实验一　java 类与对象

1. 粘贴程序代码（可截图）。

1.1Employee.java

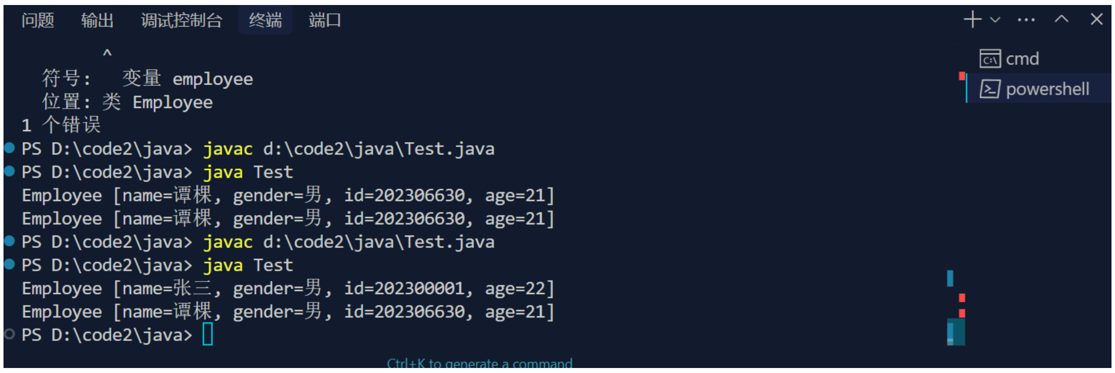
```java
public class Employee {
    private String name,gender;
    private int id,age;

    // 尽量保持函数参数与成员变量顺序一致
    Employee(String name,String gender,int id,int age){
        this.name = name;
        this.gender = gender;
        this.id = id;
        this.age = age;
    }

    // 这里的 this 可以省略
    String getName(){
        return this.name;
    }

    String getGender(){
        return this.gender;
    }

    int getId(){
        return this.id;
    }

    int getAge(){
        return this.age;
    }

    // 如果返回值是 Employee 类型,则可以进行链式调用
    Employee setName(String name){
        this.name = name;
        //调用远程服务,可能是对数据库的操作,可以使用 boolean 类型判断操作成功还是失败
        // employee.setname(name);
        return this;
    }

    //   Employee setName(String name){
    //      // 链式调用
    //      this.name = name;
    //      //调用远程服务,可能是对数据库的操作,可以使用boolean类型判断操作成功还是失败
    //      employee.setname("张三").setId();
    //      return this;
    // }

    Employee setGender(String gender){
        this.gender = gender;
        return this;
    }

    Employee setId(int id){
        this.id = id;
        return this;
    }

    Employee setAge(int age){
        this.age = age;
        return this;
    }

    @Override
    public String toString(){
        String str = "Employee [name=" + name + ", gender=" + gender + ", id=" + id + ", age=" + age + "]";
        return str;
    }
}
```

2.2Test.java

```
public class Test {
    public static void main(String[] args) {
        String name = "张三";
        String gender = "男";
        int id = 202300001;
        int age = 22;
        Employee employee = new Employee(name,gender,id,age);
        System.out.println(employee);
        employee.setName("谭棵").setGender("男").setId(202306630).setAge(21);
        System.out.println(employee);
    }
}
```

2. 粘贴程序的输出信息。

2.3 运行结果



```
        ^
  符号:   变量 employee
  位置: 类 Employee
1 个错误
PS D:\code2\java> javac d:\code2\java\Test.java
PS D:\code2\java> java Test
Employee [name=谭棵, gender=男, id=202306630, age=21]
Employee [name=谭棵, gender=男, id=202306630, age=21]
PS D:\code2\java> javac d:\code2\java\Test.java
PS D:\code2\java> java Test
Employee [name=张三, gender=男, id=202300001, age=22]
Employee [name=谭棵, gender=男, id=202306630, age=21]
PS D:\code2\java>
```

