Course outline

Week 0:Prerequisite

Week 1: Introduction to Randomized Algorithms

course work?

Algorithms

week 1

Deviations

Algorithms

Algorithms

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Randomized Find

Quiz : Assignment 1

Week3: Moments and

Week 5: Markov Chains

Week 6: Markov Chains-II

Week 8: Graph Theoretic

Week 9 : Approximate

Week 11: Computational

Week 12 : Summary

Download Videos

Weekly feedback form for

NPTEL » Randomized Algorithms

1 point

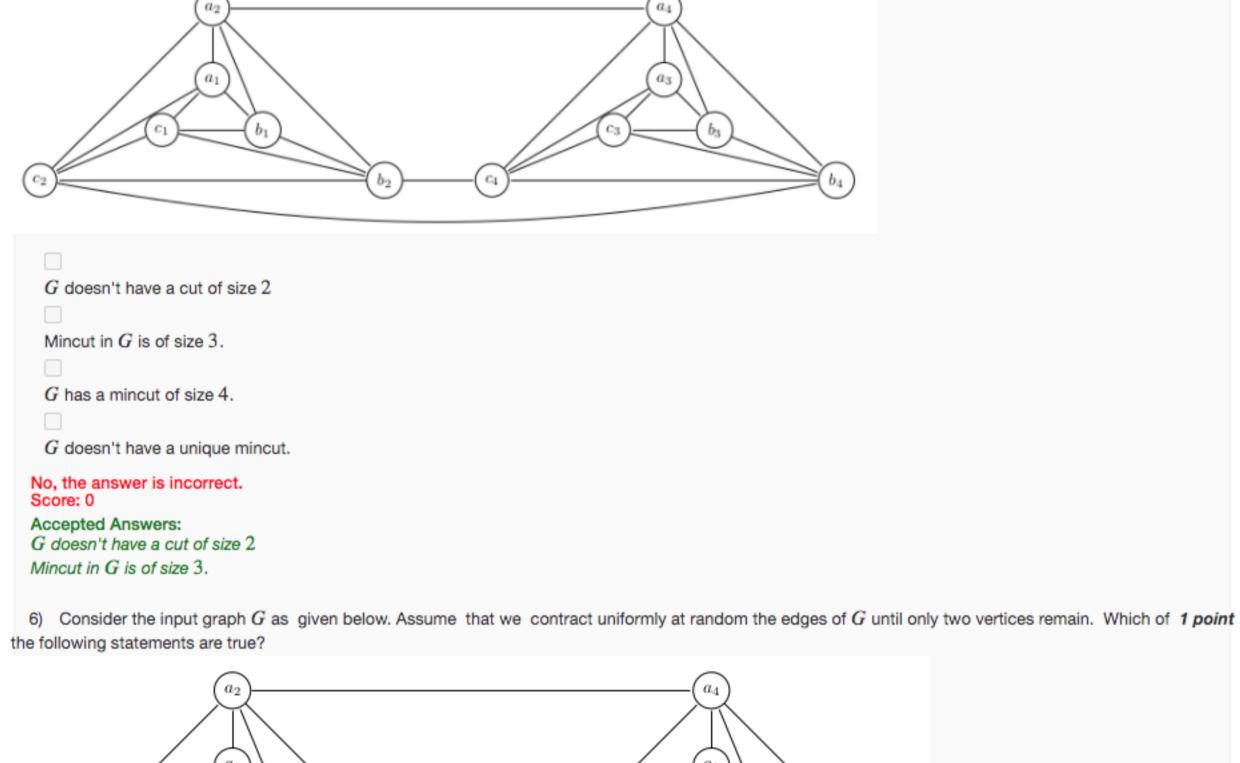
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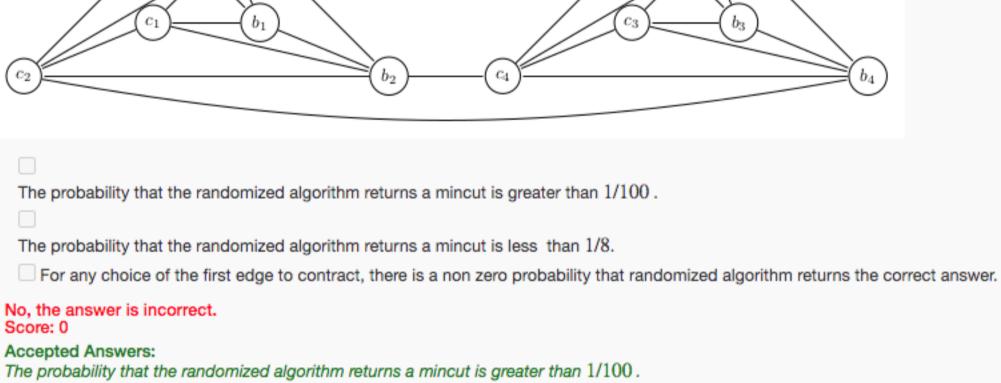
1 point

