

判断 11 A, 单选 6 程序填空 2

1-1 To solve a problem by dynamic programming instead of recursions, the key approach is to store the results of computations for the subproblems so that we only have to compute each different subproblem once. Those solutions can be stored in an array or a hash table. (3分)

☒ T ☐ F

1-1 答案正确 (3分) 创建提问

作者 叶德壮
单位 浙江大学

1-2 For the recurrence equation $T(N) = aT(N/b) + f(N)$, if $af(N/b) = Kf(N)$ for some constant $K > 1$, then $T(N) = \Theta(f(N))$. (5分)

☐ T ☒ F

1-2 答案正确 (5分) 创建提问

作者 杨欣豫
单位 浙江大学

1-3 While accessing a term, hashing is faster than search trees. (3分)

☒ T ☐ F

1-3 答案正确 (3分) 创建提问

作者 陈越
单位 浙江大学

1-4 All of the Zig, Zig-zig, and Zig-zag rotations not only move the accessed node to the root, but also roughly half the depth of most nodes on the path. (3分)

☐ T ☒ F

1-4 答案错误 ① (0分) 创建提问

作者 徐镜春
单位 浙江大学

1-5 With the same operations, the resulting skew heap is always more balanced than the leftist heap. (3分)

☐ T ☒ F

1-5 答案正确 (3分) 创建提问

作者 陈越
单位 浙江大学

1-6 For one operation, if its average time bound is $O(\log N)$, then its amortized time bound must be $O(\log N)$. (3分)

☐ T ☒ F

1-6 答案正确 (3分) 创建提问

作者 陈越
单位 浙江大学

1-7 In a B+ tree, leaves and nonleaf nodes have some key values in common. (3分)

☒ T ☐ F

1-7 答案正确 (3分) 创建提问

作者 陈越
单位 浙江大学

1-8 Insert { 1, 2, 5, 3, 8, 4, -7, 10, 88, 34, 15, 63, 18, -18, 96 } into an initially empty binomial queue, the resulting roots are 96, -18, -7 and 1. (5分)

☐ T ☒ F

1-8 答案正确 (5分) 创建提问

作者 陈越
单位 浙江大学

1-9 In the 4-queens problem, (x_1, x_2, x_3, x_4) correspond to the 4 queens' column indices. During backtracking, (1, 3, 4, ?) will be checked before (1, 4, 2, ?), and none of them has any solution in their branches. (4分)

☒ T ☐ F

1-9 答案正确 (4分) 创建提问

作者 何钦铭
单位 浙江大学

1-10 Word stemming is to eliminate the commonly used words from the original documents. (3分)

☐ T ☒ F

1-10 答案正确 (3分) 创建提问

作者 陈越
单位 浙江大学

1-11 In a red-black tree, an internal red node cannot be a node of degree 1. (4分)

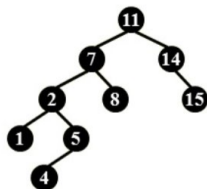
☒ T ☐ F

1-11 答案正确 (4分) 创建提问

作者 徐镜春
单位 浙江大学

2-1 For the result of accessing the keys 5 and 8 in order in the splay tree in the following figure, which one of the following statements is FALSE? (6分)

作者 徐镜春
单位 浙江大学



- ☐ A. 8 is the root
- ☒ B. 11 is the parent of 7
- ☐ C. 2 and 7 are siblings
- ☐ D. 5 is the parent of 7

2-1 答案正确 (6分) 创建提问

2-2 When solving a problem with input size N by divide and conquer, if at each step, the problem is divided into 16 sub-problems and each size of these sub-problems is $N/4$, and they are conquered in $O(N^2 \log N)$. Which one of the following is the closest to the overall time complexity? (6分)

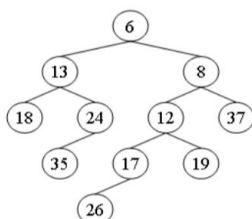
作者 沈鑫
单位 浙江大学

- ☐ A. $O(N^2 \log N)$
- ☒ B. $O(N^3 \log^2 N)$
- ☐ C. $O(N^2)$
- ☐ D. $O(N^3 \log N)$

2-2 答案正确 (6分) 创建提问

2-3 Delete the minimum number from the given leftist heap. Which one of the following statements is TRUE? (6分)

作者 陈越
单位 浙江大学



- ☐ A. 8 is NOT the root
- ☐ B. 12 is the right child of 8
- ☒ C. 24 is the left child of 13
- ☐ D. 35 is the right child of 24