实验二　继承、接口与多态

1. 粘贴程序代码（可截图）。

- 实验一
  - Employee.java

```java
package people;
import people.People;

public class Employee extends People{
    int id;
    protected String test = "子类";
    // @Override
    //  public String getTest(){
    //      return this.test;
    //  }
    public Employee(String name,String gender,int age,int id){
        super(name,gender,age);
        this.id = id;
    }

    public void speak(){
        System.out.println("speak");
    }

    public void eat(){
        System.out.println("eat");
    }

    public void work(){
        System.out.println("work");
    }

    public int getId(){
        return this.id;
    }
    public Employee setId(int id){
        this.id = id;
        return this;
    }
}
```

- People.java

```java
package people;
public abstract class People {
    protected String name,gender;
    protected int age;

    protected String test = "父类";

    public String getTest(){
        return this.test;
    }

    public People(String name,String gender,int age){
        this.name = name;
        this.gender = gender;
        this.age = age;
    }

    // 定义抽象方法
    public abstract void speak();
    public abstract void eat();

    public String getName(){
        return this.name;
    }

    public String getGender(){
        return this.gender;
    }

    public int getAge(){
        return this.age;
    }

    // 链式调用,返回this 当前对象指针
    public People setName(String name){
        this.name = name;
        return this;
    }

    public People setGender(String gender){
        this.gender = gender;
        return this;
    }

    public People setAge(int age){
        this.age = age;
        return this;
    }
}
```

- Main.java

```java
import java.util.Scanner;

import people.Employee;


public class Main {
    public static void main(String[] args){
        Employee employee = new Employee("谭棵","男",20,202306630);
        System.out.println("这是一名员工：");
        System.out.println("姓名："+employee.getName());
        System.out.println("性别："+employee.getGender());
        System.out.println("年龄："+employee.getAge());
        System.out.println("工号："+employee.getId());
        // 父类定影的返回的是父类的指针,setName 返回的是 People 的指
针,setName 返回的是 Employee 的指针,父类没有 work 方法
        // ((Employee)employee).setName("李四").setAge(20);
        // ((Employee)employee.setName("李四").setAge(20)).work();
        //
        employee.setName("李四").setAge(20);
        employee.eat();
        employee.speak();
        employee.work();
        System.out.println();
        // People people = new People("丽丝","女",16);
        // System.out.println("这是一个普通的人：");
        // System.out.println("姓名："+people.getName());
        // System.out.println("性别："+people.getGender());
        // System.out.println("年龄："+people.getAge());
        // people.eat();
        // people.speak();
        // System.out.println(employee.getTest()); 返回的是父类的属性,因为是引用关系
    }
}
```

- **实验二采用继承的方式**
  - Animal.java

```java
package animal;

public class Animal {
    // 动物的吃法都是不一样的
    public void eat(){
        System.out.println("eat");
    }

    // 动物的睡眠方法
    public void sleep() {
        System.out.println("sleep");
    }
}
```

  - Rabbit.java

```java
package animal;

public class Rabbit extends Animal {
    private String name;
    private int age;
    private String gender;

    @Override
    public void eat() {
        System.out.println("我是兔子，我吃草！");
    }
}
```

  - Tiger.java

```java
// Source code is decompiled from a .class file using FernFlower decompiler.
package animal;

public class Tiger implements Animal {
   private String name;
   private int age;
   private String gender;

   public Tiger() {
   }
```

```
    public void eat() {
        System.out.println("我是老虎，我吃肉！");
    }
}
```

- Main.java

```
import animal.Animal;
import animal.Rabbit;
import animal.Tiger;
public class Main{
    public static void main(String[] args) {
            Rabbit r = new Rabbit();
            Tiger t = new Tiger();
            r.eat();
            t.eat();
            r.sleep();
            t.sleep();
        }
}
```

