TUGAS 1 DESIGN PATTERN

BUILDER PATTERN

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Implementation

We have considered a business case of fast-food restaurant where a typical meal could be a burger and a cold drink. Burger could be either a Veg Burger or Chicken Burger and will be packed by a wrapper. Cold drink could be either a coke or pepsi and will be packed in a bottle.

We are going to create an *Item* interface representing food items such as burgers and cold drinks and concrete classes implementing the *Item* interface and a *Packing* interface representing packaging of food items and concrete classes implementing the *Packing* interface as burger would be packed in wrapper and cold drink would be packed as bottle.

We then create a *Meal* class having *ArrayList* of *Item* and a *MealBuilder* to build different types of *Meal* objects by combining *Item*. *BuilderPatternDemo*, our demo class will use *MealBuilder* to build a *Meal*.

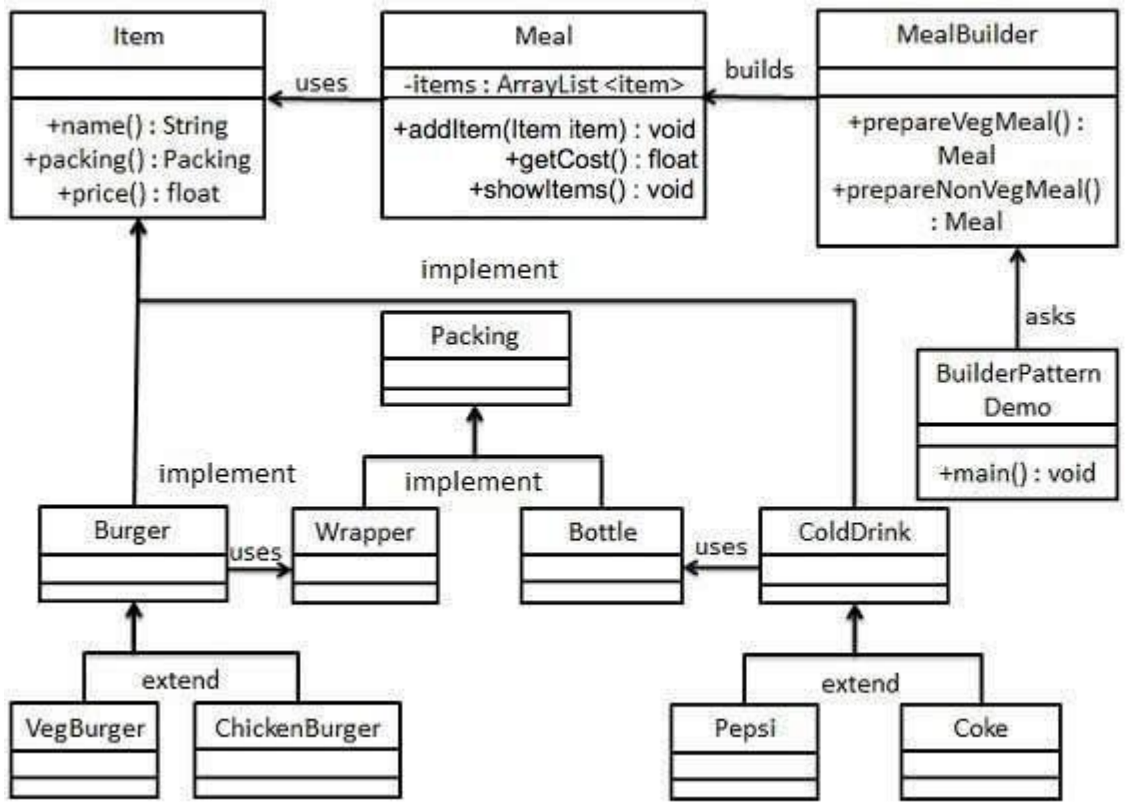
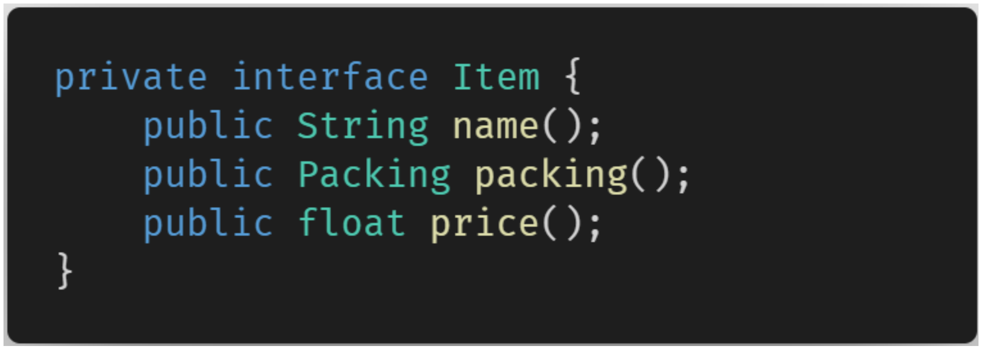


