- Experiment 7 -

Create a Java project named Experiment7 and create the following classes in the project.

1. Define a public class ExceptionTest and put the following codes in the main method of the class:

```
        String output[] = {"The ","brown ","fox ","jumps ","over ","the ","lazy ","dog."};
        int i= 0;
        while (i<10) {
            System.out.print(output[i++]);
        }
        System.out.println("haha...");
```

What is the running result of the program?

And why the statement ***System.out.println("haha...");*** is not executed?

Modify the above codes as follows:

```
    String output[]={ "The ","brown ","fox ","jumps ", "over ","the ","lazy ","dog."};
    int i =0;
    while (i<10) {
        try {
            System.out.print(output[i++]);
        }
        catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("\n 下标越界异常处理!");
            System.out.println(e.toString());
            break;
        }
    }
    System.out.println("haha...");
```

Run the program and compare the running results.

Finally, add the following statement after catch part:

```
    finally { System.out.println("不管怎样都要执行的语句!"); }
```

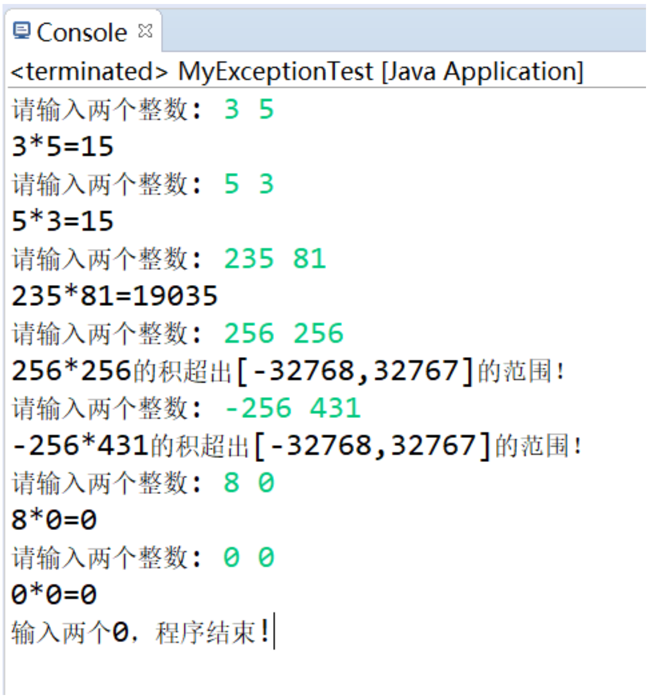
Run the program again and compare the running results.

2. Define an exception class MyException, which is thrown if the result is not in the range [-32768, 32767] in the method *multiply* that computes the product of two integers. Define a main class MyExceptionTest that contains the following methods:

```
    public static int multiply(int n1, int n2) throws MyException {
        int result;
        result=n1*n2;
        if (result<-32768 || result>32767)
            throw new MyException(n1+"*"+n2+"的积超出[-32768,32767]的范围！ ");
        return result;
        }
```

Finally, write codes that can print the product of two integers in the main method of the main class.

[Sample]



Console ☒
<terminated> MyExceptionTest [Java Application]

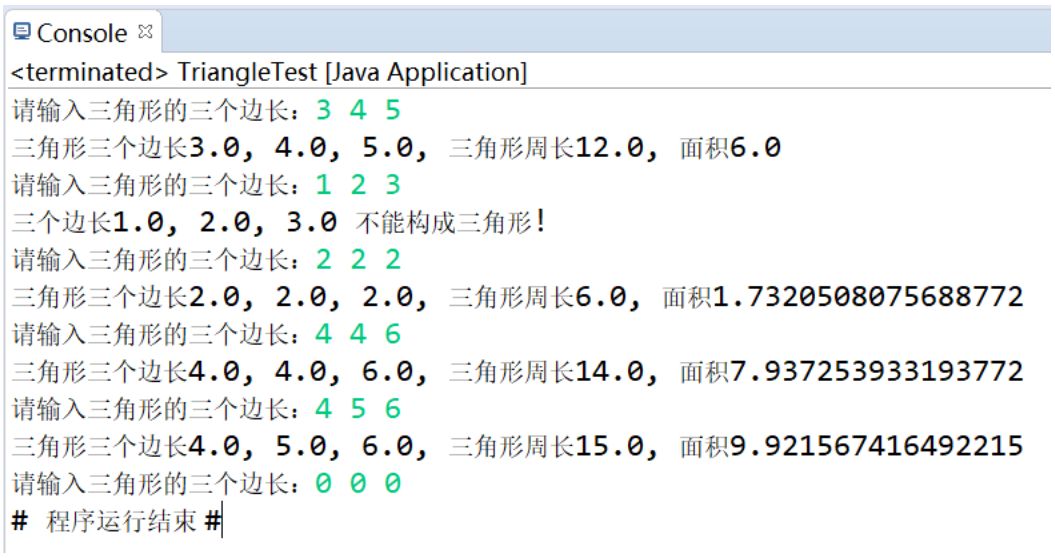
```
请输入两个整数：3 5
3*5=15
请输入两个整数：5 3
5*3=15
请输入两个整数：235 81
235*81=19035
请输入两个整数：256 256
256*256的积超出[-32768,32767]的范围！
请输入两个整数：-256 431
-256*431的积超出[-32768,32767]的范围！
请输入两个整数：8 0
8*0=0
请输入两个整数：0 0
0*0=0
输入两个0，程序结束！
```

3. Given the following codes,

```
    public class TriangleTest {
      public static void main(String[] args) {
          Triangle triangle=new Triangle();
          Scanner in=new Scanner(System.in);
          double a, b, c;
          while (true) {
              System.out.print("请输入三角形的三个边长：");
              a=in.nextDouble();
              b=in.nextDouble();
              c=in.nextDouble();
              if (a==0 && b==0 && c==0) {
                  System.out.println("#  程序运行结束  #");
                  break;
              }
              try {
                  triangle.setSideLength(a, b, c);
                  System.out.println(triangle);
              }
              catch (TriangleException e) {
                  System.out.println(e.toString());
              }
```

```
                }
            }
        }
```
Please put your defined class TriangleException and class Triangle in front of the above codes, so that the program can run as the results given below.

