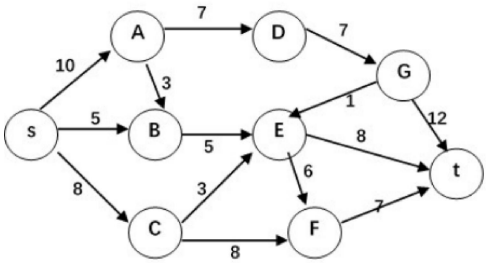
浙江大学2023-2024学年春夏学期 《数据结构基础》课程期末考试试卷 已结束

概览
题目列表
提交列表
排名

2-20-1 分数 3 作者 何钦铭 单位 浙江大学

When solving the maximum flow problem for graph G, which statement is **wrong**?



A. Edge (G,t) with flow 12 is a possible edge in the maximum flow.

B. Edge (S,A) with flow 10 is a possible edge in the maximum flow.

C. Edge (S,C) with flow 8 is a possible edge in the maximum flow.

D. Edge (S,B) with flow 5 is a possible edge in the maximum flow.

评测结果 答案正确

得分 3 分

2-8-1 分数 3 作者 李松 单位 浙江大学

Given a hash table of size 13 with the hash function $H(Key) = Key\%13$. Quadratic probing $(h_i(k) = (H(k) \pm i^2)\%13)$ is used to resolve collisions. Then after inserting {20, 6, 2, 16, 27, 15 } one by one into the hash table, the address of 15 is__.

A. 2 B. 6 C. 11 D. 4

评测结果 答案正确

得分 3 分

2-7-1 分数 3 作者 李松 单位 浙江大学

Given a set of keys {92, 81, 58, 21, 57, 45, 161, 38, 117}, the hash function is defined as $h(key) = key\%13$. To resolve the i^{th} collision, we use the following double hashing probing method: $h(key) = (h(key) + i \times h_2(key))\%13$, where $h_2(key) = (key\%11) + 1$. Assume we have a hash table with the hash address space from 0 to 12 for this sequence of keys, the average search length for successful searches is ___.

A. 1.56 B. 1.67 C. 1.44 D. 1.33

评测结果 答案正确

得分 3 分

2-3-2 分数 3 作者 干红华 单位 浙江大学

After indirectly sorting the array `list[10] = {6, 14, 0, 13, 11, 18, 17, 16, 19, 12}` by Table Sort, the resulting index permutation array `table[10]` is made up of ___ disjoint cycles.

A. 5 B. 2 C. 8 D. 3

评测结果 答案正确

得分 3 分

2-10-2 分数 3 作者 陈翔 单位 浙江大学

Suppose we have a circular queue implemented on an array `a[20]`. We store the position of the first queue element in `front`, and the next position of the last queue element in `rear`. What is the size of the circular queue when `front==7` and `rear==4`?

A. 3 B. 4 C. 18 D. 17

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提交列表
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得分 3 分

2-4-2 分数 3 作者 朱建科 单位 浙江大学

If a binary search tree of N nodes is complete, which one of the following statements is FALSE?

A. the minimum key must be at a leaf node

B. the average search time for all nodes is $O(N)$

C. the maximum key may be at a leaf node

D. the median node must either be the root or in the left subtree

评测结果 答案正确

得分 3 分

2-17-2 分数 3 作者 何钦铭 单位 浙江大学

The array representation of the disjoint sets is given by S = { -4, 0, 0, 2, -3, 4, 5, -1 }, the elements are numbered from 0 to 7. Which operations **can not** turn the array into S = { -5, 0, 0, 0, -3, 4, 5, 0 }?

A. Union(find(2),7); Find(3);

B. Union(Find(3),7)

C. Find(5); Find(3); Union(0,7);

D. Find(6); Find(3);Union(0,7);

评测结果 答案正确

得分 3 分

2-6-2 分数 3 作者 朱建科 单位 浙江大学

Given a binary search tree with its level order traversal sequence {7, 4, 12, 3, 6, 8, 1, 5, 10}. If 7 is deleted from the tree, which one of the following statements is FALSE?

A. 5 and 8 may be at the same level

B. The in-order traversal is {1, 3, 4, 5, 6, 8, 10, 12}

C. 3 and 12 may be at the same level

D. 6 and 10 may be at the same level

评测结果 答案正确

得分 3 分

2-14-1 分数 3 作者 陈超超 单位 浙江大学

The post-fix expression of `a+b*c/(d-e)` is

A. `abc*/de-+`

B. `abc*d-e/+`

C. `abc*de-/+`

D. `abcde-/*+`

评测结果 答案正确

得分 3 分

2-1-2 分数 3 作者 干红华 单位 浙江大学

When sorting the array `{76971, 19927, 31681, 98978, 19537, 40134, 65401, 60983, 92952, 83584}` in ascending order by Radix Sort, which of the following sorting results is IMPOSSIBLE?

