中山大学本科生期中考试

考试科目：《程序设计II实验》

学年学期：2024-2025 学年第 2 学期

开课单位：计算机学院

考试方式：上机闭卷

考试时间：100 分钟

【A5】Company 类

问题描述

根据头文件 `Company.hpp` 完善 `Company` 类

样例输入

```
1 2025455
2 2025456
20254551
3 2025457
4 2025458
```

样例输出

```
Congratulations on the registration of Company 1
number of Company objects: 1
Company1 Id: 2025455
Congratulations on the registration of Company 2
number of Company objects: 2
Company2 Id: 2
Company1 Id: 20254551
Congratulations on the registration of Company 3
number of Company objects: 3
number of Company objects: 2
Congratulations on the registration of Company 4
number of Company objects: 3
number of Company objects: 3
```

提示

静态成员变量、静态成员函数、成员函数、const 成员变量、const 成员函数。

构造函数需要打印构造信息：`Congratulations on the registration of Company ...`

`main.cpp`：

```cpp
#include <iostream>
#include <typeinfo>
#include "Company.hpp"
using namespace std;

int main()
{
    int realId, virtualId;
    cin >> realId >> virtualId;
    Company comp1(realId, virtualId);
    cout << "number of Company objects: " << Company::getNumberOfCompany() <<
endl;
    cout << "Company1 Id: " << comp1.getId() << endl;

    cin >> realId >> virtualId;
    const Company comp2(realId, virtualId);
    cout << "number of Company objects: " << Company::getNumberOfCompany() <<
endl;
    cout << "Company2 Id: " << comp2.getRealId() << endl;

    cin >> virtualId;
    comp1.modifyId(virtualId);
    cout << "Company1 Id: " << comp1.getId() << endl;

    {
        cin >> realId >> virtualId;
        Company comp3(realId, virtualId);
        cout << "number of Company objects: " << Company::getNumberOfCompany()
<< endl;
    }
    cout << "number of Company objects: " << Company::getNumberOfCompany() <<
endl;

    {
        cin >> realId >> virtualId;
        static Company comp4(realId, virtualId);
        cout << "number of Company objects: " << Company::getNumberOfCompany()
<< endl;
    }
```

```cpp
    cout << "number of Company objects: " << Company::getNumberOfCompany() <<
endl;


    return 0;
}
```

`Company.hpp` :

```cpp
#ifndef Company_HPP
#define Company_HPP
class Company {
public:
    Company(int r, int v);
    ~Company();
    int getRealId() const;
    int getId();
    void modifyId(int newVirtualId);
    static int getNumberOfCompany();

private:
    const int realId;
    int virtualId;
    static int numberOfCompany;  // count the number of Company objects
};

#endif
```

`Company.cpp` : （答案，仅供参考）

编译检查 20%，标准测试 20%，随机测试 60%

```cpp
#include "Company.hpp"
#include <iostream>
using namespace std;

int Company::numberOfCompany = 0;

Company::Company(int r, int v):realId(r), virtualId(v) {
    numberOfCompany++;
    cout << "Congratulations on the registration of Company " << realId <<
endl;
}
```

```cpp
Company::~Company() {
    numberOfCompany--;
}

int Company::getRealId() const {
    return realId;
}

int Company::getId() {
    return virtualId;
}

void Company::modifyId(int newVirtualId) {
    virtualId = newVirtualId;
}

int Company::getNumberOfCompany() {
    return numberOfCompany;
}
```