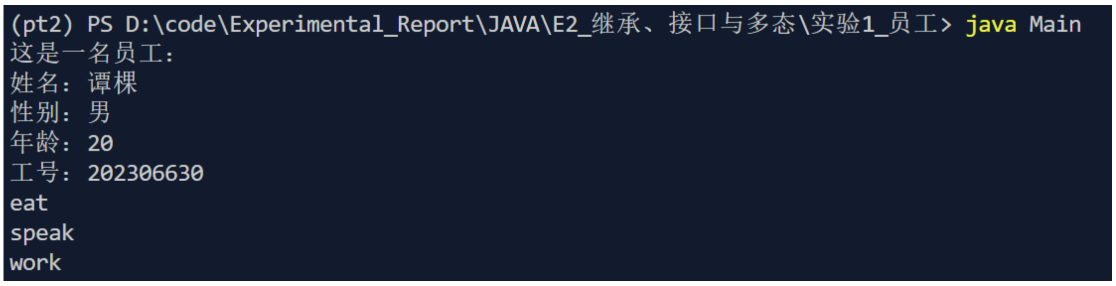
◆ 实验二采用接口的方式

- 与继承类似,只是将 Animal 改为了 interface,Rabbit 和 Tigger 使用 implements 调用接口
- Animal.java

```
package animal;

public interface Animal {
    // 动物的吃法都是不一样的
    void eat();

    // 动物的睡眠方法
    default void sleep() {
        System.out.println("sleep");
    }
}
```

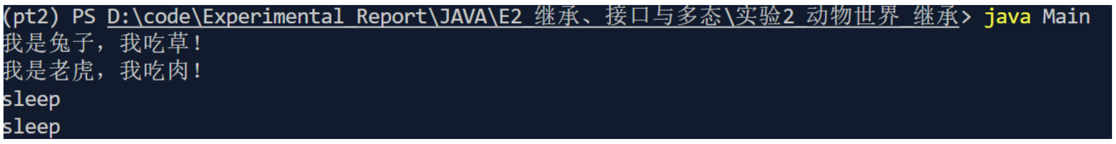
2. 粘贴程序的输出信息。

➢ 实验一运行结果



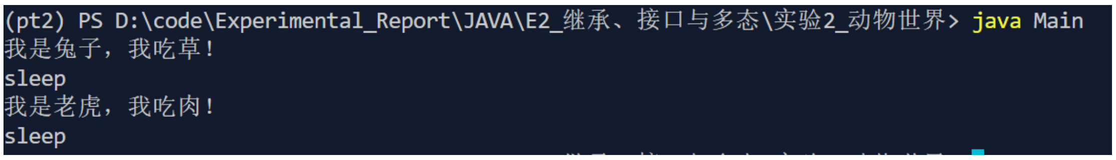
```
(pt2) PS D:\code\Experimental_Report\JAVA\E2_继承、接口与多态\实验1_员工> java Main
这是一名员工:
姓名: 谭棵
性别: 男
年龄: 20
工号: 202306630
eat
speak
work
```

➢ 实验二采用继承的方式



```
(pt2) PS D:\code\Experimental_Report\JAVA\E2_继承、接口与多态\实验2_动物世界_继承> java Main
我是兔子，我吃草！
我是老虎，我吃肉！
sleep
sleep
```

➢ 实验二采用接口的方式



```
(pt2) PS D:\code\Experimental_Report\JAVA\E2_继承、接口与多态\实验2_动物世界> java Main
我是兔子，我吃草！
sleep
我是老虎，我吃肉！
sleep
```

实验三　异常处理

1. 粘贴程序代码（可截图）。

● 实验一

  ➢ Week.java(未采用枚举)

```java
package com.sicau;
// 这段代码外层做防御,内层不做防御

public class Week {
    private final String data[] = { "星期一", "星期二", "星期三", "星期四
", "星期五", "星期六", "星期日" };

    public String getDays(int index) {
        return data[index];
    }

    private int index;

    // public Week(int index) {
    //     this.index = index;
    // }

    public String toString() {
        return data[index];
    }
}
// 外层做防御,内层不做
// 一般 web 开发常用

// 外层和内层都做
// 高可靠性,资源开销大,例如金融系统

// 内层做防御,外层不做
// 系统级底层开发常用,但是内层极其复杂
```

  ➢ Week.java(采用枚举)

```java
package com.sicau;
// 这段代码外层做防御,内层不做防御

public class Week {
    // 采用枚举
    private enum Days {
        星期一, 星期二, 星期三, 星期四, 星期五, 星期六, 星期日
    }

    public String getDays(int index) {
        return Days.values()[index].toString();
    }

    private int index;

    public String toString() {
        return Days.values()[index].toString();
    }
}
```