Unit 3 - Week 1: Introduction to Randomized Algorithms

Assignment 1 How does an NPTEL online Due on 2020-02-12, 23:59 IST. The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Which of the following statements are true? 1 point RandQS returns the sorted list after $\mathcal{O}(n \log n)$ comparisons on all inputs. RandQS never returns an unsorted list on any input. Introduction to Randomized For every input, there exist a random choice of pivots for which the algorithm makes $\mathcal{O}(n^2)$ comparisons. Randomized Mincut Algorithm For every input, most of the random choices of pivots result in the algorithm making $O(n \log n)$ comparisons. No, the answer is incorrect. Score: 0 Accepted Answers: RandQS never returns an unsorted list on any input. For every input, there exist a random choice of pivots for which the algorithm makes $\mathcal{O}(n^2)$ comparisons. Week 2: Probability Review For every input, most of the random choices of pivots result in the algorithm making $O(n \log n)$ comparisons. Let XX be a random variable denoting the number of comparisons made on sorting a given input list containing n integers. Which of the following 1 point statements are true? Week4: Probabilistic Method The expectation of X is $\mathcal{O}(n \log n)$. The expectation of X is $\mathcal{O}(n)$ if the input list is in sorted order. Week 7: Number Theoretic The random variable X cannot take the value $\mathcal{O}(n^2)$ if the input list is in sorted order. The maximum value X can take is $\mathcal{O}(n^2)$. No, the answer is incorrect. Accepted Answers: The expectation of X is $\mathcal{O}(n \log n)$. The maximum value X can take is $\mathcal{O}(n^2)$. Week 10: Randomization and 3) Let p_{ij} , where j > i, denote the probability that the i^{th} smallest and j^{th} smallest elements in the input list are compared in an execution of Rand QS. Which of the following statements are true? The probability p_{ij} depends on the ordering of the input list. $p_{ij} = 2/(j-i+1)$ $p_{ij}=2/(j-i)$ $\sum p_{i,j} \leq 2n\mathcal{H}_n$ where \mathcal{H}_n is the n^{th} Harmonic number. No, the answer is incorrect. Score: 0 Accepted Answers: $p_{ij} = 2/(j-i+1)$ $\sum p_{i,j} \leq 2n\mathcal{H}_n$ where \mathcal{H}_n is the n^{th} Harmonic number. 4) Assume that the binary tree T shown below was produced as a result of an execution on RandQS. Which sequences of picking pivot elements can 1 point lead to T?



5) Consider the graph G below. Which of the following statements are true?



