

课程编号：100072107 北京理工大学 2019 – 2020 学年第二学期

课程名称：面向对象技术与方法

班级_____ 学号_____ 姓名_____

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注意：一共有三道编程题，请同学们根据本课程《考试须知》中的要求，在规定的截止时间之前把此答卷发到相应老师的电子邮箱。对每一道编程题目，都要有设计思想说明（可用中文）、源代码（注释可用中文）、以及运行结果的截屏。

【此处贴上有你签名和日期的考试诚信承诺书】

第一题 (20 points)

According to the function **main()** and the **outputs** in the following, define class **Complex(复数)** with two data members **real(实部)** and **image (虚部)**. You may design suitable constructors and other necessary functions.

```
void main()  
{  
    Complex C1(1, 2), C2;  
    Complex C3 = C2;  
    cout << " C3 = " << C3 << endl;  
    C2 = C1 + C3;  
    cout << " C2 = " << C2 << endl;  
    C2 += C1;  
    cout << " C2 = " << C2 << endl;  
}
```

The outputs:

```
C3 = 0  
C2 = 1+2i  
C2 = 2+4i
```

【说明】简述你对本题的设计思想

【源代码】

//要有必要的注释：如说明数据成员的含义、成员/非成员函数的功能、函数参数及返回值的含义等

【运行结果的截屏】

第二题 (20 points)

(1) **Shape** is an abstract class with a pure virtual function: **Area()**. (2) **Circle** is inherited from **Shape**, with a data member **Radius**, and a member function **Area()** to get the area of a circle. (3) **Triangle** is inherited from **Shape**, with two data members **Bottom-length** and **Height**, and a member function **Area()** to get the area of a triangle.

Please complete the definition of **Shape**, **Circle** and **Triangle**, and define other necessary functions, to let a user can use **Shape**, **Point** and **Circle** as follows:

```
void main()  
{  
    Shape* p = new Circle(2);  
    cout << "The area of the circle is: " << PrintArea(*p) << endl;  
    Triangle triangle (3,4);  
    cout << "The area of the triangle is: " << PrintArea(triangle) << endl;  
    delete p;  
}
```

The outputs:

The area of the circle is: 12.56

The area of the triangle is: 6

【说明】简述你对本题的设计思想

【源代码】

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【运行结果的截屏】

第三题 (20 points)

Define an array class: **MyArray**. The user can use **MyArray** as follows:

```
void main()
{
    MyArray<int>  intArray(10); // 10 is the number of elements in intArray
    for (int i=0; i<10; i++)
        intArray[i] = i * i;
    cout << intArray << endl;
}
```

The outputs:

0, 1, 4, 9, 16, 25, 36, 49, 64, 81,

【说明】简述你对本题的设计思想

【源代码】

//要有必要的注释：如说明数据成员的含义、成员/非成员函数的功能、函数参数及返回值的含义等

【运行结果的截屏】