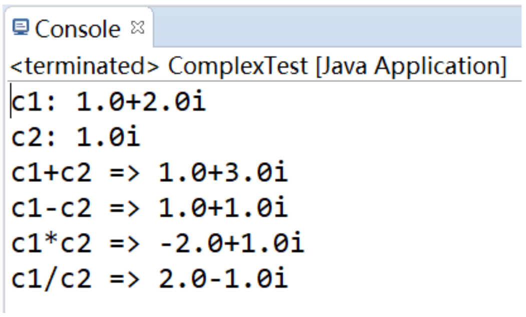
[Sample]



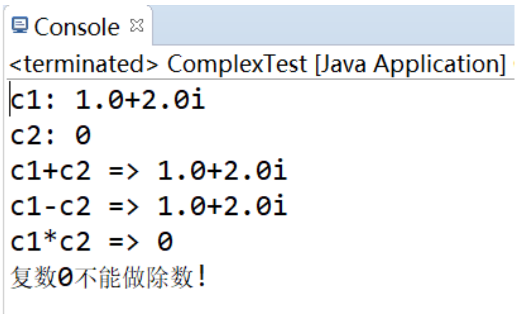
```
Console
<terminated> TriangleTest [Java Application]
请输入三角形的三个边长：3 4 5
三角形三个边长3.0, 4.0, 5.0, 三角形周长12.0, 面积6.0
请输入三角形的三个边长：1 2 3
三个边长1.0, 2.0, 3.0 不能构成三角形！
请输入三角形的三个边长：2 2 2
三角形三个边长2.0, 2.0, 2.0, 三角形周长6.0, 面积1.7320508075688772
请输入三角形的三个边长：4 4 6
三角形三个边长4.0, 4.0, 6.0, 三角形周长14.0, 面积7.937253933193772
请输入三角形的三个边长：4 5 6
三角形三个边长4.0, 5.0, 6.0, 三角形周长15.0, 面积9.921567416492215
请输入三角形的三个边长：0 0 0
# 程序运行结束 #
```

4. Define class Complex that can add, subtract, multiply and divide complex numbers. The case where 0 cannot be used as a divisor must be considered. When 0 is used as a divisor, an exception is thrown with "复数 0+0i 不能做除数！ ". Finally, define a main class named ComplexTest that can test the validity of class Complex.

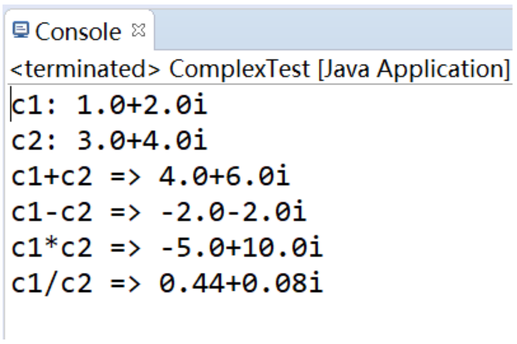
[Sample]



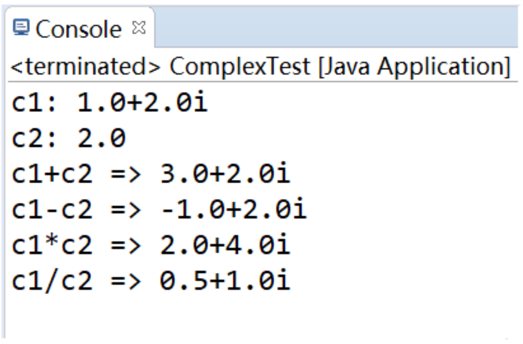
```
Console
<terminated> ComplexTest [Java Application]
c1: 1.0+2.0i
c2: 1.0i
c1+c2 => 1.0+3.0i
c1-c2 => 1.0+1.0i
c1*c2 => -2.0+1.0i
c1/c2 => 2.0-1.0i
```



```
Console
<terminated> ComplexTest [Java Application]
c1: 1.0+2.0i
c2: 0
c1+c2 => 1.0+2.0i
c1-c2 => 1.0+2.0i
c1*c2 => 0
复数0不能做除数！
```



```
Console
<terminated> ComplexTest [Java Application]
c1: 1.0+2.0i
c2: 3.0+4.0i
c1+c2 => 4.0+6.0i
c1-c2 => -2.0-2.0i
c1*c2 => -5.0+10.0i
c1/c2 => 0.44+0.08i
```



```
Console
<terminated> ComplexTest [Java Application]
c1: 1.0+2.0i
c2: 2.0
c1+c2 => 3.0+2.0i
c1-c2 => -1.0+2.0i
c1*c2 => 2.0+4.0i
c1/c2 => 0.5+1.0i
```

5. Practice on logging and debugging **[just practice, no need to be submitted]**
Write a simple program named MyLogDebug.java, such as a program that calculates 1+2+3+…+100, and outputs the result. Set breakpoints and debug the program, such as: single-step execution, jump out of the current method, run to the next breakpoint, view the current value of variables, etc.
Next, add the following log in your program (assuming sum is the result of 1+2+3+…+100),

```
    Logger.getGlobal().info("The result of 1+2+3+...+100 is: "+sum);
```

Then run and see if there is any log output.