Figure 1 - Builder Pattern UML Diagram

Step 1

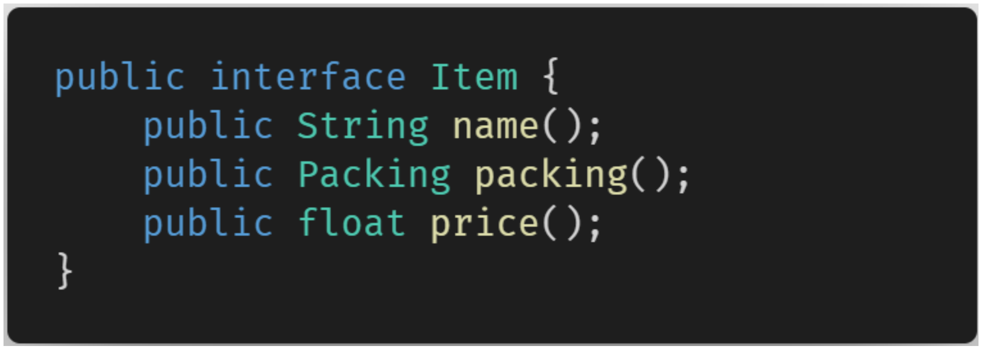
Create an interface Item representing food item and packing.

Item.java



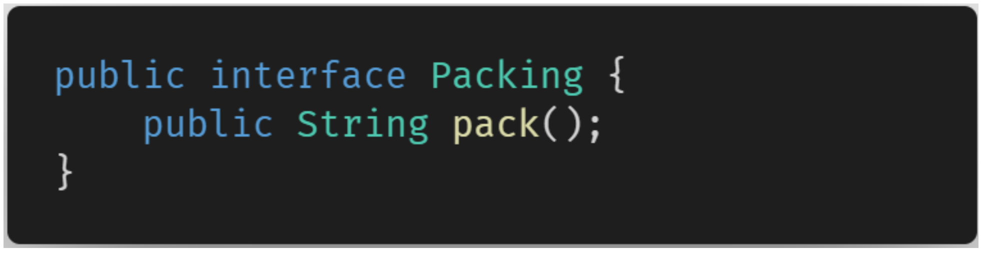
```java
private interface Item {
    public String name();
    public Packing packing();
    public float price();
}
```

Package private change to public:



```java
public interface Item {
    public String name();
    public Packing packing();
    public float price();
}
```

Packing.java

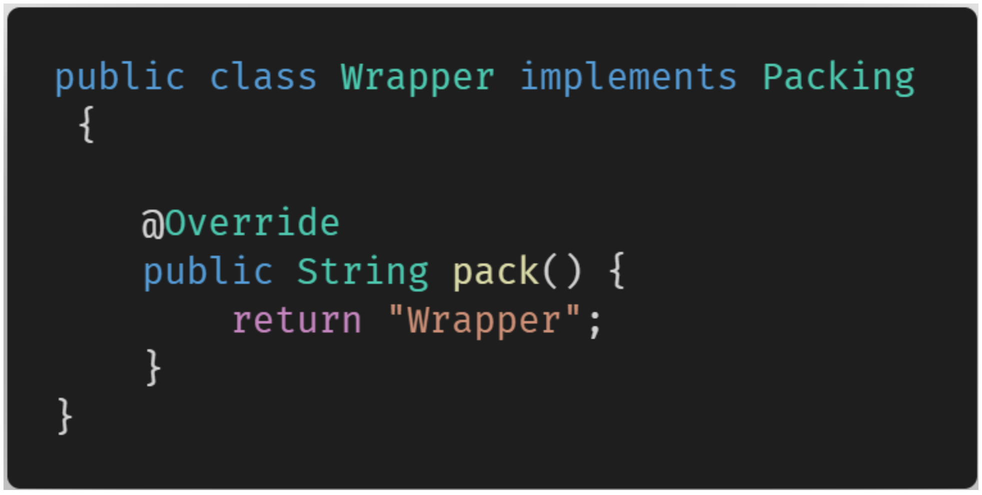


```java
public interface Packing {
    public String pack();
}
```