7) Consider the input graph G as given below. Assume that we contract uniformly at random the edges of G until only two vertices remain. Further

3,2,1,5,4,8,7,6,9

3,5,8,9,7,6,4,2,1

3,2,5,1,4,8,7,9,6

3,5,8,9,2,4,7,1,6

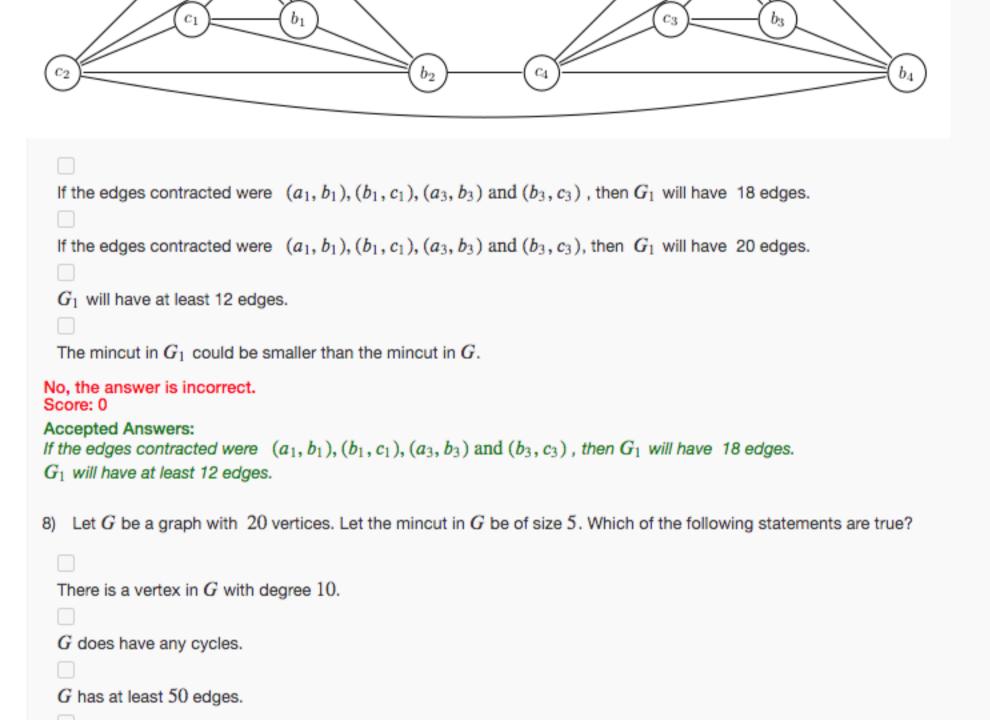
Accepted Answers: 3,2,1,5,4,8,7,6,9

Score: 0

No, the answer is incorrect.

assume that G_1 is the resultant graph after the first four edge contractions. Which of the following statements are true?

The probability that the randomized algorithm returns a mincut is less than 1/8.



Accepted Answers: G has at least 50 edges. Every vertex in G has degree at least 5.

Score: 0

statements are true?

No, the answer is incorrect.

Every vertex in G has degree at least 5.

The randomized algorithm runs in $\mathcal{O}(n^2)$ time on all inputs. There are some inputs on which the randomized algorithm never gives an incorrect answer.

9) Consider the randomized algorithm for verifying if the product of two $n \times n$ matrices A and B is equal to a matrix C. Which of the following

There are some inputs on which the randomized algorithm never gives an correct answer. For some inputs, the probability that the randomized algorithm gives an incorrect answer is greater than 0.5 No, the answer is incorrect. Score: 0 Accepted Answers: The randomized algorithm runs in $\mathcal{O}(n^2)$ time on all inputs. There are some inputs on which the randomized algorithm never gives an incorrect answer. 10) Consider the randomized find algorithm. Which of the following statements are true?

There are some inputs on which the algorithm performs poorly, i.e. the expected running time is not $\mathcal{O}(n)$. The expected number of recursive calls to the randomized find routine is $\mathcal{O}(\log n)$.

No, the answer is incorrect.

On all inputs the expected running rime of the algorithm is $\mathcal{O}(n)$.

Score: 0 Accepted Answers: On all inputs the expected running rime of the algorithm is $\mathcal{O}(n)$. The expected number of recursive calls to the randomized find routine is $\mathcal{O}(\log n)$.

There is a small but non zero probability that the randomized find returns an incorrect answer.