重庆大学　数据结构　课程试卷

◉ A卷
○ B卷

2012 ~2013 学年　第 **2** 学期

开课学院： 计算机学院 课程号 ：**18013840** 考试日期： **2013-7-02**

考试方式： ○ 开卷 ◉ 闭卷 ○ 其他　　考试时间： **120** 分钟

题 号	一	二	三	四	五	六	七	八	九	十	总分
得 分											

一、 Single Choice （30 points ）

1. Here is a series of C++ statements using the list ADT in the book.

L1.append(10);
L1.append(20);
L1.append(15);

If these statements are applied to an empty list, the result will look like: （ ）

a) < 10 20 15 | >　　b) < | 10 20 15 >
c) < 15 20 10 | >　　d) < | 15 20 10 >

2. When comparing the array-based and linked implementations, the array-based implementation has: （ ）

a) faster direct access to elements by position,but slower insert/delete from the current position.
b) slower direct access to elements by position,but faster insert/delete from the current position.
c) both faster direct access to elements by position, and faster insert/delete from the current position.
d) both slower direct access to elements by position, and slower insert/delete from the current position.

3. For a list of length n, the linked-list implementation's prev function requires worst-case time: （ ）

a) O(1)　　b) O(log n).　　c) O(n).　　d) O(n^2).

4. Finding the element in an array-based list with a given key value requires worst case time: （ ）

a) O(1).　　b) O(log n).　　c) O(n).　　d) O(n^2).

5. The Full Binary Tree Theorem states that: （ ）

a) The number of leaves in a non-empty full binary tree is one more than the number of internal nodes.
b) The number of leaves in a non-empty full binary tree is one less than the number of internal nodes.
c) The number of leaves in a non-empty full binary tree is one half of the number of internal nodes.
d) The number of internal nodes in a non-empty full binary tree is one half of the number of leaves.

6. If a node is at position r in the array implementation for a complete binary tree, then its parent is at: （ ）

a) (r - 1)/2　if　r > 0　　b) 2r + 1　if　(2r + 1) < n
c) 2r + 2　if　(2r + 2) < n　　d) r - 1　if　r is even

7. Dijkstra's algorithm requires that vertices be visited in: （ ）

a) Depth-first order .　　b) Breadth-first order .
c) Order of distance from the source vertex.　　d) No particular order .

8. Which is a good example of a greedy algorithm? （ ）

a) Floyd's all-pairs shortest path algorithm.
b) Prim's minimal-cost spanning tree algorithm.
c) Depth-first search.
d) Topological sorting.

9. Which of the following is a true statement: （ ）

a) In a BST , the left child of any node is less than the right child, and in a heap, the left child of any node is less than the right child.
b) In a BST , the left child of any node is less than the right child,but in a heap, the left child of any node could be less than or greater than the right

child.
c) In a BST, the left child of any node could be less or greater than the right child, but in a heap, the left child of any node must be less than the right child.
d) In both a BST and a heap, the left child of any node could be either less than or greater than the right child.

10. The primary ADT access functions used to traverse a general tree are: （ ）
a) left child and right sibling b) left child and right child
c) leftmost child and right sibling d) leftmost child and next child

11. Huffman coding provides the optimal coding when:
a) The messages are in English.
b) The messages are binary numbers.
c) The frequency of occurrence for a letter is independent of its context within the message.
d) Never.

12. Shellsort takes advantage of the best-case behavior of which sort? （ ）
a) Insertion sort b) Bubble sort c) Selection sort d) Radix sort

13.Given an unordered array containing N elements, how many comparisons will need to be performed (WORST CASE) to find a specific value? （ ）
a. N/2 b. N c. 1 d. log(N)

14. A good hash function will: （ ）
a) Use the high-order bits of the key value.
b) Use the middle bits of the key value.
c) Use the low-order bits of the key value.
d) Make use of all bits in the key value.

15. A collision resolution technique that places all records directly into the hash table is called: （ ）
a) Open hashing. b) Separate chaining.
c) Closed hashing. d) Probe function.

