

Unit 13 - Week 11

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Lecture 51 : Disjoint set data structure

Lecture 52 : Union-Find

Lecture 53 : Augmented disjoint set data structure

Lecture 54 : Network flow

Lecture 55 : Network Flow (cont...)

Week 11: Lecture Notes

Quiz : Assignment 11

Week 11 Feedback Form

Week 12

Details Solution

Download videos

Text Transcripts

Assignment 11

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-15, 23:59 IST.

1) In disjoint set data structure, *representative element* supports which of the following operation?

1 point

- (a) Find-Set
- (b) Union
- (c) Make-Set
- (d) All of these

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

2) let $\mathcal{S}=\{S_1, S_2, \dots, S_n\}$ be the collection of disjoint sets, then after how many maximum UNION operation will the set \mathcal{S} contain exactly one set?

1 point

- (a) $n - 1$
- (b) $n - 3$
- (c) $n - 2$
- (d) None of these

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

3) If for each set $S_i=\{x_1, x_2, \dots, x_n\}$ as balanced tree, then what is time complexity in worst case for FIND-SET(x) operation, for some x ?

1 point

- (a) $\Theta(n)$
- (b) $\Theta(\log n)$
- (c) $\Theta(n^2)$
- (d) $\Theta(1)$

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

4) "The *MakeSet* operation makes a new set by creating a new element with a unique id, a rank of 0, and a parent pointer to itself. The parent pointer to itself indicates that the element is the representative member of its own set."
The above statement is

1 point

- (a) True
- (b) False

- a.
 b.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

5) If we concatenate smaller lists into the end of larger list and n is the overall numbers of elements, then cost of all UNIONS is

1 point

- (a) $\mathcal{O}(n \log n)$
- (b) $\mathcal{O}(\log \log n)$
- (c) $\mathcal{O}(1)$
- (d) None of these

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

6) Given a flow network $G = (V, E)$, let f_1 and f_2 be functions from $V \times V$ to \mathbb{R} . The flow sum $f_1 + f_2$ is the function from $V \times V$ to \mathbb{R} by

1 point

$$(f_1 + f_2)(u, v) = f_1(u, v) + f_2(u, v) \quad \forall u, v \in V$$

If f_1 and f_2 are flows in G , then which of the flow properties must the flow sum $f_1 + f_2$ satisfy?

- (a) Skew symmetry, flow conservation
- (b) Flow conservation, capacity constraints
- (c) Capacity constraints, skew symmetry
- (d) Flow conservation, capacity constraints, skew symmetry

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

7) For any integer $j \geq 1$ the value of $A_1(j)$ is _____, where A is Ackermann's function

1 point

- (a) $2j - 1$
- (b) $2j + 1$
- (c) $2j$
- (d) $j + 1$

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

8) What does Maximum flow problem involve?

1 point

- (a) finding a flow between source and sink that is maximum
- (b) finding a flow between source and sink that is minimum
- (c) finding the shortest path between source and sink
- (d) computing a minimum spanning tree

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

9) A vertex is called *source* if the vertex _____

1 point

- (a) has no incoming edges
- (b) has no leaving edges
- (c) is a central vertex
- (d) has the least weight

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

10) What is the maximum number of minimum cuts that a graph with n vertices can have?

1 point

- (a) $n + 1$
- (b) $n(n - 1)$
- (c) $\frac{n(n-1)}{2}$
- (d) $\frac{n(n+1)}{2}$

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.