➢ Main.java

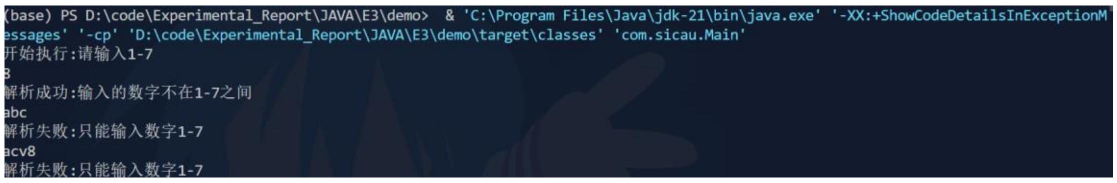
```java
package com.sicau;
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Week week = new Week();

        String input_str = null;
        String output_str = null;
        boolean invalid = true; // Changed to true to enter the loop
        int index = -1;
        System.out.println("开始执行:请输入 1-7");

        while(invalid){
            input_str = sc.nextLine();
            try{
                index = Integer.parseInt(input_str) - 1;
                if(index < 0 || index > 6){
                    System.out.println("解析成功:输入的数字不在 1-7 之间");
                } else {
                    invalid = false;
                }
            } catch (NumberFormatException e) {
                System.out.println("解析失败:只能输入数字 1-7");
            }
        }
        sc.close(); // Added scanner close
        output_str = week.getDays(index);
        System.out.println(output_str);
    }
}
```

- 实验二
  - Main.java

```
package com.tk;

import java.io.IOException;

public class Test03 {
    public static void main(String[] args) throws IOException {
        int i = 1, j;
        try{
            System.out.println("Try:这是一个异常处理的例子：");
            j = i/0;
            throw new ArithmeticException();
        }catch(ArithmeticException e){
            System.out.println("Catch:"+e+";"+"\n"+"reason:"+e.getMessag
e());
        }finally{
            System.out.println("Finally:must go inside finally");
        }
    }
}
```

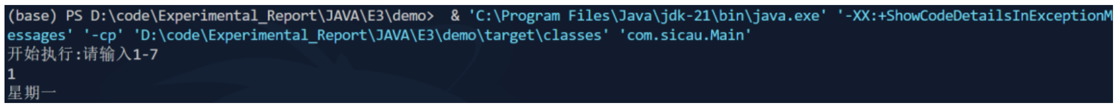
2. 粘贴程序的输出信息。

- 实验一运行结果
  - 异常捕获



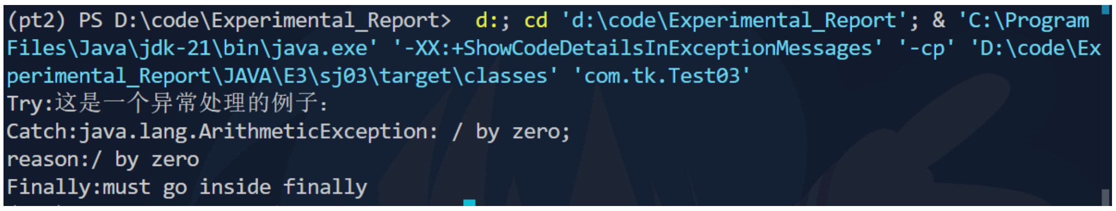
```
(base) PS D:\code\Experimental_Report\JAVA\E3\demo>  & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionM
essages' '-cp' 'D:\code\Experimental_Report\JAVA\E3\demo\target\classes' 'com.sicau.Main'
开始执行:请输入1-7
8
解析成功:输入的数字不在1-7之间
abc
解析失败:只能输入数字1-7
acv8
解析失败:只能输入数字1-7
```

  - 正常输入



```
(base) PS D:\code\Experimental_Report\JAVA\E3\demo>  & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionM
essages' '-cp' 'D:\code\Experimental_Report\JAVA\E3\demo\target\classes' 'com.sicau.Main'
开始执行:请输入1-7
1
星期一
```

- 实验二运行结果


```
(pt2) PS D:\code\Experimental_Report>  d:; cd 'd:\code\Experimental_Report'; & 'C:\Program Files\Java\jdk-21\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'D:\code\Experimental_Report\JAVA\E3\sj03\target\classes' 'com.tk.Test03'
Try:这是一个异常处理的例子:
Catch:java.lang.ArithmeticException: / by zero;
reason:/ by zero
Finally:must go inside finally
```

实验四　输入输出

1. 粘贴程序代码（可截图）。

2. 粘贴程序的输出信息。