Mock Written Quiz (Mid-term)

Due No due date **Points** 100 **Questions** 18 **Available** Oct 6, 2022 at 1pm - Nov 1, 2022 at 4am
Time Limit 60 Minutes **Allowed Attempts** 3

Instructions

Please conform to Academic Honest rules.

Please open your camera in zoom.

This quiz is no longer available as the course has been concluded.

Score for this attempt: **92.75** out of 100 *
Submitted Oct 21, 2022 at 8:47am
This attempt took 41 minutes.

Question 1 — 4 / 4 pts

Using linear probing, searching in hash table takes O(k) time in the worst case if there are k occupied slots in the hash table.

- ○ True
- ◉ False

Correct!

Question 2 — 4 / 4 pts

The worst case for searching for a specific word from the beginning of a paragraph to the end is that the paragraph is extremely long.

- ○ True
- ◉ False

Correct!

Question 3 — 4 / 4 pts

When using alpha-beta pruning, it is possible to cut a whole big branch, instead of only cutting leaves.

Correct!

- (●) True
- ( ) False

Question 4

4 / 4 pts

Every array can uniquely reconstruct a binary tree if we use the labeling scheme we introduced in the lecture.

- ( ) True

Correct!

- (●) False

Question 5

4 / 4 pts

In a min-heap, finding the largest number takes O(logn) time if the heap has n elements.

- ( ) True

Correct!

- (●) False

Question 6

7 / 7 pts

Insert the following numbers to a hash table of size 7 using double hashing where h1(x)=x%7 and h2(x)=5-x%5:

13, 25, 3, 4, 9, 10, 1

Please show the results in the array in the following (starting from slot 0)

1	10	9	3	25	4	13

Answer 1:

Correct!

1

Answer 2:

Correct!

10

Answer 3:

Correct!

9

Answer 4:

Correct! 3

Answer 5:

Correct! 25

Answer 6:

Correct! 4

Answer 7:

Correct! 13

Question 7

7 / 7 pts

Insert the following numbers one by one into an empty Max-heap: 1, 2, 3, 4, 5, 6, 7

Show the content in the array in the end below:

7	4	6	1	3	
2	5				

Answer 1:

Correct! 7

Answer 2:

Correct! 4

Answer 3:

Correct! 6

Answer 4:

Correct! 1

Answer 5:

Correct! 3

Answer 6:

Correct! 2

Answer 7:

Correct! 5

Question 8

5 / 7 pts

Show the array index of each of the following elements if they are inserted one by one into an empty binary search tree implemented by array: 3, 1, 2, 9, 7, 6, 8

0	1	4	2	5
12	13			

Answer 1:

Correct! 0

Answer 2:

Correct! 1

Answer 3:

Correct! 4

Answer 4:

Correct! 2

Answer 5:

Correct! 5

Answer 6:

You Answered 12

Correct Answer 11

Answer 7:

You Answered 13

Correct Answer 12

Question 9

7 / 7 pts

Suppose we have an array implementation of queue with the following content in the array:

0 0 3 4 6 0 0

where front is at 3 and rear is at the first 0 after 6.

Show the array content after we do the following:

Push (5)

Push (9)

Pop()

Push (2)

Pop()

2	0	3	4	6
5	9			

Answer 1:

Correct! 2

Answer 2:

Correct! 0

Answer 3:

Correct! 3

Answer 4:

Correct! 4

Answer 5:

Correct! 6

Answer 6:

Correct! 5

Answer 7:

Correct! 9

Question 10

3.75 / 5 pts

Which of the following are correct about O( ) and o( )?

Correct! ☑ 1000n^2=O(n^2)

Correct! ☑ 1/n=o(1)

☐ nlogn=o(nlogn)

Correct! ☑ n=O(2^n)

Correct Answer ☐ n(logn)^1000=o(n^1.1)

Question 11

5 / 5 pts

Which of the following about hash are correct?

Correct! ☑ Quadratic probing is most suitable to be used together with rehashing

☐ The bigger the hash table, the less collision will arise.

- The smaller the load factor, the more numbers a hash table contains.
- Double hashing needs two hash functions to be the same.
- Correct! The choice of hash function is important for the resilience of hash table against attack.

Question 12

5 / 5 pts

Which of the following about Binary Tree are correct?