Step 2

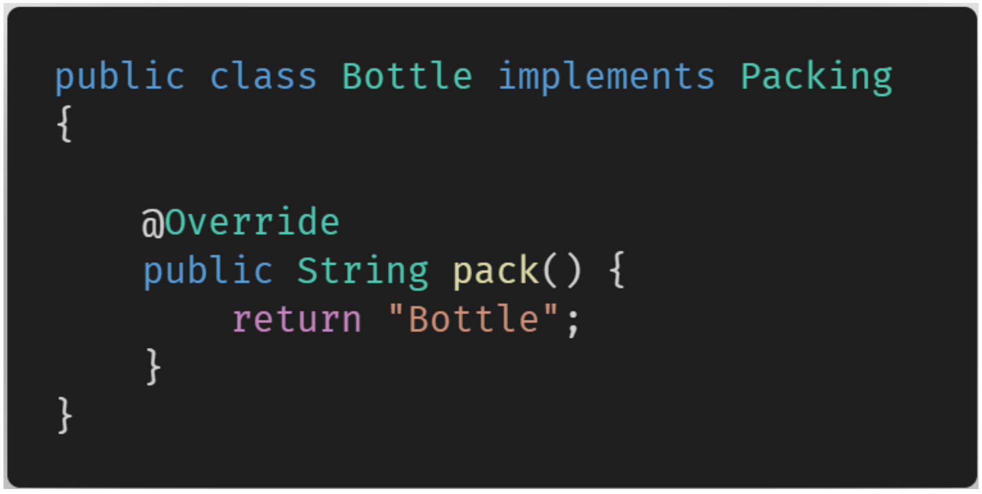
Create concrete classes implementing the Packing interface.

Wrapper.java



```java
public class Wrapper implements Packing
 {

    @Override
    public String pack() {
        return "Wrapper";
    }
}
```

Bottle.java

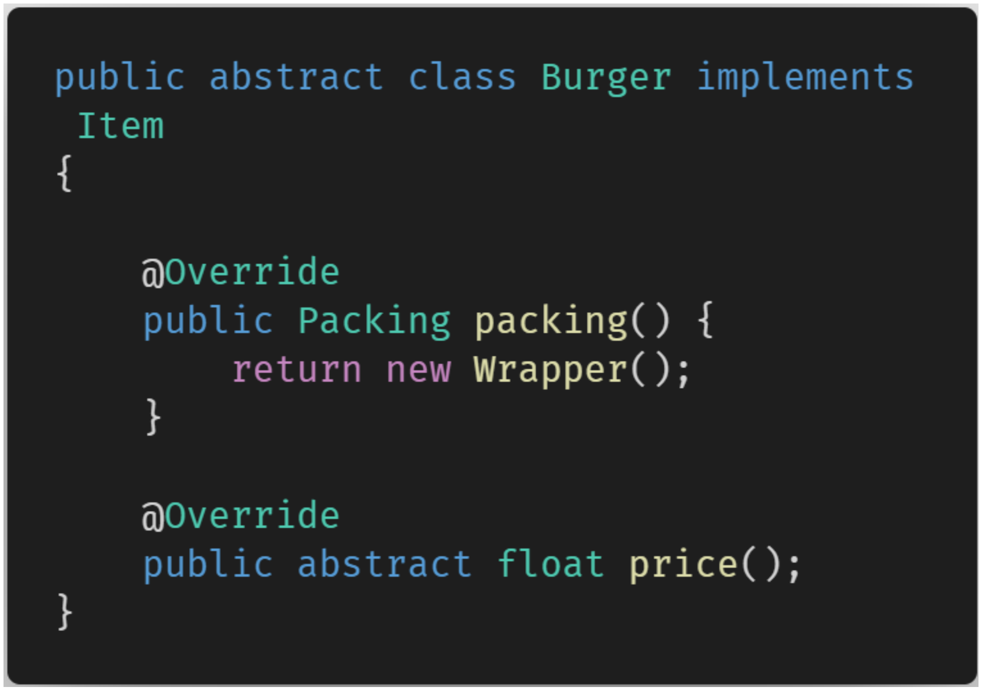


```java
public class Bottle implements Packing
{

    @Override
    public String pack() {
        return "Bottle";
    }
}
```

