第五课--类和对象

任务目标

1、类的定义

2、对象和类的关系，is-a和has-a

3、属性、行为、构造方法、访问权限、方法重载和方法覆盖

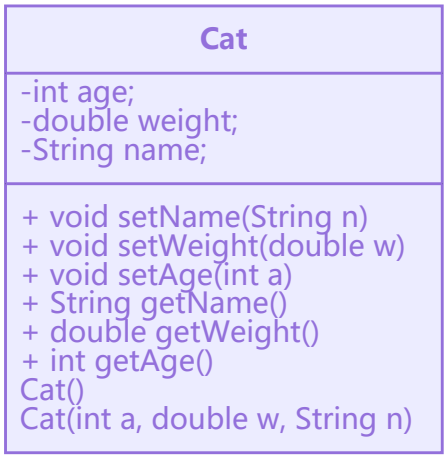
相关知识

1、类、对象、属性、行为、构造方法、访问权限、方法重载、Static属性和方法。

2、方法重载（方法名相同，参数列表不同）

3、构造方法（与类同名，无返回值）

1、类的设计




```
import java.lang.Math;
import java.util.Scanner;

class Cat
{
    private int age;
    private double weight;
    private String name;
    public void setName(String n)
    {
        this.name = n;
    }
    public void setWeight(double w)
    {
        this.weight = w;
    }
    public void setAge(int a)
```

```
    {
        this.age=a;
    }
    public String getName()
    {
        return this.name;
    }
    public double getWeight()
    {
        return this.weight;
    }
    public int getAge()
    {
        return this.age;
    }
    public void printinfo() //功能的内聚
    {
        System.out.print(this.getName()+"\n");
        System.out.print(this.getAge()+"\n");
        System.out.print(this.getWeight()+"\n");
    }
    public void printinfo(int a)
    {
        System.out.print(a+"\n");
    }
    Cat()
    {

    }
    Cat(int a)
    {
        this();
        this.age=a;
    }
    Cat(int a, double w, String n)
    {
        this.age=a;
        this.weight=w;
        this.name=n;
    }
}

public class Test1
{
    public static void main(String[] args)
    {
        Cat c1  =new Cat();
        Cat c2 = new Cat(3,32,"Panda");
        Cat c3 = new Cat(13);
        c1.setName("Kitty");
        c1.setAge(4);
        c1.setWeight(20);
        c1.printinfo();
        c2.printinfo();
        c2.printinfo(3);
        // System.out.print(c1.getName()+"\n");
        // System.out.print(c1.getAge()+"\n");
        // System.out.print(c1.getWeight()+"\n");
```

```
        // System.out.print(c2.getName()+"\n");
        // System.out.print(c2.getAge()+"\n");
        // System.out.print(c2.getWeight()+"\n");
    }
}
```

2、Static属性

1、Static变量是全局变量

```
import java.lang.Math;
import java.util.Scanner;

class Cat
{
    private int age;
    private double weight;
    private String name;
    static int num;  //Staic 属性
    public void setName(String n)
    {
        this.name = n;
    }
    public void setWeight(double w)
    {
        this.weight = w;
    }
    public void setAge(int a)
    {
        this.age=a;
    }
    public String getName()
    {
        return this.name;
    }
    public double getWeight()
    {
        return this.weight;
    }
    public int getAge()
    {
        return this.age;
    }
    public void printinfo()
    {
        System.out.print(this.getName()+"\n");
        System.out.print(this.getAge()+"\n");
        System.out.print(this.getWeight()+"\n");
    }
    public void printinfo(int a)
    {
        System.out.print(a+"\n");
    }
    Cat()
    {
        num++;
    }
```

```
    Cat(int a)
    {
        this.age=a;
        num++;
    }
    Cat(int a, double w, String n)
    {
        this.age=a;
        this.weight=w;
        this.name=n;
        num++;
    }
}

public class Test1
{
    public static void main(String[] args)
    {
        Cat c1  =new Cat();
        Cat c2 = new Cat(3,32,"Panda");
        Cat c3 = new Cat(13);
        c1.setName("Kitty");
        c1.setAge(4);
        c1.setWeight(20);
        System.out.print(Cat.num+"\n");
    }
}
```

