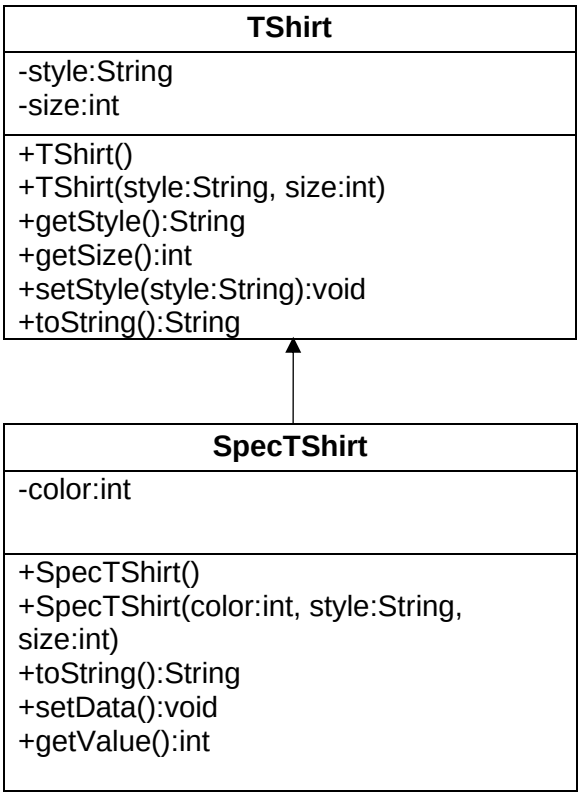
Workshop #4: Inheritance

Upon successful completion of this workshop, you will have demonstrated the abilities to:

- Design and implement classes in the “is-a” relationship.
- Practice casting
- Describe to your instructor what you have learned in completing this workshop.

To complete this task you should read and study the lecture Inheritance

1) Write a class TShirt and a class SpecTShirt extending from TShirt (i.e. TShirt is a superclass and SpecTShirt is a subclass) with the following information:



Where:

- getStyle():String - return style.
- getSize():int - return size.
- setStyle(style:String):void - update style.
- toString():String - return the string of format: **style, size**

Where:

- toString():String - return the string of format: **style, size, color**
- setData():void - insert the string " - " into the penultimate position (position before the last position) in the **style**.
- getValue():int - check if **color** is less than or equal to 5 then return **size+3**, otherwise return **size**.

In the project, create a new file named “Main.java. Create the method main() in here, you type:

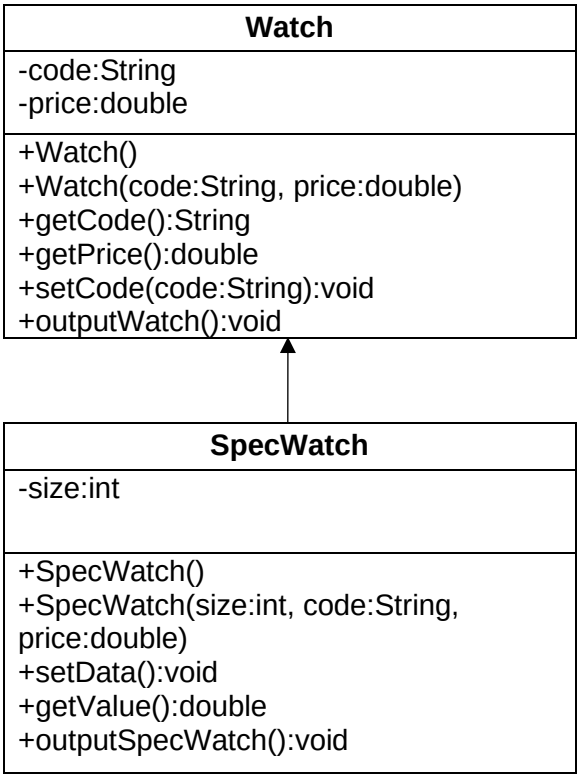
```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter style: ");
        String nStyle = sc.nextLine().toLowerCase().trim();
        System.out.print("Enter size: ");
        int nSize = Integer.parseInt(sc.nextLine());
        System.out.print("Enter color: ");
        int nColor = Integer.parseInt(sc.nextLine());
        TShirt st = new SpecTShirt(nColor, nStyle, nSize);
        System.out.println("1. Test toString()");
        System.out.println("2. Test setData()");
        System.out.println("3. Test getValue()");
        System.out.print("Enter TC (1,2,3): ");
        int choice = sc.nextInt();
```

```
            switch(choice) {
                case 1:
                    System.out.println("OUTPUT: ");
                    System.out.println(st.toString());
                    break;
                case 2:
                    System.out.println("OUTPUT: ");
                    ((SpecTShirt)st).setData();
                    System.out.println(st.getStyle() + ", " + st.getSize());
                    break;
                case 3:
                    System.out.println("OUTPUT: ");
                    int size = ((SpecTShirt)st).getValue();
                    System.out.println(size);
                    break;
            }
        }
    }
```

