Unit 12 - Week 10 : Randomization and Data Structures

Assignment 10

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

Due on 2020-04-08, 23:59 IST.

1) Consider a treap T with 100 elements. Assume that the keys are numbers from 1 to 100. Assume that the priorities are also numbers from 1 to 100. ***1 point***
The maximum possible height of T is

- 99
- 50
- 7
- 100

No, the answer is incorrect.
Score: 0

Accepted Answers:
100

2) Consider a treap T with n elements. Assume that the keys are numbers from 1 to n. Assume that the priorities randomly chosen, uniformly and independently for each key from $[0, 1]$. The expected height of T is ***1 point***

- $O(n)$
- $O(n^2)$
- $O(1)$
- $O(\log n)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$O(\log n)$

3) Consider a treap T where the keys are numbers 1 to 15. Assume that the height of T is 4. The key value of the root node is ***1 point***

- 1
- 8
- 15
- 7

No, the answer is incorrect.
Score: 0

Accepted Answers:
8

4) Let H be a $2-$universal family of hash functions from set $M = \{0, 1, \ldots, m\}$ to $N = \{0, 1, \ldots, n\}$, with $m \geq n$. ***1 point***
Let x be any element of M. Let X denote the number of elements y in M such that $h(x) = h(y)$ where h is chosen uniformly at random from H. Which of the following statements are true?

- $\mathbb{E}[X] = m$ for some x
- $\mathbb{E}[X]\chi \leq \frac{m}{n}$ for every x.
- $\mathbb{E}[X] > \frac{m}{n}$ for every x.
- $\mathbb{E}[X] \geq \frac{m}{n}$ some x.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\mathbb{E}[X]\chi \leq \frac{m}{n}$ *for every* x.

5) Assume that the size of the dynamic set is $O(n)$. The expected time taken for searching an element in a hash table of size $O(n)$ is ***1 point***

- $(n \log n)$
- (n)
- $(\log n)$
- $O(1)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$O(1)$