Step 3

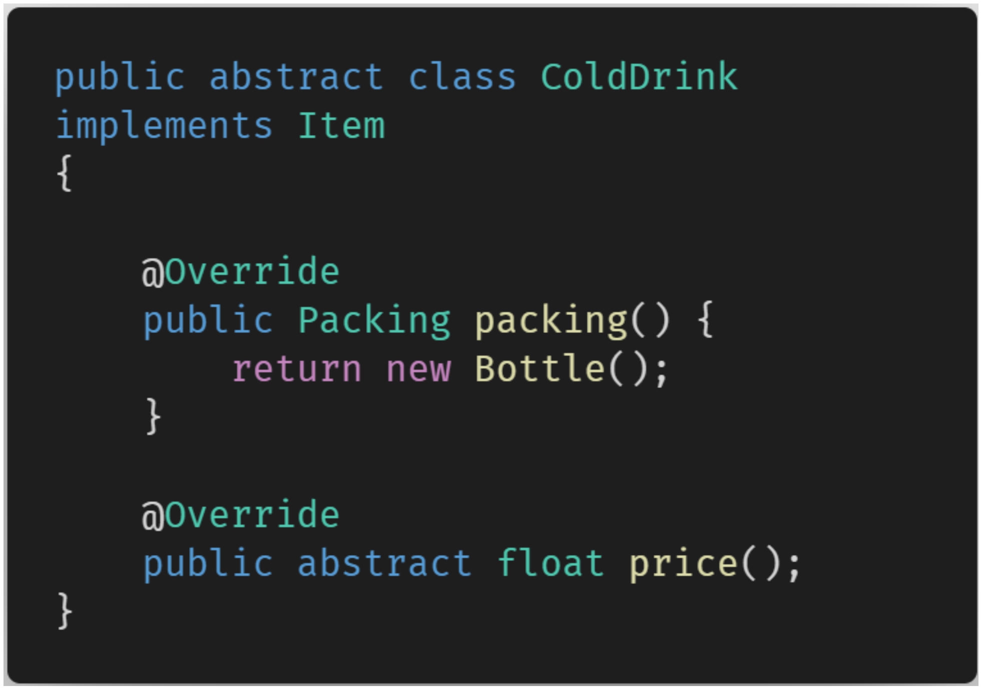
Create abstract classes implementing the item interface providing default functionalities.

Burger.java



```
public abstract class Burger implements
 Item
{

    @Override
    public Packing packing() {
        return new Wrapper();
    }

    @Override
    public abstract float price();
}
```

