淡江大學 100 學年度碩士班招生考試試題

68-1

系別：資訊工程學系　　科目：資　訊　概　論

考試日期：2 月 28 日(星期一) 第 4 節　　本試題共　九　大題，　二　頁

本試題雙面印刷

1.(15%)Give an analysis of the running time (Big-Oh will do) of the following five program fragments:

(1)
```
sum=0;
for (i=0; i<n; i++)
    sum++;
```

(2)
```
sum=0;
for (i=0; i<n; i++)
    for (j=0; j<n; j++) sum++;
```

(3)
```
sum=0;
for (i=0; i<n; i++)
    for (j=0; j<n×n; j++) sum++;
```

(4)
```
sum=0;
for (i=0; i<n; i++)
    for (j=0; j<i; j++) sum++;
```

(5)
```
sum=0;
for (i=0; i<n; i++)
    for (j=0; j<i×i; j++)
        for(k=0; k<j; k++) sum++;
```

2.(10%)A symmetric matrix M is stored with its upper diagonal part stored in a one dimensional array with column-major order, i.e. M(1, 1) stored in A[0], M(1, 2)=M(2, 1) stored in A[1], M(2, 2) is A[2], M(1, 3)=M(3, 1) is A[3], M(2, 3)=M(3, 2) is A[4]. Let M(i, j) be stored in A[k], write a single expression for k in terms of i and j, the MAX and MIN functions can be used in this expression.
MAX function: MAX(i, j)=i if (i>j) otherwise is j ;
MIN function: MIN(i, j)=j if (i>j) otherwise is i

3.(10%)Given the postorder sequence：ABCDEFGHI and the inorder sequence：CBADFEGIH of the same binary tree. Draw a binary tree defined by such a pair of sequences。

4.(10%)Use the O(N) algorithm to create a **min priority queue** based on min heap for the initial list：9 8 7 6 5 4 3 2 1 show your result by graph and then represent your tree by array structure which the **root is located at array [0]**.

5.(10%)Build the Breadth-first Spanning tree and Depth-first Spanning tree of Figure 1from Vertex B.(You should select the vertex by the alphabet order when there are multichoice.)

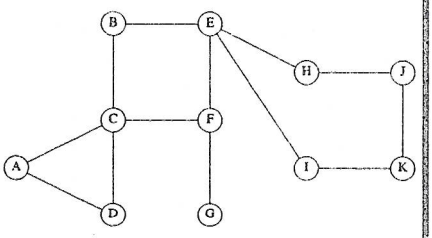

Figure 1

6.(10%)Why the Breadth-first Spanning tree or Depth-first Spanning tree can be used to check the connected graph?

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7.(5%)List an input sequence that will make the worst-case time for the Quick Sort Algorithms to sort an increase result. The input sequence is one case of the permutations of set {5,3,1,9,7,8} and the pivot is the leftmost element.

8.(10%)Design a O(N) algorithm to compute Fibonacci number F(N). F(N)=F(N-1)+F(N-2) with F(0)=F(1)=1.

9.(20%)Multiple Choice questions

(1)Which two statements are true about the command ip route 172.16.3.0 255.255.255.0 192.168.2.4?
A. It establishes a static route to the 192.168.2.0 network.
B. It establishes a static route to the 172.16.3.0 network.
C. It configures the router to send any traffic for an unknown destination to the 172.16.3.0 network.
D. It is a route that would be used last if other routes to the same destination exist.
E. It uses the default administrative distance.

(2)What are the following security appliances that can be installed in a network?
A. SDM; B. IDS; C. IOS; D. IPS; E. IOX

(3) How many classes of addresses are available for use on the internet?
A. 1 B. 2 C. 3 D. 4 E. 5.

(4)A host is attempting to send data to another host on a different network. What is the first action that the sending host will take?
A. Drop the data. B. Send the data frames to the default gateway.
C. Send the data frames to the router.
D. Create an ARP request to get a MAC address for the receiving host.
E. Send a TCP SYN and wait for the SYN ACK with the IP address of the receiving host.

(5) What are characteristics of UDP?
A. It is reliable and acknowledged.
B. It is unreliable and acknowledged.
C. It is reliable and unacknowledged.
D. It is unreliable and unacknowledged..
E. no correct answer.

(6) What are three basic parameters to configure on a wireless access point?
A. SSID; B. RTS/CTS; C. TKIP/MIC; D. RF channel; E. authentication method

(7) Which option is a valid IPv6 address?
A. 2001:0000:130F::099a::12a; B. 2002:7654:A1AD:61:81AF:CCC1 ;
C. FEC0:ABCD:WXYZ:0067::2A4 ; D. FEC0:ABCD:WXYZ:0067::2A4F; E. 2004:1:25A4:886F::1

(8)How many total hosts are possible with a class C address and a subnet mask of 255.255.255.224?
A. 24; B. 30; C. 8; D. 16; E.4

(9) For the network 163.13.2.0/23, which option is a valid IP address that can be assigned to a host?
A. 163.13.2.0; B. 163.13.2.255; C. 163.13.3.255; D. 163.13.4.0; E. 163.13.4.255

(10)How many addresses for hosts will the network 124.12.4.0/22 provide?
A. 510; B. 1022; C. 1024; D. 2048; E.512