The program output might look something like:

Enter style: 01921 Enter size: 5 Enter color: 9 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 1 OUTPUT: 01921, 5 01921, 5, 9	Enter style: 01921 Enter size: 5 Enter color: 9 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 2 OUTPUT: 0192-1, 5	Enter style: 01921 Enter size: 5 Enter color: 9 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 5	Enter style: 01921 Enter size: 5 Enter color: 5 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 8

2) Write a class Watch and a class SpecWatch extending from Watch (i.e. Watch is a superclass and SpecWatch is a subclass) with the following information:



Where:

- getCode():String - return code.
- getPrice():double - return price.
- setCode(code:String):void - update code.
- outputWatch():void - return the string of format: **code, price**

Where:

- outputSpecWatch():void - print out the string of format: **code, price, size**
- setData():void - replace the first 2 characters in the **code** with the string "**XYZ**".
- getValue():double - check if **size** is less than or equal to **39** then return **price-price*0.1**, otherwise return **price+price*0.05**.

In the project, create a new file named "Main.java. Create the method main() in here, you type:

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter code: ");
        String nCode = sc.nextLine().toUpperCase().trim();
        System.out.print("Enter price: ");
        double nPrice = Double.parseDouble(sc.nextLine());
        System.out.print("Enter size: ");
        int nSize = Integer.parseInt(sc.nextLine());
        Watch wt = new SpecWatch(nSize, nCode, nPrice);
        System.out.println("1. Test outputSpecWatch()");
        System.out.println("2. Test setData()");
        System.out.println("3. Test getValue()");
        System.out.print("Enter TC (1,2,3): ");
        int choice = sc.nextInt();
        switch(choice) {
            case 1:
                System.out.println("OUTPUT: ");
                ((SpecWatch)wt).outputSpecWatch();
                break;
            case 2:
                System.out.println("OUTPUT: ");
                ((SpecWatch)wt).setData();
                wt.outputWatch();
                break;
            case 3:
                System.out.println("OUTPUT: ");
                double price = ((SpecWatch)wt).getValue();
                System.out.println(price);
                break;
        }
    }
}
```

The program output might look something like:

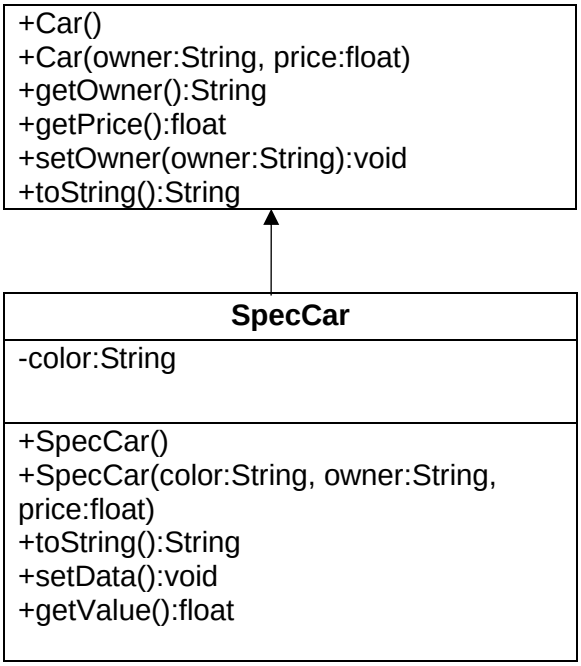
Enter code: OR-8003D Enter price: 3.762 Enter size: 40 1. Test outputSpecWatch() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 1 OUTPUT: OR-8003D, 3.762 OR-8003D, 3.762, 40	Enter code: OR-8003D Enter price: 3.762 Enter color: 40 1. Test outputSpecWatch() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 2 OUTPUT: XYZ-8003D, 3.762	Enter code: OR-8003D Enter price: 3.762 Enter color: 40 1. Test outputSpecWatch() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 3.9501	Enter code: OR-1006W Enter price: 3.059 Enter color: 38 1. Test outputSpecWatch() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 2.7531