ColdDrink.java

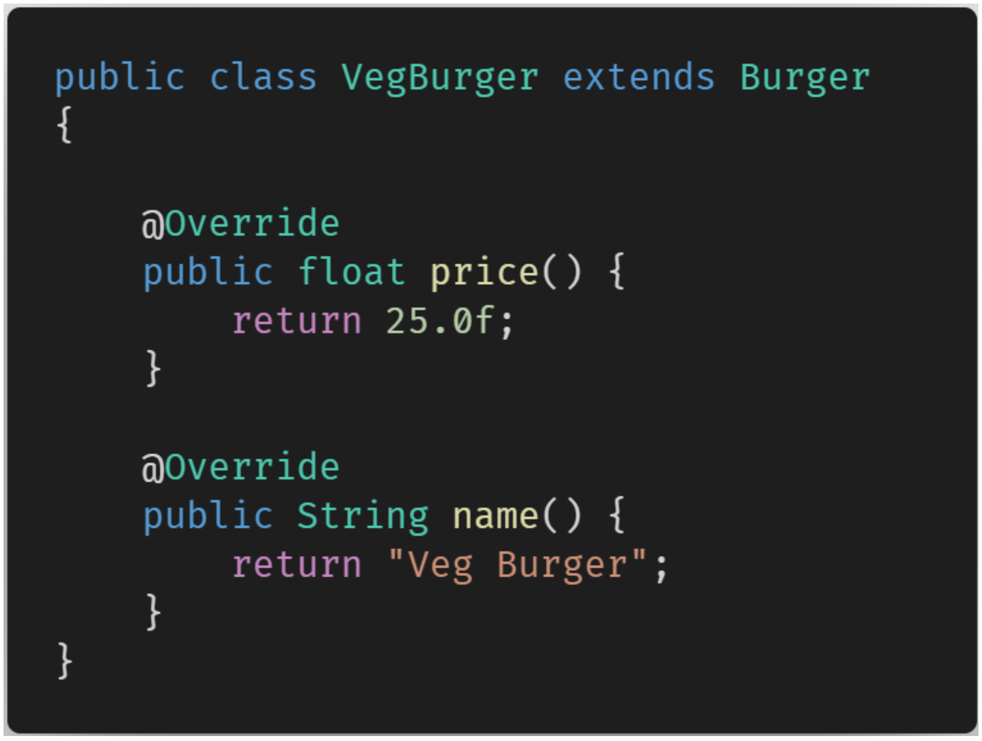


```
public abstract class ColdDrink
implements Item
{

    @Override
    public Packing packing() {
        return new Bottle();
    }

    @Override
    public abstract float price();
}
```

Step 4

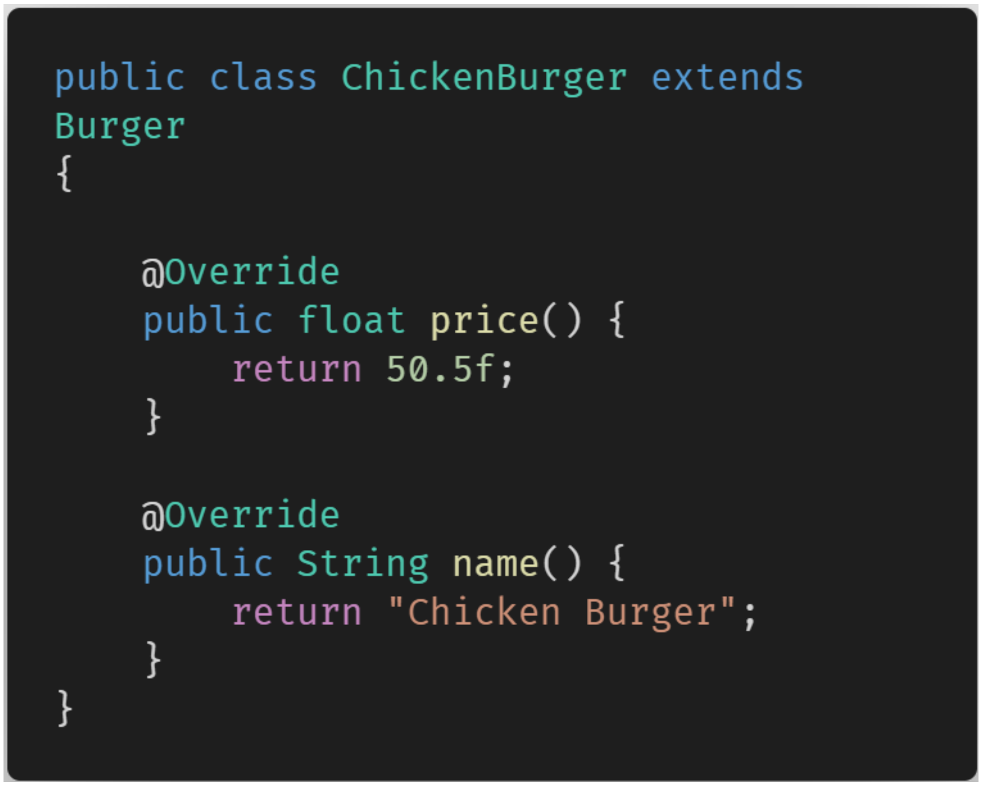
Create concrete classes extending Burger and ColdDrink classes