16. Searching for all those records in a database with key value between 10 and 100 is known as: （ ）
a) An exact match query. b) A range query.
c) A sequential search. d) A binary search.

17.Ordered arrays, compared to unordered arrays, are （ ）
a) Much quicker at deletion b) Quicker at searching
c) Quicker at insertion d.)Quicker to create

18.What kind of linked list should be used to implement a stack? （ ）
a) An ordered linked list b) A double ended linked list
c) A singly linked list d) A doubly linked list

19. The single-source shortest path problem can be used to: （ ）
a) Sort all of the graph vertices by value.
b) Sort all of the graph vertices so that each vertex is listed prior to any others that depend on it.
c) Sort all of the graph vertices by distance from the source vertex.
d） Sort all of the graph edges by weight.

20. The correct traversal to use on a BST to visit the nodes in sorted order is: （ ）
a) Preorder traversal. b) Inorder traversal.
c) Postorder traversal. d)Level order traversal.

二. Fill the blanks （20 points ）

1.Recursion is generally implemented using _____

2 A symmetric matrix A of order 10, is stored in lower-packed storage mode (is packed sequentially row by row), and address of
A [0] [0] = 1, then the address of A [8] [5] is _____ .

3. A poor result from which step causes the worst-case behavior for Quicksort? _____.

4. Breadth-first search is best implemented using_____

5. A topological sort requires the graph be _____ and _____

6. The maximum number of elements that must be examined to complete a binary search in an array of 200 elements is _____

7. In _____ sort the smallest item is repeatedly taken from the unsorted portion of the array and put into the sorted part

8. The preorder and inorder enumeration for a binary tree is ABDHECFGIJ and DHBEAFCIGJ, then the Postorder enumeration is_____.

9.How many null branches are there in a binary tree with 20 nodes? _____ .

三、 Short Answers (30 points)

1. Show how QUICKSORT sorts the following string:

E A S Y Q U E S T I O N

Assume that letters have the standard alphabetical ordering.

2.(1) Draw the binary search tree you get by inserting the following sequence into an initially empty tree:

5 1 20 30 15 25 21 8 17 9

(2) Draw the BST that results from deleting the value 20 from the BST above .

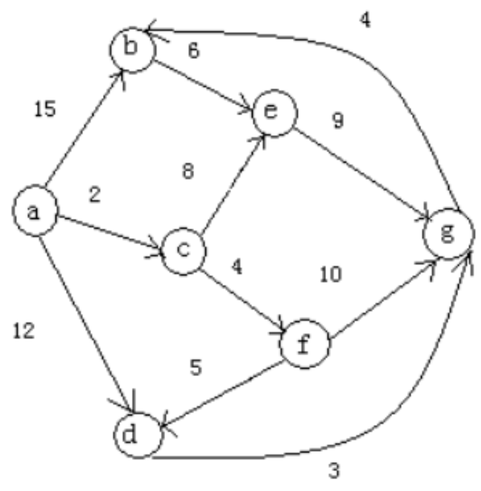
3.Consider inserting the following keys into a hash table of length

m = 13:

152 44 39 22 134 53 144 131 0 135

The auxiliary hash function is given by (k mod m). Draw the resulting hash table if we use linear probing

4. Calculate the shortest path from “ a ” to other vertexes using Dijkstra algorithm.



5.（1） Show the max-heap that results from running buildHeap on the following values stored in an array:

10 5 12 3 2 1 8 7 9 4

（2） Show the heap that results from deleting the maximum value from the max-heap above.

四、 Algorithm (20 points)

1. (5p)What is the function of following algorithm?

```
bool palin() {
   Stack<char> S;
   Queue<char> Q;
   while ((c = getc()) != ENDOFSTRING) {
      S.push(c);
      Q.enqueue(c);
   }
   while (!S.isEmpty()) {
      if (S.top() != Q.front()) return FALSE;
      char dum = S.pop();
      dum = Q.dequeue();
   }
   return TRUE;
}
```

2. (7p)Write a function that reverses the order of an array of n items.

3. (8p)Write a recursive function named smallcount that, given the pointer to the root of a BST and a key K, returns the number of nodes having key values less than or equal to K.