Assignment 4

1. Summarize the various means of function value return, and explain how to select the method of function value return.
2. Explain the function of the keyword *const* in parameter passing and function value return.
3. The effect of a default argument can be alternatively achieved by overloading. Discuss with example.
4. Find all the errors and correct them by refer to the line number in the following program.

```
1    #include <iostream>
2    #include <memory>
3    using namespace std;
4    int main()
5    {
6         int i=10;
7         auto_ptr<int> ap1(new int(4)),ap2;
8         ap2=ap1;
9         cout << *ap2;
10        cout << *ap1 << endl;
11        char *c;
12        shared_ptr<char> sc;
13        sc=c;
14        sc=new char(10);
15        return 0;
16   }
```

5. Read the following program and determine the output.

```
#include <iostream>
using namespace std;
int print(int i){return i*i;}
double print(double d){return 2*d;}

int main(){
    int a=25;
    float b=9.2;
    double d=3.3;
    char c='a';
    short i=3;
    long l=9;
    cout << print(a) << endl << print(b) << endl << print(d) << endl;
    cout << print(c) << endl << print(i) << endl << print(l) << endl;
    return 0;
}
```

6. Analyze the following four programs and determine the output of the function Test().

    (1)
    ```
    void GetMemory(char *p){
        p=(char *)malloc(100);
    }
    void Test(void){
        char *str=NULL;
        GetMemory(str);
        strcpy(str,"hello world");
        printf(str);
    }
    ```

    (2)
    ```
    char *GetMemory(void){
        char p[]="hello world";
        return p;
    }
    void Test(void){
        char *str=NULL;
        str=GetMemory();
        printf(str);
    }
    ```

    (3)
    ```
    void GetMemory(char **p, int num){
        *p=(char *)malloc(num);
    }
    void Test(void){
        char *str=NULL;
        GetMemory(&str,100);
        strcpy(str, "hello");
        printf(str);
    }
    ```

    (4)
    ```
    void Test(void){
        char *str=(char *)malloc(100);
        strcpy(str, "hello");
        free(str);
        if(str!=NULL){
            strcpy(str, "world");
        printf(str);
        }
    ```

```
    }
```

Question:

The program above adopted C style. If it is changed to C++, for example, *malloc* to *new* and *free* to *delete*, will result appear the same? And what you think about reason? How to avoid it? Can you give some programming suggestions about dynamic memory management?

7. Write the overloaded function min() to find the smallest number from the int, double, float and long arrays separately.

✧ Note:

Write all your answer in the word document and save it with the name of "StudentID_Name_4.pdf". (The StudentID should be your full student ID such as 2023337621003_叶子绿_4.pdf).

✧ Submit your assignment before the end of next Monday (March 25) to the Superstar platform!