

臺中健康暨管理學院
九十二學年度大學部轉學招生考試試題紙

學 系 別	考試科目	考試日期	時 間	備 註
資訊管理學系三年級	資料結構	92.8.23	10:20-12:00	共二頁

*答題須知：請按照順序回答，並於答案卷上標明題號。答案請簡明扼要!!! 未按照上述方式答題者，該題不予計分。

1. Ackermann's function $A(m,n)$ is defined as follows:

$$A(m,n) = \begin{cases} n+1 & , \text{ if } m=0 \\ A(m-1,1) & , \text{ if } n=0 \\ A(m-1, A(m,n-1)) & , \text{ otherwise} \end{cases}$$

(a) What is the value of $A(1,1)$ and $A(1,2)$? (4%)

(b) Write a recursive algorithm to compute the Ackermann's function. (6%)

2. Write an algorithm *length* in class *List* to count the number of nodes in a singly linked list. The last node has *link* field 0. What is the time complexity of your algorithm? (10%)

class *ListNode*{ private: int *dada*; *ListNode* **link*;};

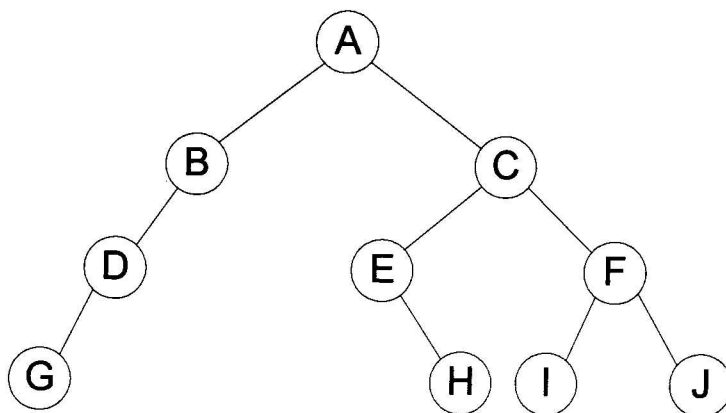
class *List*{ private: *ListNode* **first*;};

3. (a) Transfer the infix expression $(A+B)*D-E/(F+C)+G$ into the postfix expression step by step using a stack. (10%)

(b) List four operations that can be performed on a stack. Explain them. (5%)

4. (a) What are the basic differences between a tree and a binary tree? (10%)

(b) Giving the following tree, list the nodes in inorder sequence and preorder sequence. (10%)



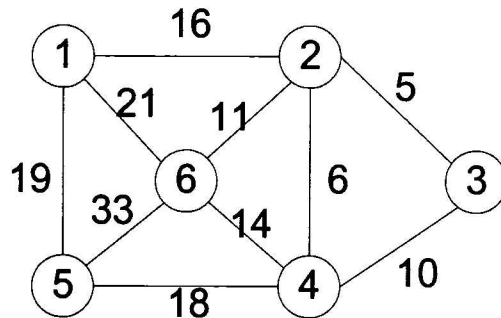
5. (a) Use the quicksort to sort the sequence 26, 5, 37, 1, 61, 11, 59, 15, 48, 19 in increasing order step by step. (10%)

(b) What is the worst and average time-complexity of the quicksort method? (5%)

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6. Use Krusal's method to find the minimal spanning tree of the following graph. Explain your steps. (10%)



7. (a) Explain Object Oriented Programming paradigm in three hundred words (10%)

(b) What is the output of the following C program ? (10%)

```

#include <stdio.h>

int ggg(int n) {
    int tmp;
    int m=0;
    if (n == 0) return m;
    tmp=++m;
    return ggg(n-1)+tmp;
}

int hhh(int);

int main()
{
    printf("ans=%d, %d\n", ggg(5), hhh(5)); return 0;
}

int hhh(int n) {
    int tmp;
    static int m=0;
    if (n == 0) return m;
    tmp=++m;
    return hhh(n-1)+tmp;
}
  
```