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BITS WILP Data Structures and Algorithms Design Quiz-2 2017-H1

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Question 1

The following letter sequence was generated by using a postorder traversal of a perfect binary tree T. What is the root of this tree?

d e b f g c h

Select one:

- ☒ a. h
☐ b. f
☐ c. d
☐ d. None of the above

Feedback

The correct answer is: h

Question 2

The following letter sequence was generated by using a postorder traversal of a perfect binary tree T. What is the preorder traversal?

d e b f g c h

Select one:

- ☐ a. d b f g h c e
☐ b. d e b f g c h
☐ c. d b e h f c g
☒ d. h b d e c f g
☐ e. None of the above

Feedback

The correct answer is: h b d e c f g

Question 3

The following letter sequence was generated by using a postorder traversal of a perfect binary tree T. What is the inorder traversal?

d e b f g c h

Select one:

- ☐ a. h b d e c f g
☐ b. d b f g h c e
☒ c. d b e h f c g
☐ d. None of the above
☐ e. d e b f g c h

Feedback

The correct answer is: d b e h f c g

Question 4

The following letter sequence was generated by using a postorder traversal of a perfect binary tree T.

d e b f g c h

Which of the following is true?

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- i. f and e are siblings
- ii. f and g are siblings
- iii. c is decendent of h

Select one:

- ☐ a. All of them are false
- ☐ b. i is true and ii, iii are false
- ☒ c. ii and iii are true and i is false
- ☐ d. All of them are true
- ☐ e. None of the above

Feedback

The correct answer is: ii and iii are true and i is false

Question 5

The following letter sequence was generated by using a postorder traversal of a perfect binary tree T. What is the depth of node c?

d e b f g c h

Select one:

- ☐ a. 0
- ☒ b. 1
- ☐ c. None of the above
- ☐ d. 2

Feedback

The correct answer is: 1

Question 6

Let T be a binary tree with n nodes. The time required to traverse the tree using in-order traversal is

Select one:

- ☒ a. $O(n)$
- ☐ b. $O(n^2)$
- ☐ c. none of the above
- ☐ d. $O(n \log n)$

Feedback

The correct answer is: $O(n)$

Question 7

Suppose T is a proper binary tree with 11 internal nodes. What is the size of T?

Select one:

- ☒ a. 23
- ☐ b. 12
- ☐ c. None of the above
- ☐ d. 22
- ☐ e. 21

Feedback

The correct answer is: 23

Question 8

Suppose T is a binary tree with 10 nodes. What is the maximum possible height of T?

Select one:

- ☐ a. 4
- ☐ b. None of the above
- ☒ c. 10
- ☐ d. 5

Feedback

The correct answer is: 10

Question 9

A binary search tree has n internal nodes. The number of external nodes is at most

Select one:

- ☐ a. None of the above
- ☐ b. n-1
- ☐ c. $\log n$
- ☒ d. $2n$
- ☐ e. n

Feedback

The correct answer is: $2n$

Question 10

The worst case running time to find a maximum element in a binary search tree with n items is

Select one:

- ☒ a. $O(n)$
- ☐ b. $O(\log n)$
- ☐ c. None of the above
- ☐ d. $O(n^2)$
- ☐ e. $O(1)$

Feedback

The correct answer is: $O(n)$

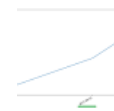
Question 11

Which of the following have $O(1)$ running time for insert operation?

Select one:

- ☒ a. Log File, Hash Table
- ☐ b. Hash Table, Binary Search Tree
- ☐ c. Look-up Table, Hash Table

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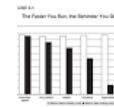
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- ☐ d. None of the above
☐ e. Binary Search Tree, Look-up Table

Feedback

The correct answer is: Log File, Hash Table

Question 12

Which of the following has more than $O(n)$ space requirement where n is the number of items stored.

Select one:

- ☐ a. Log File
☐ b. None of the above
☐ c. Look-up Table
☐ d. Binary Search Tree
☒ e. Direct Address Table

Feedback

The correct answer is: Direct Address Table

Question 13

Keys "63, 73, 43, 98, 110" are stored in a direct address table. What is the minimum size of the table?

