实验名称：Class and Object 重修刷分

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分析设计	代码实现	分析总结	总评

实验类型：设计型

实验目的：

1. Understand how to test and debug a C++ program. Learn to compile their program and correct their program based on error messages.
2. Be able to define a class, and understand the characteristics of public and private member variables or member function in a class.
3. Understand the function of destructor and copy constructor, which are special kind of member function for a class.

实验要求：

1. Write a class called CPU that describes the following information about a CPU: clock frequency, with a maximum of no more than 3000MHz; word length, which can be 32 bit or 64 bit; number of cores, which can be single core, dual core, or quad core; whether it support super thread or not. Each information requires the use of bit fields to represent it. Observe the proportion of this class by outputting sizeof(CPU) number of bytes.
2. Write one negative number class Complex. Make the following code work.

```
 Complex c1(3, 5);          // Initialize c1 with complex 3+5i
 Complex c2=4.5;            // Initialize c2 with real number 4.5
 c1.add(c2);                // Add c1 and c2, and save the result in c1
 c1.show();                 // Output c1 (the result at this point should
be 7.5+5i)
```

实验内容与设计：(学生作答区)

说明：根据每一实验要求，给出：(1)分析与设计(画出类图、算法流程图等)；(2)程序代码(注意代码风格和必要注释)；(3)测试数据和执行结果(用截图展现输入和输出)

任务一：
设计一个类来描述 CPU
Clock frequency 为 12，因为 clock frequency 不超过 3000，我们足够的位数表示 3000，因此需要 2 的 12 次方（4096）
Wordlength 为 1，因为只有种情况，0 是 32，1 是 64
Number of core 为 2，因为有三种情况，所以用两位来表示，00 表示单核，01 表示双核，10 表示四核

superThread为1，因为只有是和否两种情况

```
#include <iostream>

// CPU class
class CPU {
private:
    unsigned int clockFrequency : 12;
    unsigned int wordLength : 1;
    unsigned int numberOfCores : 2;
    unsigned int superThread : 1;
public:
    // Constructor
    CPU(unsigned int freq, unsigned int word, unsigned int cores, 
unsigned int thread):
    clockFrequency(freq),
    wordLength(word),
    numberOfCores(cores),
    superThread(thread) {}

    // Destructor
    ~CPU() {}

    // Function to output size of CPU object
    void sizeofCPU() {
        std::cout << "Size of CPU object: " << sizeof(*this) << " bytes" 
<< std::endl;
    }
};
```

任务二：
要求创建一个complex类表示虚数，有两个变量存储实部和虚部。

```
class Complex {
private:
    double real;
    double imaginary;
```

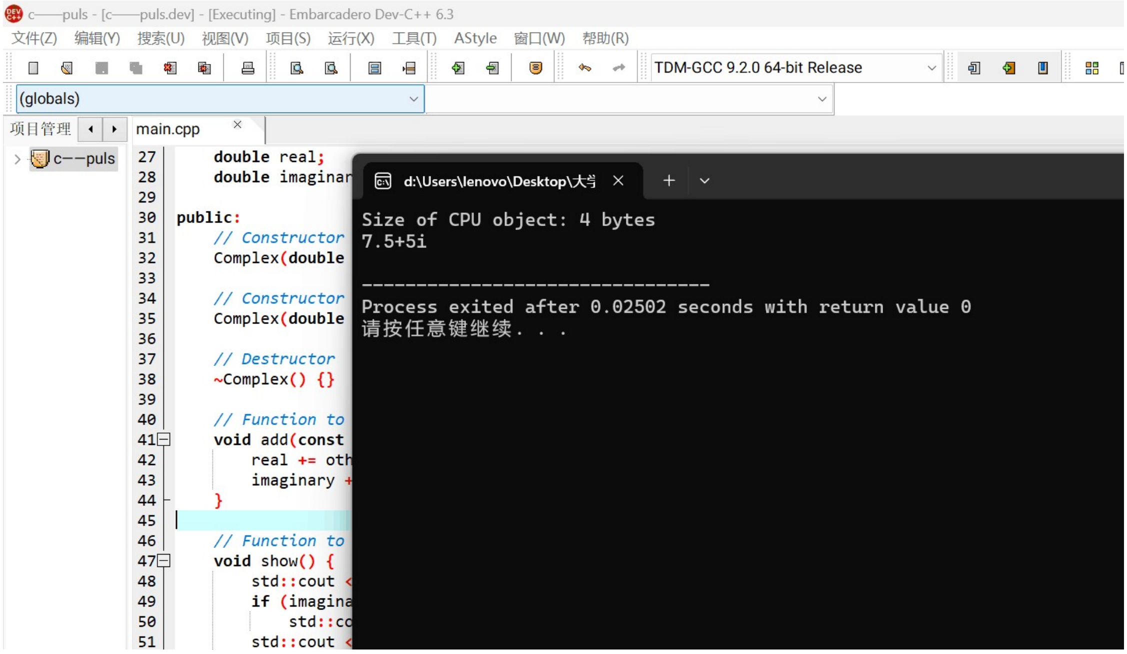
```
public:
    // Constructor with real and imaginary parts
    Complex(double r, double i) : real(r), imaginary(i) {}

    // Constructor with only real part

    Complex(double r) : real(r), imaginary(0) {}


    // Destructor
    ~Complex() {}

    // Function to add another Complex number
    void add(const Complex& other) {
        real += other.real;
        imaginary += other.imaginary;
    }

    // Function to display the complex number
    void show() {
        std::cout << real;

        if (imaginary >= 0)

            std::cout << "+";
        std::cout << imaginary << "i" << std::endl;
    }
};

int main() {
    // Test CPU class

    CPU cpu(2500, 0, 2, 1); // 2500MHz, 64-bit, dual core, supports

super thread
    cpu.sizeofCPU();

    // Test Complex class

    Complex c1(3, 5);  // Initialize c1 with complex 3+5i

    Complex c2 = 4.5;  // Initialize c2 with real number 4.5

    c1.add(c2);         // Add c1 and c2, and save the result in c1
    c1.show();          // Output c1


    return 0;
```

```
}
```

分析总结：（学生作答区）

说明：遇到的 bug 和排错、多种解决方法、实验要求之外更多的尝试、心得体会等。

运行成功！


c——puls - [c——puls.dev] - [Executing] - Embarcadero Dev-C++ 6.3
文件(Z) 编辑(Y) 搜索(U) 视图(V) 项目(S) 运行(X) 工具(T) AStyle 窗口(W) 帮助(R)
TDM-GCC 9.2.0 64-bit Release
(globals)
项目管理
main.cpp
c——puls
d:\Users\lenovo\Desktop\大号

```
    double real;
    double imaginar

public:
    // Constructor
    Complex(double

    // Constructor
    Complex(double

    // Destructor
    ~Complex() {}

    // Function to
    void add(const
        real += oth
        imaginary +
    }

    // Function to
    void show() {
        std::cout <
        if (imagina
            std::co
        std::cout <
```

```
Size of CPU object: 4 bytes
7.5+5i

--------------------------------
Process exited after 0.02502 seconds with return value 0
请按任意键继续. . .
```

我遇到的问题其实是问题一，因为我一开始不太懂什么意思，我想不懂怎么去设计这个 CPU 类，我直接设置 clock frequency 为 3000，但后面我发现这样做太笨了，不需要这么多位数来表示 3000，而是使用二进制的原理来表示。

此外，我对 C++的基本语法也有点模糊，在写程序的时候经常运行不起来，我后来有重新复习了一下基本语法，后来编写代码就流程很多了。