VegBurger.java



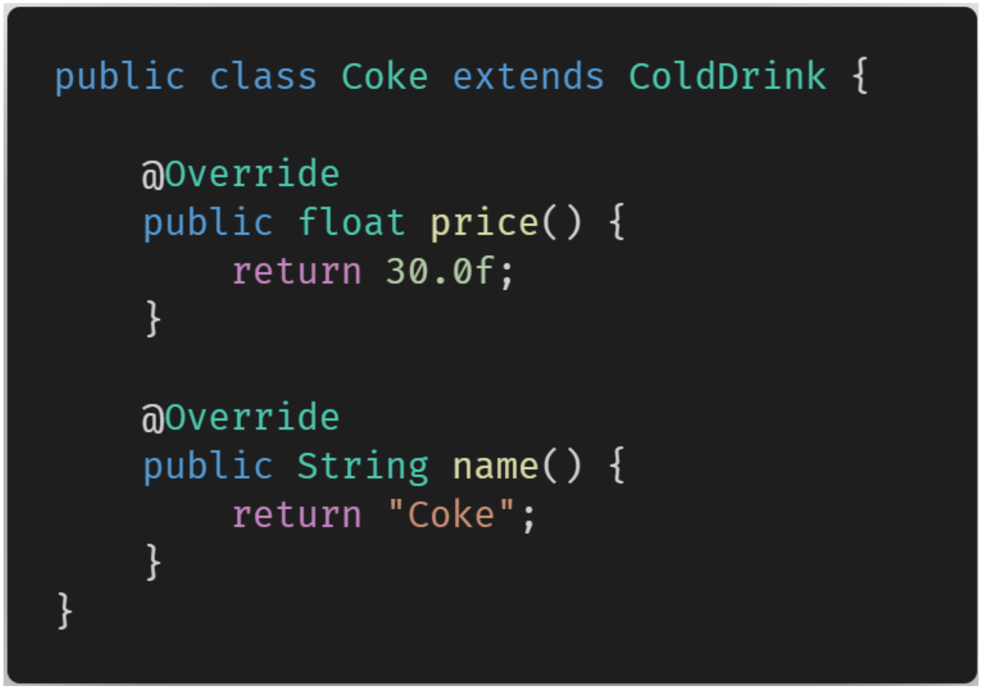
```java
public class VegBurger extends Burger
{

    @Override
    public float price() {
        return 25.0f;
    }

    @Override
    public String name() {
        return "Veg Burger";
    }
}
```

ChickenBurger.java



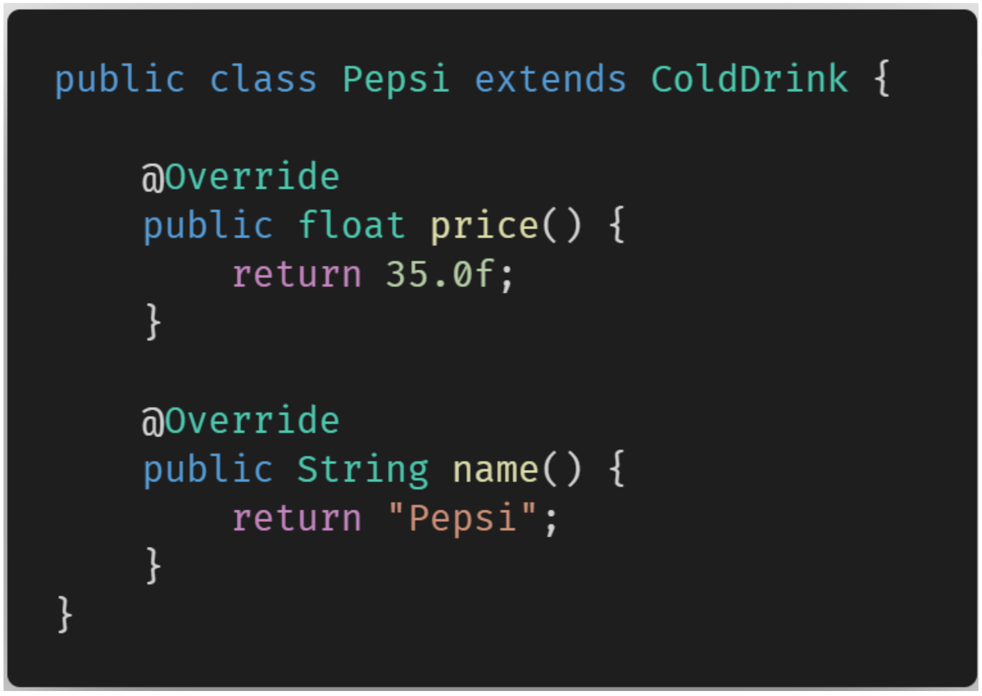
```java
public class ChickenBurger extends
Burger
{

    @Override
    public float price() {
        return 50.5f;
    }

    @Override
    public String name() {
        return "Chicken Burger";
    }
}
```