Select one:

- ☐ a. None of the above
☐ b. 4
☒ c. 111
☐ d. 109
☐ e. 5

Feedback

The correct answer is: 111

Question 14

Keys "63, 73, 43, 98, 110" are stored in a direct address table. "43" will be stored in the slot _____

Select one:

- ☒ a. 43
☐ b. 3
☐ c. 0
☐ d. None of the above
☐ e. 44

Feedback

The correct answer is: 43

Question 15

Keys $\{200, 205, 210, \dots, 600\}$ are stored in a chained hash table. Suppose $h(k) = k \bmod 100$ is used, which slot will have maximum number of keys?

Select one:

- ☐ a. 200
☒ b. 0
☐ c. 99
☐ d. None of the above
☐ e. 100

Feedback

The correct answer is: 0

Question 16

Keys $\{200, 205, 210, \dots, 600\}$ are stored in a chained hash table. Let $h(k) = k \bmod 101$, α be the load factor, and v be the maximum number of keys stored in a single slot. Which of the following is true?

Select one:

- ☐ a. $\alpha > v$
☐ b. None of the above
☒ c. $\alpha < v$
☐ d. $\alpha = v$
☐ e. $\alpha > 1$

Feedback

The correct answer is: $\alpha < v$

Question 17

When using linear probing policy, what is the probability of an empty slot gets filled if it is preceded by i full slots?

Select one:

- ☐ a. $(i+1)/n$
☐ b. $1/n$
☒ c. $(i+1)/m$
☐ d. $1/m$
☐ e. None of the above

Feedback

The correct answer is: $(i+1)/m$

Question 18

Assume the keys are inserted in the following order. 1055, 1492, 1776, 1812, 1918, 1945. Find the total number of key comparisons if linear probing policy is used and $h(k) = 5 * x \bmod 8$ is the auxiliary hash function.

Select one:

- ☒ a. 9
☐ b. None of the above
☐ c. 7

- ☐ d. 6
- ☐ e. 4

Feedback

The correct answer is: 9

Question 19

Assume the keys are inserted in the following order. 1055, 1492, 1776, 1812, 1918, 1945. 1945 is stored in the slot _____ if linear probing policy is used and $h(k) = 5 * k \text{ mod } 8$ is the auxiliary hash function.

Select one:

- ☐ a. 6
- ☐ b. 0
- ☒ c. 7
- ☐ d. None of the above
- ☐ e. 5

Feedback

The correct answer is: 7

Question 20

Assume the keys are inserted in the following order. 1055, 1492, 1776, 1812, 1918, 1945. What is the minimum number of nodes in a complete binary tree with height 4?

Select one:

- ☐ a. None of the above
- ☒ b. 8
- ☐ c. 4
- ☐ d. 3
- ☐ e. 11

Feedback

The correct answer is: 8

Question 21

Consider the following statements.

- i) External nodes of heap does not store any keys or elements
- ii) Insertion and deletion in heap can be done in $O(\log n)$ time
- iii) Minimum of a heap can be found in constant time.

Select one:

- ☒ a. All of them are true
- ☐ b. i is true and ii, iii are false
- ☐ c. None of the above
- ☐ d. i, ii are true and iii is false
- ☐ e. All of them are false

Feedback

The correct answer is: All of them are true

Question 22

Queue is empty in the circular array implementation when

Select one:

- ☐ a. None of the above
- ☒ b. $f=r$
- ☐ c. $f=0$
- ☐ d. $r=0$

Feedback

The correct answer is: $f=r$

Question 23

Queue is full in the circular array implementation when

Select one:

- ☐ a. $f-r=0$
- ☒ b. $f-r=1$
- ☐ c. $r-f=1$
- ☐ d. None of the above

Feedback

The correct answer is: $f-r=1$

Question 24

Consider an experiment of rolling a die and tossing a coin. The size of the sample space is

Select one:

- ☐ a. None of the above
- ☐ b. 2
- ☒ c. 12
- ☐ d. $O(n^2)$
- ☐ e. 36
- ☐ f. 6

Feedback

The correct answer is: 12

Question 25

We toss a coin until a head appears. What is the expected number of coin tosses?

Select one:

- ☒ a. 2
- ☐ b. None of the above
- ☐ c. 4
- ☐ d. 0.5
- ☐ e. 1


Feedback

The correct answer is: 2

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