PTA

ZJU_FDS_MidTermExam

判断题 8 **A. 单选题** 13 **程序填空题** 2

2-1 In a complete binary tree with 1238 nodes, there must be ＿＿ leaf nodes. （5分）

- ◉ A. 619
- ○ B. 620
- ○ C. 215
- ○ D. 214

2-1 答案正确 （5 分） ♀ 创建提问

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2-2 Given the shape of a binary tree shown by the figure below. If its preorder traversal sequence is { E, D, A, F, H, C, B, G }, then the node on the same level of F must be:

- ○ A. B
- ◉ B. H
- ○ C. A and G
- ○ D. C and G

2-2 答案正确 （5 分） ♀ 创建提问

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2-3 Given the popping sequence of a stack as { a, b, c, d, e, f }. Among the following, the impossible pushing sequence is:

- ◉ A. d f e a c b
- ○ B. f e a b c d
- ○ C. f e d a b c
- ○ D. c b a f e d

2-3 答案正确 （5 分） ♀ 创建提问

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2-4 A tri-diagonal matrix is a square matrix with nonzero elements only on the diagonal and slots horizontally or vertically adjacent the diagonal, as shown in the figure.

$$\begin{bmatrix} a_{11} & a_{12} & 0 & 0 & \cdots & 0 & 0 \\ a_{21} & a_{22} & a_{23} & \ddots & \ddots & 0 & 0 \\ 0 & a_{32} & a_{33} & \ddots & \ddots & a_{n-2,n-1} & 0 \\ \vdots & \ddots & \ddots & \ddots & \ddots & a_{n-1,n-1} & a_{n-1,n} \\ 0 & 0 & \cdots & \cdots & \cdots & a_{n,n-1} & a_{nn} \end{bmatrix}$$

Given a tri-diagonal matrix (三对角矩阵) M of order 100. Compress the matrix by storing its tri-diagonal entries $m_{i,j}$ ($1 \le i \le 100$, $1 \le j \le 100$) row by row into a one dimensional array N with indices starting from 0. Then the index of $m_{30,30}$ in N is:

- ○ A. 86
- ○ B. 87
- ○ C. 89
- ◉ D. 88

2-4 答案错误 ⓘ （0 分） ♀ 创建提问

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2-5 What is the major difference among lists, stacks, and queues? （5分）

- ○ A. Lists are linear structures while stacks and queues are not
- ○ B. Lists use pointers, and stacks and queues use arrays
- ○ C. Stacks and queues are lists with insertion/deletion constraints

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2-6 Suppose that enqueue is allowed to happen at both ends of a queue, but dequeue can only be done at one end. If elements are enqueued in the order {a, b, c, d, e}, the impossible dequeue sequence is: (5分)

