CMPSC 465 Data Structures & Algorithms
Fall 2025 Ke Chen and Yana Safonova

Quiz 6

Lecture Section: **Monday, Oct 13, 2025**

Student Name: **PSU Email ID:**

1. (2 pts.) The Bellman-Ford algorithm can be used to find shortest paths in an **undirected** graph with negative edge weights.

(a) True

(b) False

2. (2 pts.) While running Bellman-Ford on a graph with no negative cycles, updating every edge $|V|^2$ times instead of $|V|-1$ times has no effect on the output.

(a) True

(b) False

3. (2 pts.) Which of the following recursions is used in Floyd-Warshall? Here, $dist_k[i,j]$ is the shortest path from vertex i to vertex j using only the first k vertices and $\ell(i,j)$ is the weight of the edge from i to j.

(a) $dist_k[i,j] = dist_{k-1}[i,j] + \ell(k-1,j)$

(b) $dist_k[i,j] = dist_k[i,k] + dist_k[k,j]$

(c) $dist_k[i,j] = \max\left\{\begin{matrix} dist_{k-1}[i,j], \\ dist_{k-1}[i,k] + dist_{k-1}[k,j] \end{matrix}\right\}$

(d) $dist_k[i,j] = \min\left\{\begin{matrix} dist_{k-1}[i,j], \\ dist_{k-1}[i,k] + dist_{k-1}[k,j] \end{matrix}\right\}$

4. (2 pts.) In a valid flow, the total flow out of the unique source vertex s (i.e., the value of the flow) is greater than the total flow into the unique sink vertex t.

(a) True

(b) False

5. (2 pts.) In a network flow, if the capacity of an edge is increased, the maximum flow from the source to the sink must increase.

(a) True

(b) False