The following problems may be answered in Chinese or English.

Problem 1 (15%) The following C function takes a positive integer as the input and outputs an integer.

```c
int g(int n) {
    if (n==0) return 0;
    else if (n==1) return 1;
    else return g(n-1)+g(n-2);
}
```

Analyze its time complexity.

Problem 2 (15%) Write a program that can test whether a string is a *palindrome*. A palindrome is a string that is the same whether you read it backwards or forwards, for example the word 'refer'.

Problem 3 Explain the following data structures:

a. (5%) stack

b. (5%) queue

c. (5%) heap

d. (5%) hash

Problem 4 Explain the following terms for programming languages:

a. (5%) interpreter

b. (5%) compiler

Problem 5 (20%) The following lists are the traverse orders of a binary search tree:

- preorder: 6, 7, 4, 8, 5, 2, 3, 1, 9, 11, 10, 13, 12;

- inorder: 8, 4, 5, 7, 2, 6, 9, 1, 11, 3, 13, 10, 12

where the numbers are labels on the nodes. Recover the original tree with labels from this information.

Problem 6 Modern computers and operating systems can execute many programs at the same time.

a. (10%) Explain the mechanism of hardware to support this.

b. (10%) Explain how operating systems to support this.