Quiz 3

Started: Oct 16 at 1:20pm

Quiz Instructions

Question 1 — 2 pts

Let G = (V, E) be an indirected graph. Let X = E. Let S be the set of forests of G satisfying that each forest in S contains at most 5 edges. Then (X, S) forms a matroid.

- [x] True
- [ ] False

Question 2 — 2 pts

Let T be a leftist tree. Let v be an arbitrary node of T. Let L(v) be the number of nodes in the left subtree rooted at v, and let R(v) be the number of nodes in the right subtree rooted at v. Then we have L(v) >= R(v).

- [ ] True
- [x] False

Question 3 — 3 pts

When Dijkstra's algorithm is applied to the instance (shown on screen) to find the shortest path from S to other vertices, the order of vertices that are removed from the priority queue is:

- [ ] (S, A, B, C, D)
- [ ] (S, A, C, B, D)
- [ ] (S, A, D, B, C)
- [x] (S, A, D, C, B)

Question 4

3 pts

Let G = (V, E) be an indirected graph with positive weight w(e) for edge e in E. Let C be a cycle in G and let e1 be one edge in C.

- ○ If there exists some other edge e2 such that w(e2) < w(e1), then there exists a minimum spanning tree of G such that e1 is not in it.
- ○ If there exists some other edge e2 such that w(e2) > w(e1), then there exists a minimum spanning tree of G such that e1 is in it.
- ◉ If e1 has larger weight than any other edge in C. Then e1 is not in any minimum spanning tree of G.
- ○ If e1 has smaller weight than any other edge in C. Then e1 is in every minimum spanning tree of G.

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