2、Static变量可以通过对象名、类名或者静态方法进行访问。

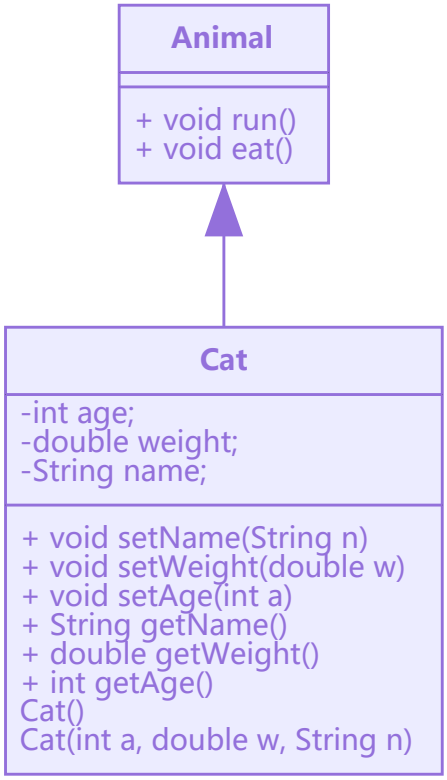
```
import java.lang.Math;
import java.util.Scanner;

class Cat
{
    private int age;
    private double weight;
    private String name;
    static int num;
    public static int getNum()
    {
        return num;
    }
    public void setName(String n)
    {
        this.name = n;
    }
    public void setWeight(double w)
    {
        this.weight = w;
    }
    public void setAge(int a)
    {
        this.age=a;
    }
    public String getName()
    {
```

```
        return this.name;
    }
    public double getWeight()
    {
        return this.weight;
    }
    public int getAge()
    {
        return this.age;
    }
    public void printinfo()
    {
        System.out.print(this.getName()+"\n");
        System.out.print(this.getAge()+"\n");
        System.out.print(this.getWeight()+"\n");
    }
    public void printinfo(int a)
    {
        System.out.print(a+"\n");
    }
    Cat()
    {
        num++;
    }
    Cat(int a)
    {
        this.age=a;
        num++;
    }
    Cat(int a, double w, String n)
    {
        this.age=a;
        this.weight=w;
        this.name=n;
        num++;
    }
}

public class Test1
{
    public static void main(String[] args)
    {
        Cat c1  =new Cat();
        Cat c2 = new Cat(3,32,"Panda");
        Cat c3 = new Cat(13);
        c1.setName("Kitty");
        c1.setAge(4);
        c1.setWeight(20);
        System.out.print(c1.num+"\n");
        System.out.print(Cat.num+"\n");
        System.out.print(Cat.getNum()+"\n");
    }
}
```

3、继承




```
import java.lang.Math;
import java.util.Scanner;

class Animal
{
    public void run()
    {
        System.out.print("Animal Run\n");
    }

    public void eat()
    {
        System.out.print("Animal Eat\n");
    }
}

class Cat extends Animal
{
    private int age;
    private double weight;
    private String name;
    static int num;
    public static int getNum()
    {
        return num;
    }
    public void setName(String n)
    {
        this.name = n;
    }
    public void setWeight(double w)
    {
        this.weight = w;
```

