

Homework 4, Due Wednesday October 28, 2015

**Problem 1 (10 points):**

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**Problem 2 (10 points):**

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**Problem 3 (10 points):**

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**Problem 4 (10 points):**

Let  $G = (V, E)$  be a directed acyclic graph with lengths assigned to the edges. Give an  $O(n + m)$  time algorithm that given vertices  $s, t \in V$  finds a maximum length path from  $s$  to  $t$ . Justify that your algorithm is correct.

**Problem 5 (10 points):**

Let  $G = (V, E)$  be a directed graph with lengths assigned to the edges. Let  $\delta(u, v)$  denote the shortest path distance from  $u$  to  $v$ . Prove that for all vertices  $u, v, w \in V$ :

$$\delta(u, w) \leq \delta(u, v) + \delta(v, w).$$