3) Write a class Car and a class SpecCar extending from Car (i.e. Car is a superclass and SpecCar is a subclass) with the following information:

Car
-owner:String -price:float

Where:

- getOwner():String - return owner.
- getPrice():float - return price.



- setOwner(owner:String):void - update owner.
- toString():String - return the string of format: **owner, price**

Where:

- toString():String - return the string of format: **owner, price, color**
- setData():void - convert the first letter to uppercase the rest of the letters to lowercase for each word in the **owner**.
- getValue():float - check if color is "Silver" then return **price-price*0.1**, otherwise return **price**.

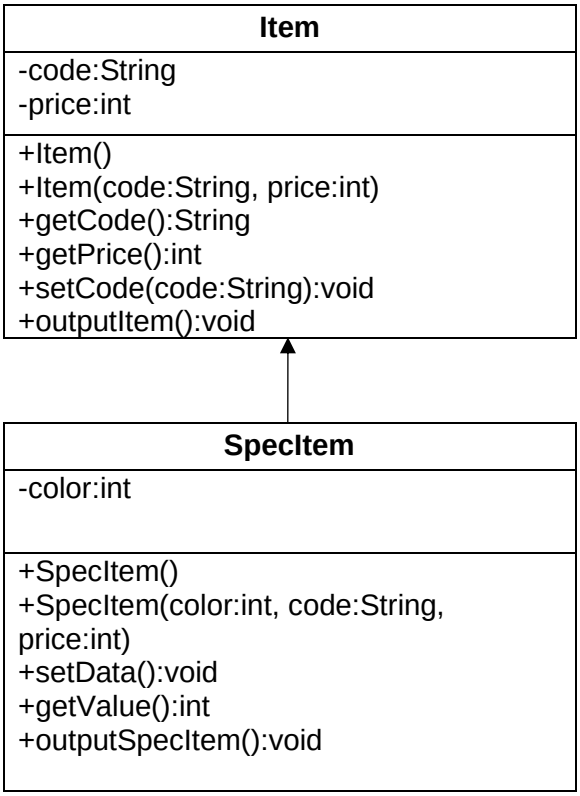
In the project, create a new file named "Main.java. Create the method main() in here, you type:

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter owner: ");
        String nOwner = sc.nextLine().toLowerCase().trim();
        System.out.print("Enter price: ");
        float nPrice = Float.parseFloat(sc.nextLine());
        System.out.print("Enter color: ");
        String nColor = sc.nextLine().toLowerCase().trim();
        Car st = new SpecCar(nColor, nOwner, nPrice);
        System.out.println("1. Test toString()");
        System.out.println("2. Test setData()");
        System.out.println("3. Test getValue()");
        System.out.print("Enter TC (1,2,3): ");
        int choice = sc.nextInt();
        switch(choice) {
            case 1:
                System.out.println("OUTPUT: ");
                System.out.println(st.toString());
                break;
            case 2:
                System.out.println("OUTPUT: ");
                ((SpecCar)st).setData();
                System.out.println(st.getOwner() + ", " + st.getPrice());
                break;
            case 3:
                System.out.println("OUTPUT: ");
                float price = ((SpecCar)st).getValue();
                System.out.println(price);
                break;
        }
    }
}
```

The program output might look something like:

Enter owner: phong vu Enter price: 39.69 Enter color: silver 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 1 OUTPUT: phong vu, 39.69 phong vu, 39.69, silver	Enter owner: phong vu Enter price: 39.69 Enter color: silver 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 2 OUTPUT: Phong Vu, 39.69	Enter owner: phong vu Enter price: 39.69 Enter color: silver 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 35.721	Enter owner: phong vu Enter price: 39.69 Enter color: black 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 39.69

4) Write a class Item and a class SpecItem extending from Item (i.e. Item is a superclass and SpecItem is a subclass) with the following information:



Where:

- getCode():String - return code.
- getPrice():int - return price.
- setCode(code:String):void - update code.
- outputItem():void - return the string of format: **code, price**

Where:

- outputSpecItem():void - print out the string of format: **code, price, color**
- setData():void - insert the string " -ABC- " into the position 2 (the first position is 0) in the **code**.
- getValue():int - check if **color** is greater than **5** then return **price-5**, otherwise return **price-3**.