○ A. e c b a d

○ B. d b a c e

◉ C. d b c a e
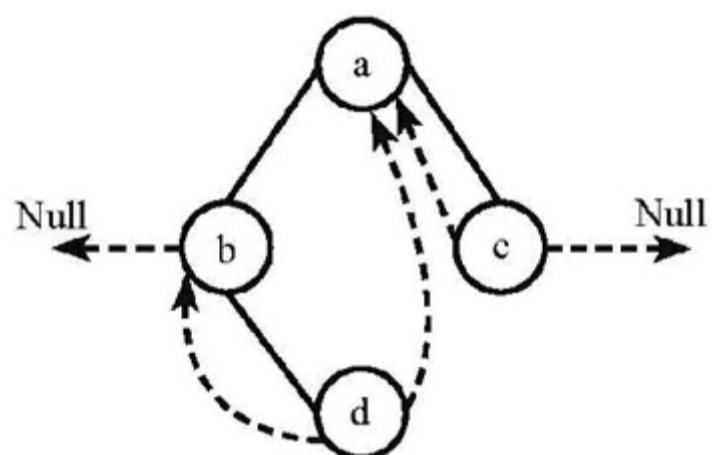
○ D. b a c d e

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2-6 答案正确 (5 分)   💡 创建提问

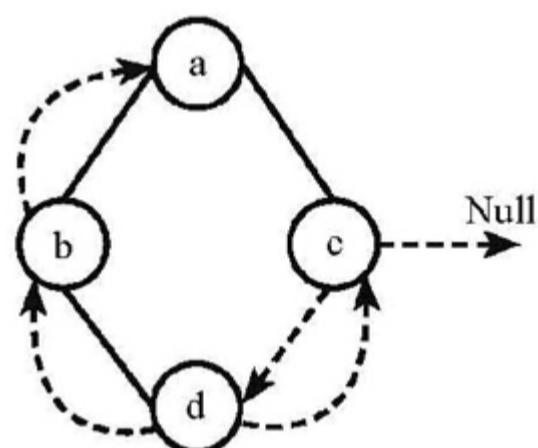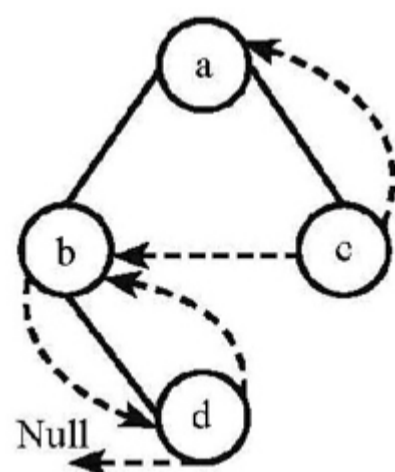**2-7** Among the following threaded binary trees (the threads are represented by dotted curves), which one is the postorder threaded tree? (5分)
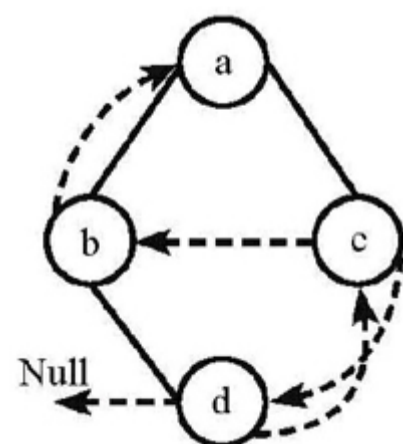
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○ A.

◉ B.

○ C.

○ D.

2-7 答案错误 ⓘ (0 分)   💡 创建提问

2-8 What kind of tree has the property that the nodes along the path from the root to any node are in sorted order? (5分)

○ A. complete binary tree

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D. heap

2-8 答案正确 (5 分)

2-9 Suppose that the level-order traversal sequence of a max-heap is { 48, 27, 32, 12, 18, 20, 15 }. Use the linear algorithm to adjust this max-heap into a min-heap, and then call DeleteMin. The postorder traversal sequence of the resulting tree is: (5分)

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- A. 32, 48, 27, 20, 15, 18
- B. 27, 48, 18, 32, 20, 15
- C. 15, 18, 20, 27, 48, 32
- D. 48, 18, 27, 20, 32, 15

2-9 答案正确 (5 分)

2-10 Given a binary search tree with its postorder traversal sequence { 2, 7, 15, 10, 20, 19, 35, 21, 18 }. If 18 is deleted from the tree, which one of the following statements is FALSE?   (5分)

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- A. One possible preprder traversal sequence of the resulting tree may be { 15, 10, 7, 2, 21, 19, 20, 35 }
- B. One possible preprder traversal sequence of the resulting tree may be { 20, 10, 7, 2, 15, 21, 19, 35 }
- C. It is possible that the resulting tree may have 3 leaves
- D. One possible preprder traversal sequence of the resulting tree may be { 19, 10, 7, 2, 15, 21, 20, 35 }

2-10 答案正确 (5 分)

2-11 The array representation of the disjoint sets is given by { 3, 3, -5, 2, 1, -3, -1, 6, 6 }. Keep in mind that the elements are numbered from 1 to 9. After invoking Union(Find(4), Find(8)) with union-by-size and path compression, how many elements will be changed in the resulting array?   (5分)

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- A. 4
- B. 2
- C. 1
- D. 3

2-11 答案错误 ⓘ (0 分)

2-12 For the following function (where $n > 0$)   (5分)

```
int func ( int n )
{   int i = 1, sum = 0;
    while ( sum < n )  { sum += i; i *= 2; }
    return i;
}
```

the most accurate time complexity bound is:

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- A. $O(n \log n)$
- B. $O(\log n)$
- C. $O(n)$
- D. $O(2^n)$

2-12 答案正确 (5 分)

2-13 For a non-empty doubly linked circular list, with `h` and `t` pointing to its head and tail nodes, respectively, the TRUE statement is: (5分)

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- A. `t->next == h`
- B. `h->next == t`
- C. `t->next == h->next`
- D. `h->pre == NULL`

2-13 答案错误 ⓘ (0 分)

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