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Unit 2 - Week 0

Assignment 0

The due date for submitting this assignment has passed. **Due on 2018-01-29, 23:59 IST.**

Submitted assignment

1) Let's look at an undirected connected graph G = (V, E). The diameter of a graph is defined to be the length of the longest shortest path.Consider the following statements: ***1 point***
I. The diameter of a complete graph is 1.
II. The diameter of a complete bipartite graph is 1.

- I. is true, II. is false
- Both are true
- I. is false, II. is true
- Both are false

No, the answer is incorrect.
Score: 0

Accepted Answers:
I. is true, II. is false

2) Consider an undirected connected graph G in which each edge is assigned a weight. Which of the following statements about the minimum spanning tree are true? ***1 point***

- The minimum spanning tree of a graph is always unique.
- The minimum spanning tree of a graph is unique if the weights are distinct.
- There **will** be more than one minimum spanning tree if the weights are not distinct.
- There **can** be more than one minimum spanning tree if the weights are not distinct.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The minimum spanning tree of a graph is unique if the weights are distinct.
*There **can** be more than one minimum spanning tree if the weights are not distinct.*

3) A cut-set of a graph G is defined to be any subset of edges in graph G whose removal disconnects the graph. A min-cut is a cut-set with the least possible cardinality. In Figure 1, the edge (3,5) is a min-cut. Let the number of vertices in G be n ***1 point***

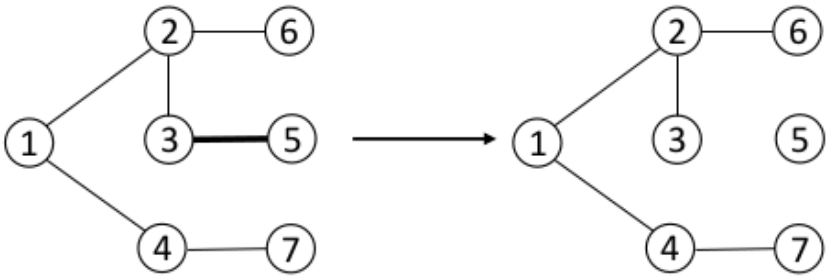

Figure 1: A cut-set that is also a min-cut.

What is the min-cut of a complete graph?

- 1
- n
- n − 1
- n/2

No, the answer is incorrect.
Score: 0

Accepted Answers:
n − 1

4) What type of algorithmic design paradigm does quicksort rely on? ***1 point***

- Divide and conquer
- Dynamic programming
- Greedy
- Prune and search

No, the answer is incorrect.
Score: 0

Accepted Answers:
Divide and conquer

5) Consider applying deterministic quicksort to the following arrays of numbers where the first element of the partition is chosen as the pivot every time. Using this strategy, for which of the following arrays will quicksort require the most number of comparisons? ***1 point***

- 1 2 3 4 5
- 1 3 2 5 4
- 5 2 3 1 4
- 4 3 1 5 2

No, the answer is incorrect.
Score: 0

Accepted Answers:
1 2 3 4 5

6) What is the worst case running time of deterministic quicksort? ***1 point***

- $\Theta(n^2 \log n)$
- $\Theta(n \log n)$
- $\Theta(n^2)$
-

$\Theta(\sqrt{n})$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$\Theta(n^2)$

7) Among the following pivot choice strategies, which one is the best in terms of speeding up worst case run time of quicksort? Assume that for the following options, the operation to choose the required pivot element takes the same time. ***1 point***

- Choose the first element of the partition every time.
- Choose the last element of the partition every time.
- Choose the middle element of the partition every time
- Choose the median of the first, middle, and last element of the partition every time.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Choose the median of the first, middle, and last element of the partition every time.

8) Recall Blum's median finding algorithm. It has a worst case running time that is linear in n (the total number of elements). Assume that 3, 5 are factors of n. In the algorithm, usually, we split the input of n elements into n/5 groups of 5 elements each. Suppose, instead, we split the n elements into n/3 groups of 3 elements each then, the asymptotic worst case running time of the algorithm is still linear. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

End