In the project, create a new file named "Main.java. Create the method main() in here, you type:

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter code: ");
        String nCode = sc.nextLine().toLowerCase().trim();
        System.out.print("Enter price: ");
        int nPrice = Integer.parseInt(sc.nextLine());
        System.out.print("Enter color: ");
        int nColor = Integer.parseInt(sc.nextLine());
        Item it = new SpecItem(nColor, nCode, nPrice);
        System.out.println("1. Test outputSpecItem()");
        System.out.println("2. Test setData()");
        System.out.println("3. Test getValue()");
        System.out.print("Enter TC (1,2,3): ");
        int choice = sc.nextInt();
        switch(choice) {
```

```
                case 1:
                    System.out.println("OUTPUT: ");
                    ((SpecItem)it).outputSpecItem();
                    break;
                case 2:
                    System.out.println("OUTPUT: ");
                    ((SpecItem)it).setData();
                    it.outputItem();
                    break;
                case 3:
                    System.out.println("OUTPUT: ");
                    int price = ((SpecItem)it).getValue();
                    System.out.println(price);
                    break;
            }
        }
    }
```

The program output might look something like:

Enter code: 01311 Enter price: 25 Enter color: 6 1. Test outputSpecItem() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 1 OUTPUT: 01311, 25 01311, 25, 6	Enter code: 01311 Enter price: 25 Enter color: 6 1. Test outputSpecItem() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 2 OUTPUT: 01-ABC-311, 25	Enter code: 01311 Enter price: 25 Enter color: 6 1. Test outputSpecItem() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 20	Enter code: 01311 Enter price: 25 Enter color: 4 1. Test outputSpecItem() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 22

5) Write a class SDrink and a class SpecSDrink extending from SDrink (i.e. SDrink is a superclass and SpecSDrink is a subclass) with the following information:

SDrink
-make:String -price:double
+SDrink() +SDrink(make:String, price:double) +getMake():String +getPrice():double +setMake(make:String):void +toString():String

Where:

- getMake():String - return make.
- getPrice():double - return price.
- setMake(make:String):void - update make.
- toString():String - return the string of format: **make, price**

SpecSDrink
-unit:String
+SpecSDrink() +SpecSDrink(unit:String, make:String, price:double) +toString():String +setData():void +getValue():double

Where:

- toString():String - return the string of format: **make, price, unit**
- setData():void - separate and save words into the **make** (remove "-" between words in the make if present).
- getValue():double - check if the **unit** contains the string "24 cans" then return **price+price*0.05**, otherwise return **price**.

In the project, create a new file named "Main.java. Create the method main() in here, you type:

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter make: ");
        String nMake = sc.nextLine().toLowerCase().trim();
        System.out.print("Enter price: ");
        double nPrice = Double.parseDouble(sc.nextLine());
        System.out.print("Enter unit: ");
        String nUnit = sc.nextLine().toLowerCase().trim();
        SDrink st = new SpecSDrink(nUnit, nMake, nPrice);
        System.out.println("1. Test toString()");
        System.out.println("2. Test setData()");
        System.out.println("3. Test getValue()");
        System.out.print("Enter TC (1,2,3): ");
        int choice = sc.nextInt();
        switch(choice) {
            case 1:
                System.out.println("OUTPUT: ");
                System.out.println(st.toString());
                break;
            case 2:
                System.out.println("OUTPUT: ");
                ((SpecSDrink)st).setData();
                System.out.println(st.getMake() + ", " + st.getPrice());
                break;
            case 3:
                System.out.println("OUTPUT: ");
                double price = ((SpecSDrink)st).getValue();
                System.out.println(price);
                break;
        }
    }
}
```

The program output might look something like:

Enter make: Coca-Cola Enter price: 224.000 Enter unit: Carton of 24 cans 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 1 OUTPUT: coca-cola, 224.0 coca-cola, 224.0, carton of 24 cans	Enter make: Coca-Cola Enter price: 224.000 Enter unit: Carton of 24 cans 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 2 OUTPUT: coca cola, 224.0	Enter make: Coca-Cola Enter price: 224.000 Enter unit: Carton of 24 cans 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 235.2	Enter make: Coca-Cola Enter price: 180.000 Enter unit: Carton of 24 bottles 1. Test toString() 2. Test setData() 3. Test getValue() Enter TC (1,2,3): 3 OUTPUT: 180.0