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

Quiz 8 Solution

Lecture Section: **Monday, Oct 27, 2025**

Student Name: **PSU Email ID:**

1. (2 pts.) Which of the following problems has an optimal greedy solution?

(a) 0-1 Knapsack

(b) Minimum Spanning Tree

(c) Maximum sum path from root to leaf in a binary tree.

Answer (b) Minimum Spanning Tree
Both Kruskal's Algorithm and Prim's Algorithm are optimal and greedy.

2. (2 pts.) When does a greedy algorithm guarantee an optimal solution?

(a) When the problem exhibits the greedy-choice property and optimal substructure.

(b) When the problem has no constraints.

(c) As long as the problem has optimal substructure, a greedy algorithm guarantees an optimal solution.

Answer (a) When the problem exhibits the greedy-choice property and optimal substructure.

3. (2 pts.) In Kruskal's algorithm for finding the Minimum Spanning Tree (MST), what is the greedy choice?

(a) Selecting the vertex with the minimum degree.

(b) Choosing the edge with the minimum weight that does not form a cycle.

(c) Adding the edge with the maximum weight first.

(d) Exploring all possible spanning trees.

Answer (b) Choosing the edge with the minimum weight that does not form a cycle.

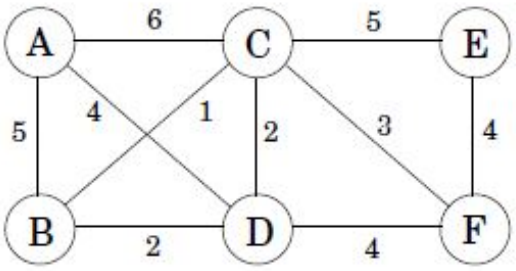
4. (2 pts.) Dijkstra's Algorithm for finding the shortest path to all vertices from a single source is an example of a greedy algorithm.

(a) True

(b) False

Answer (a) True

5. (2 pts.) What is the cost of the minimum spanning tree in the following graph?



(a) 12

(b) 14

(c) 15

(d) 16

Answer (b) 14