2-3 答案正确 (6分) 创建提问

2-4 Insert { 9, 8, 7, 2, 3, 5, 6, 4} into an initially empty AVL tree. Which one of the following statements is FALSE? (6分)

作者 徐镜春
单位 浙江大学

- ☒ A. 5 is the root
- ☐ B. 2 and 5 are siblings
- ☐ C. there are 2 nodes with their balance factors being -1
- ☐ D. the height of the resulting AVL tree is 3

2-4 答案正确 (6分) 创建提问

2-5 A B+ tree of order 3 with 21 numbers has at most __ nodes of degree 3. (6分)

作者 徐镜春
单位 浙江大学

- ☐ A. 1
- ☐ B. 2
- ☐ C. 3
- ☒ D. 4

2-5 答案正确 (6分) 创建提问

2-6 Among the following groups of concepts, which group is not totally relevant to a search engine? (6分)

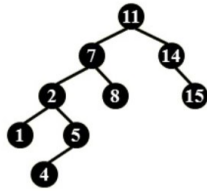
作者 徐镜春
单位 浙江大学

- ☒ A. thresholding, dynamic programming, precision
- ☐ B. word stemming, compression, recall
- ☐ C. distributed index, hashing, inverted file index
- ☐ D. stop words, posting list, dynamic indexing

2-6 答案正确 (6分) 创建提问

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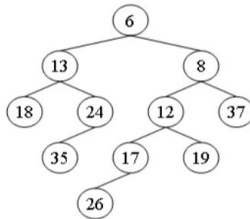
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单位 浙江大学

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作者 陈越
单位 浙江大学



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2-3 答案正确 (6分) 创建提问

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单位 浙江大学

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2-4 答案正确 (6分) 创建提问

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单位 浙江大学

- ☐ A. 1
- ☐ B. 2
- ☐ C. 3
- ☒ D. 4

2-5 答案正确 (6分) 创建提问

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单位 浙江大学

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- ☐ C. distributed index, hashing, inverted file index
- ☐ D. stop words, posting list, dynamic indexing

2-6 答案正确 (6分) 创建提问

5-1 The function `BinQueue_Merge` is to merge two binomial queues `H1` and `H2`, and return `H1` as the resulting queue.

```
BinQueue BinQueue_Merge( BinQueue H1, BinQueue H2 )
{
    BinTree T1, T2, Carry = NULL;
    int i, j;
    H1->CurrentSize += H2->CurrentSize;
    for ( i=0, j=1; j<= H1->CurrentSize; i++, j*=2 ) {
        T1 = H1->TheTrees[i]; T2 = H2->TheTrees[i];
        switch( 4*!!Carry + 2*!!T2 + !!T1 ) {
            case 0:
            case 1: break;
            case 2: H1->TheTrees[i] = T2; H2->TheTrees[i] = NULL; break;
            case 4: H1->TheTrees[i] = Carry; Carry = NULL; break;
            case 3: Carry = CombineTrees( T1, T2 );
                    H1->TheTrees[i]=H2->TheTrees[i]=NULL (5分); break;
            case 5: Carry = CombineTrees( T1, Carry );
                    H1->TheTrees[i] = NULL; break;
            case 6: Carry = CombineTrees( T2, Carry ) (5分);
                    H2->TheTrees[i] = NULL; break;
            case 7: H1->TheTrees[i] = Carry;
                    Carry = CombineTrees( T1, T2 );
                    H2->TheTrees[i] = NULL; break;
        } /* end switch */
    } /* end for-loop */
    return H1;
}
```

5-1 答案正确 (10 分) 创建提问

5-2 The function `LR_Rotation` is to do left-right rotation to the trouble-finder tree node `T` in an AVL tree.

```
typedef struct TNode *Tree;
struct TNode {
    int key, h;
    Tree left, right;
};

Tree LR_Rotation( Tree T )
{
    Tree K1, K2;

    K1 = T->left;
    K2 = K1->right;
    K1->right = K2->left; (5分)
    T->left = K2->right; (5分)
    K2->left = K1;
    K2->right=T (5分);
    /* Update the heights */
    K1->h = maxh(Height(K1->left), Height(K1->right)) + 1;
    T->h = maxh(Height(T->left), Height(T->right)) + 1;
    K2->h = maxh(K1->h, T->h) + 1;

    return K2;
}
```

5-2 答案正确 (15 分) 创建提问

作者	陈越
单位	浙江大学
时间限制	400 ms
内存限制	64 MB

作者	陈越
单位	浙江大学
时间限制	400 ms
内存限制	64 MB