

## COP 3503 Honors – Homework 7 (Collaborative)

**Due Date: November 19, 2018**

1. (25 pts) Modify Dijkstra's algorithm so that it checks if a given directed graph  $G = (V, E)$  has a cycle. Give the pseudocode and analyze the performance.
2. (25 pts) Assume that for a given weighted directed graph  $G = (V, E)$ , the shortest path from  $s$  to any other vertex contains at most  $m$  edges. Show how to modify the Bellman-Ford algorithm to take advantage of this information. Give the pseudocode.

### Extra Credit (10 pts)

How can we use the output of the Floyd-Warshall algorithm to detect the presence of a negative weight cycle?