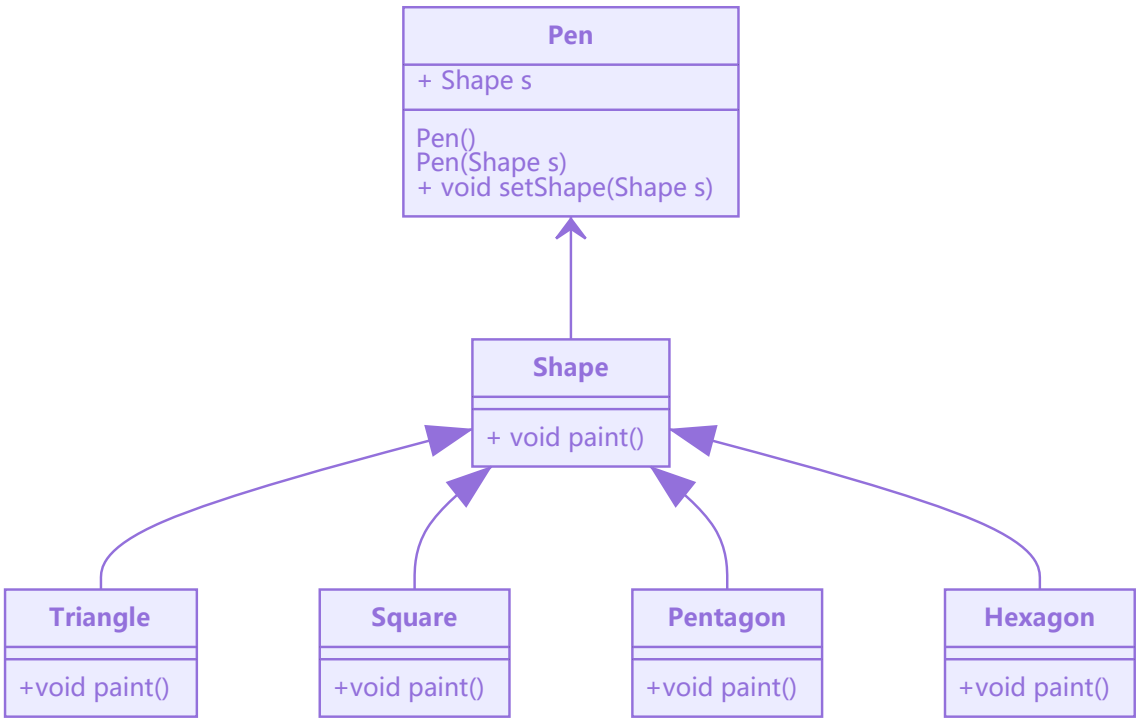
```
    }
    public void setAge(int a)
    {
        this.age=a;
    }
    public String getName()
    {
        return this.name;
    }
    public double getWeight()
    {
        return this.weight;
    }
    public int getAge()
    {
        return this.age;
    }
    public void printinfo()
    {
        System.out.print(this.getName()+"\n");
        System.out.print(this.getAge()+"\n");
        System.out.print(this.getWeight()+"\n");
    }
    public void printinfo(int a)
    {
        System.out.print(a+"\n");
    }
    Cat()
    {
        num++;
    }
    Cat(int a)
    {
        this.age=a;
        num++;
    }
    Cat(int a, double w, String n)
    {
        this.age=a;
        this.weight=w;
        this.name=n;
        num++;
    }
    public void run()
    {
        System.out.print("Cat Run\n");
    }

    public void eat()
    {
        System.out.print("Cat Eat\n");
    }
}

public class Test1
{
    public static void main(String[] args)
    {
```

```
        Cat c2 = new Cat(3,32,"Panda");
        c2.run();
        c2.eat();
    }
}
```

4、多态




```
class Shape
{
    public void paint()
    {
        System.out.print("paint");
    }
}

class Triangle extends Shape
{
    public void paint()
    {
        System.out.println(" /\\");
        System.out.println("/__\\");
    }
}

class Square extends Shape
{
    public void paint()
    {
        System.out.println("|---|");
        System.out.println("|---|");

    }
}
```

```
class Pentagon extends Shape
{
    public void paint()
    {
        System.out.print("pentagen paint");

    }
}

class Pen
{
    private Shape s;
    Pen()
    {

    }
    Pen(Shape s)
    {
        this.s = s;
    }
    public void draw()
    {
        s.paint();
    }
    public void setShape(Shape s)
    {
        this.s=s;
    }
}

public class Test3
{
    public static void main(String[] args)
    {
        Shape s = new Triangle();
        Pen p = new Pen();
        s = new Square();
        p.setShape(s);
        p.draw();
    }
}
```