A. `{19927, 19537, 31681, 40134, 65401, 60983, 76971, 83584, 98978, 92952}`, after the first run of MSD Sort

B. `{76971, 31681, 65401, 92952, 60983, 40134, 83584, 19927, 19537, 98978}`, after the first run of LSD Sort

C. `{65401, 76971, 31681, 92952, 60983, 40134, 83584, 19927, 19537, 98978}`, after the second run of LSD Sort

D. `{19927, 19537, 31681, 40134, 60983, 65401, 76971, 83584, 92952, 98978}`, after the second run of MSD Sort

评测结果 答案正确

得分 3 分

浙江大学2023-2024学年春夏学期 《数据结构基础》课程期末考试试卷 已结束

概览
题目列表
提交列表
排名

Given a binary search tree with its preorder traversal sequence { 9, 5, 1, 7, 15, 20}. If 10 is inserted into the tree, which one of the following statements is TRUE?

A. 10 is the left child of 20
B. 10 and 5 are at the same level
C. 1 and 10 are at the same level
D. 10 is the right child of 9

评测结果 答案正确
得分 3 分

2-13-1 分数 3 作者 陈超超 单位 浙江大学

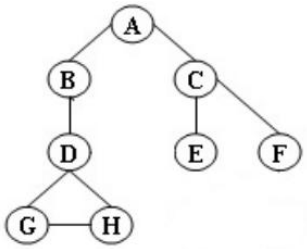
Given a binary tree with in-order traversal sequence { 4, 1, 3, 8, 7, 12, 11, 9 } and post-order traversal sequence { 4, 1, 8, 12, 7, 9, 11, 3 }. What is the index of 8 if we number the nodes in level-order? (Obviously, the index of the root is 1.)

A. 7
B. 3
C. 2
D. 5

评测结果 答案正确
得分 3 分

2-19-2 分数 3 作者 何钦铭 单位 浙江大学

To find the articulation points for following graph by depth-first search tree start from node D, which of the following statement is **wrong**?



A. Low(B) > Low(D)
B. D has 2 children in depth-first search tree.
C. There are 2 back edges.
D. Num(A) > Num(B)

评测结果 答案正确
得分 3 分

2-16-1 分数 3 作者 陈超超 单位 浙江大学

Which of the following statements about d-heaps is True?

A. In a complete d-heap, the number of leaf nodes is less than the number of internal nodes.
B. The height of a d-heap with n elements is directly proportional to n.
C. D-heaps are used for sorting data in ascending order.
D. In a d-heap, the parent of a given node can be found using integer division.

评测结果 答案错误
得分 0 分

2-15-2 分数 3 作者 陈超超 单位 浙江大学

Suppose that the level-order traversal sequence of a min-heap is { 3, 12, 7, 53, 32, 8, 19 }. Use the linear algorithm to adjust this min-heap into a max-heap, and then call DeleteMax. The inorder traversal sequence of the resulting tree is:

A. 3, 8, 12, 7, 19, 32
B. 7, 12, 3, 32, 8, 19
C. 32, 12, 7, 3, 19, 8
D. 7, 3, 12, 8, 19, 32

评测结果 答案正确
得分 3 分

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概览
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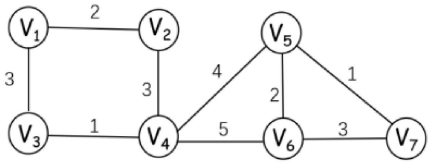
提交列表
排名

Given an undirected weighted graph as shown below, its minimum spanning tree is to grow by Kruskal's algorithm with greedy strategies. Which of the following statement is **correct**?



A. (v3,v4) must be an edge of the minimum spanning tree, but (v5,v4) must be not.

B. (v1,v3) must be an edge of the minimum spanning tree, but (v4,v6) must not be.

C. (v5,v7) must be an edge of the minimum spanning tree, but (v2,v4) must not be.

D. (v5,v6) must be an edge of the minimum spanning tree, but (v4,v6) must not be.

评测结果 答案正确

得分 3 分

2-9-1 分数 3 作者 陈翔 单位 浙江大学

Suppose that we are using a stack to convert the infix expression `((a + b) - c * (d / e)) + f` to the postfix expression. What is the maximum number of operators in the stack during conversion?

A. 3 B. 6 C. 4 D. 5

评测结果 答案正确

得分 3 分

2-11-2 分数 3 作者 陈越 单位 浙江大学

Which of the following algorithms can be used to solve the single source shortest path problem for an unweighted DAG?
I.Kruskal; II. Breadth-first search; III. Topological Sort; IV. Dijkstra

A. I and IV only B. II, III and IV only C. All of them D. II and IV only

评测结果 答案错误

得分 0 分

2-12-2 分数 3 作者 陈越 单位 浙江大学

We represent a directed graph as an adjacency list:

```
v0: -> null
v1: -> v0 -> v3 -> null
v2: -> v1 -> null
v3: -> null
v4: -> v1 -> v6 -> null
v5: -> v2 -> v4 -> null
v6: -> null
v7: -> v1 -> v2 -> null
```

Which one below is a topological order of the given graph?

A. 6 0 3 1 4 2 7 5 B. 7 5 2 1 0 3 4 6 C. 5 7 4 6 2 1 0 3 D. 7 5 4 1 6 2 0 3

评测结果 答案正确

得分 3 分

2-2-1 分数 3 作者 干红华 单位 浙江大学

When sorting the array {80, 58, 88, 11, 7, 25, 64} in ascending order by Quick Sort, the pivot is selected by Median-of-Three Partitioning. After the first run, the number of inversions will decrease by ____.

A. 2 B. 9 C. 3 D. 5

评测结果 答案正确

得分 3 分