北京邮电大学2018——2019学年第1学期

《算法与数据结构》期中考试试题

考试注意事项	一、学生参加考试须带学生证或学院证明，未带者不准进入考场。学生必须按照监考教师指定座位就坐。 二、书本、参考资料、书包等物品一律放到考场指定位置。 三、学生不得另行携带、使用稿纸，要遵守《北京邮电大学考场规则》，有考场违纪或作弊行为者，按相应规定严肃处理。 四、学生必须将答题内容做在试题答卷上，做在试题及草稿纸上一律无效。

考试课程				考试时间		年 月 日			
题号	一	二	三	四	五	六	七	八	总分
满分	24	10	34	32					
得分									
阅卷									

I、 Single/Multiple Selections (24 Points, 2 Points/Each)

1. Algorithm refers to ( ).

A. Computer program
B. Computational methods for solving problems
C. Sorting algorithm
D. Limited operational sequence for solving problems

2. Data structures are formally defined as (D, S), where D is a finite set of ( ), and S is a finite set of ( ).

A. Algorithm B. Data element C. Data operation
D. Logical structure E. operation F. Mapping

3. The purpose of the algorithm analysis is ( ), and the two main aspects of the algorithm analysis are ( ).

A. The rationality of data structure is given.

B. The relationship between input and output in the research

C. To improve the efficiency of the algorithm

D. Analysis of the algorithm's understanding and documentation

E. Space complexity and time complexity

F. Correctness and simplicity

4. For a linear table, it is required to be able to insert and delete a relatively fast, but also to require the storage structure to reflect the logical relationship between the data elements, then it should ().

A. Storage with sequence
B. Storage with Linked list
C. Storage with hash table
D. All of the above

5. Using the linked list structure to store the linear list, the address of the memory for the nodes ( ).

A. Must be continuous
B. Part of the address must be continuous.
C. Must be discontinuous
D. Can be continuous or discontinuous.

6. The stack ST is represented by a sequential storage structure, what is the condition that ST is empty? ( )

A. ST.top – ST.base <> 0
B. ST.top – St.base = 0
C. ST.top – ST.base <> n
D. ST.top – ST.base <> n

7. If a sequence of the Enqueue is 1, 2, 3, 4, the possible Dequeue sequence is ( ).

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

8. Which statement is correct? ( ).

A. String is a special kind of linear list.

B. The length of the string must be greater than zero.

C. The elements in a string can only be letters.

D. Null string is the Space string.

9. Tree structure is the most suitable to express ( ).

A. Sequence data element

B. Data that has a hierarchical relationship between elements

C. Disorderly data element

D. No link between elements

10. A full binary tree, M is the number of leaf nodes, N is the number of all nodes, H is the depth of the tree, then ( ).

A. $N = H+M$ B. $H+M = 2N$ C. $M = H-1$ D. $N = 2^H-1$

11. There is a binary tree, if the preorder sequence of the tree is same as the postorder sequence of the tree, then what is the possible shape of the binary tree? ( )

A. There is no node whose node degree is 2.

B. There is only one root node in the tree.

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A. There is no node whose node degree is 2. ↵

B. There is only one root node in the tree. ↵

C. There are only left Branch Node or leaf Node in the tree. ↵

D. There are only right Branch Node or leaf Node in the tree. ↵

12. If the head pointer of the single linked list is head, the condition of the linked list is empty is ( ). ↵

A. head=NULL B. head->next=NULL ↵

C. head!=NULL D. head->next!=head ↵

II、 Fill in the blanks (10 points, 2 points/each)

1. The time complexity of the following program is _____.

```
S=0;
for (i=0; i<n; i++)
    for (j=0; j<m; j++)
        S+=a[i][j];
```

2. The number of elements in the list is N. when inserting an element to the list or deleting an element from the list, the number of average moving elements will be _____, the number of

2. The number of elements in the list is N, when inserting an element to the list or deleting an element from the list, the number of average moving elements will be _____, the number of moving element is related with _____.

3. What are the different points of the stack and queue? The main feature of stack is _____, and the main feature of queue is _____.

4. After SubString(&sub, 'data structure', 6, 9), what is the result of sub?

Sub = _____.

5. In a binary tree, the number of node degree 0 is N0, the number of node degree 2 is N2, then N0=_____.

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III、 Simple Answer following questions(34 points).

1. (2 points) What kind of memory structure should be used when you need to insert and delete the elements from the linear list more frequently? Why?

2. (4 points) Briefly describes the functionality of following algorithm(the data type of each element is int)

北京邮电大学软件学院2016级本科生

《算法与数据结构》期中考试答案

中

一、 多选题 (24分,每小题2 分)

1. D 2.BH 3.CE 4.B 5.D 6.B 7.B 8.A 9.B 10.D 11.B
12. B

二、 填空(10 分,每小题2 分)

1. O(m*n) 2. 表中一半; 该元素的位置 3.先进后出;先进先出
4. 'structure' 5. N2+1

三、 简答(32 分)

1. 采用链式存储结构, 链式存储插入、删除时间复杂度为 O（1），而线性时间复杂度为 O

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2. 利用栈 S 将数组 A 中的元素逆置（4 分）。

3. 求链表的倒数第 k 个元素的值（5 分）。

4.（5 分）

1） s->next=p->next; p->next->prior=s;

2) 双链表中插入一个元素。

5. （8 分）

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