky edges.

2. Now suppose there are two different types of risky edges: blue and red. Let $E_1 \subset E$ be the blue risky edges and $E_2 \subset E$ be the red risky edges. You want to solve the same single-source shortest path problem but now the paths are constrained to use at most h_1 blue risky edges and at most h_2 red risky edges.