Coke.java



```java
public class Coke extends ColdDrink {

    @Override
    public float price() {
        return 30.0f;
    }

    @Override
    public String name() {
        return "Coke";
    }
}
```

Pepsi.java

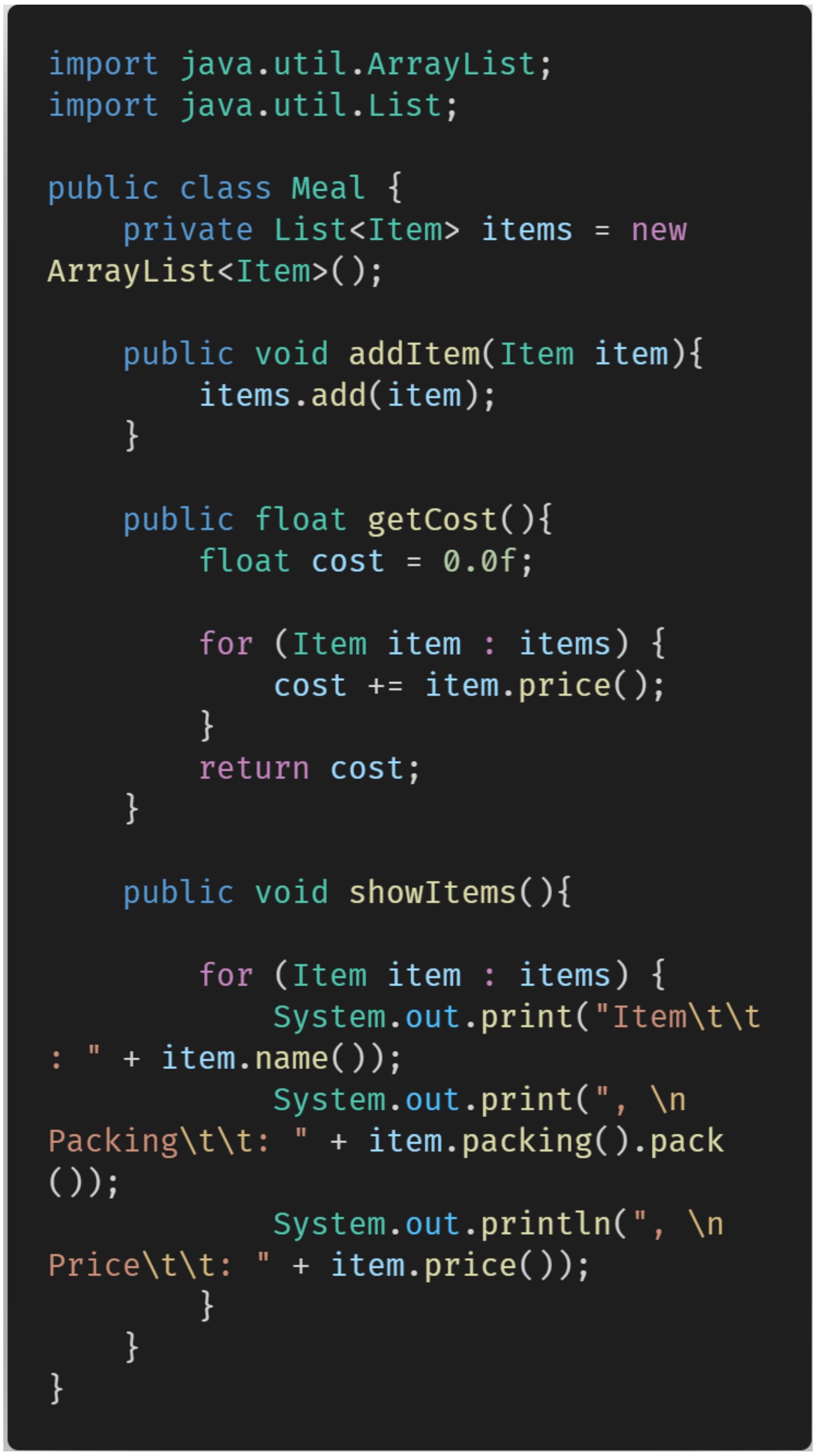


```java
public class Pepsi extends ColdDrink {

    @Override
    public float price() {
        return 35.0f;
    }

    @Override
    public String name() {
        return "Pepsi";
    }
}
```