- Given a preorder traversal sequence and an inorder traversal sequence, one can always construct a unique binary tree.
- Preorder Traversal can only be implemented in a recursive way.
- When doing deletion in binary search tree, the result is always unique.
- Correct! Full binary tree is also a complete binary tree
- Correct! The number of nodes on level k is at most twice the number of nodes in level k-1

Question 13

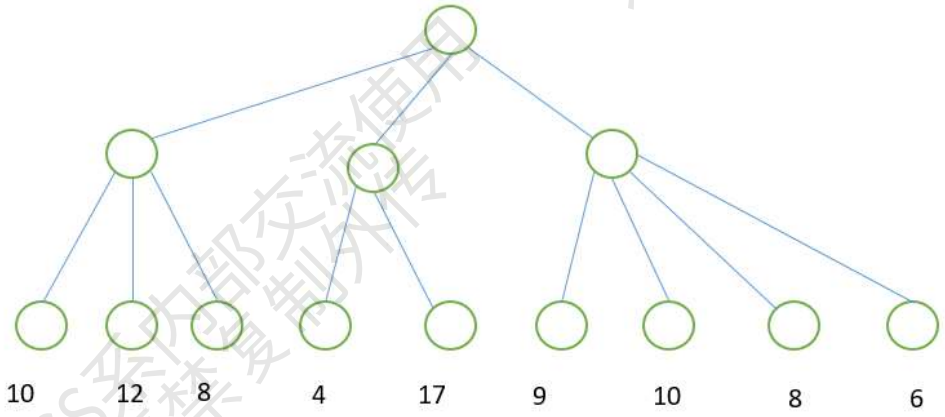
5 / 5 pts

Which of the following about heap are correct?

- Linked implementation is better for Heap
- Correct! The second smallest value in a Min-Heap must be a child of the root
- The third smallest value in a Min-heap must be a child of the root
- Correct! Heap is the best implementation of Priority Queue
- We can delete any value from Min-Heap

Question 14

6 / 6 pts



Given the above game tree where the player 1 makes the first move and the value of any leaf means the number of dollars player 1 can get if the game proceed to that leaf. Then the best move for player 1 is Leftmost branch , and the game tree allow you to cut 2 branches.

Answer 1:

Correct!

Leftmost branch

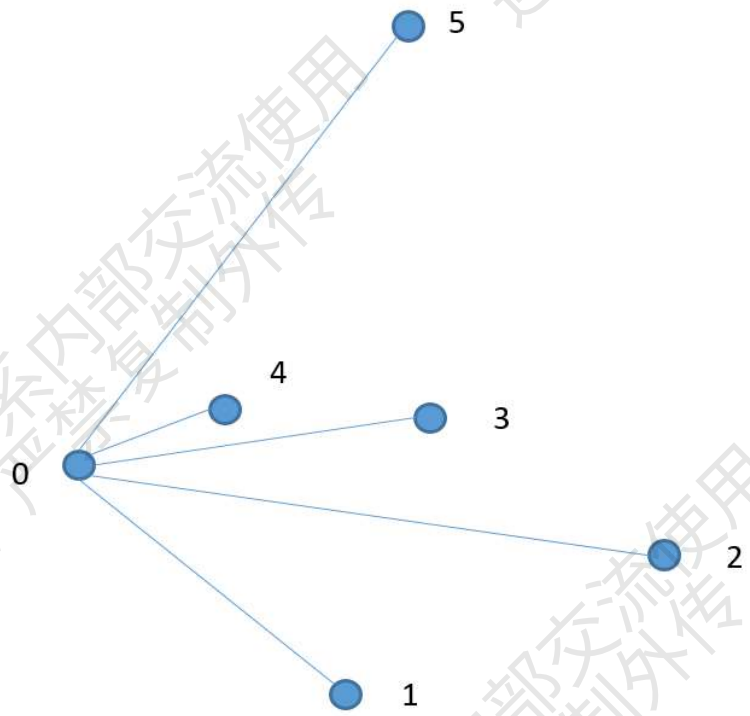
Answer 2:

Correct!

2

Question 15

6 / 6 pts



In the above figure, if we use graham scan to generate the convex hull, 11 pushes and 8 pops will be done during the process of the algorithm.

Answer 1:

Correct! 11

Answer 2:

Correct! 8

Question 16

8 / 8 pts

Give the postorder traversal sequence of the binary tree reconstructed by the following sequences:

Preorder Traversal Sequence: ABCEDFGH

Inorder Traversal Sequence: ECBDAHGF

E	C	D	B	H
G	F	A		

Answer 1:

Correct! E

Answer 2:

Correct! C

Answer 3:

Correct! D

Answer 4:

Correct! B

Answer 5:

Correct! H

Answer 6:

Correct! G

Answer 7:

Correct! F

Answer 8:

Correct! A

Question 17

8 / 8 pts

Given a 4*4 maze, if we use stack to generate a maze, use the lower left corner as the entrance and the last room visited as the exit. At most 15 walls are broken and at least 15 walls are broken. At most 16 rooms are on the path from the entrance to the exit and at least 6 rooms are on the path from the entrance to the exit. (The outer boundary walls will not be broken during the maze generation)

Answer 1:

Correct! 15

Answer 2:

Correct! 15

Answer 3:

Correct! 16

Answer 4:

Correct! 6

Question 18

Not yet graded / 4 pts

Which data structure do you like best up to now? Give some brief reason.

Your Answer:

Splay tree. A Splay tree is relatively simple: no extra fields required and has excellent locality properties: such as frequently accessed keys are cheap to find (near top of tree) and infrequently accessed keys stay out of the way(in the bottom of tree)

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