Step 5

Create a Meal class having Item objects defined above.

Meal.java

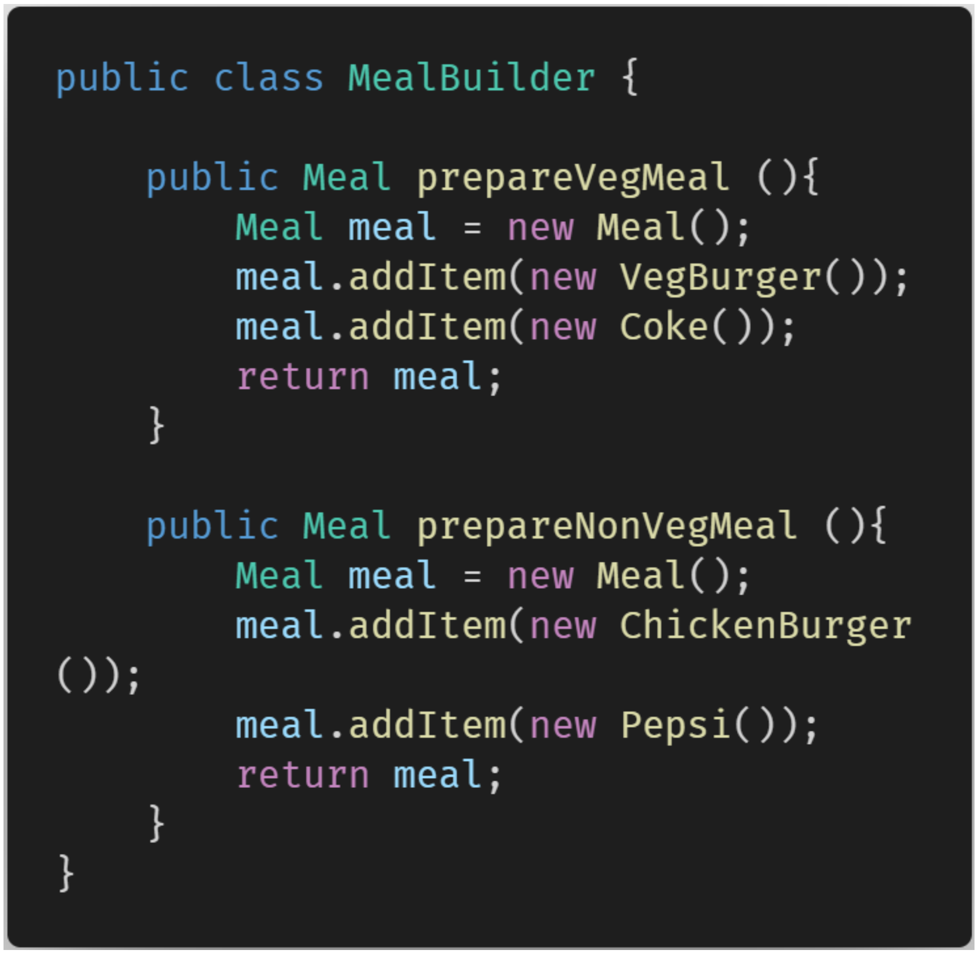


```
import java.util.ArrayList;
import java.util.List;

public class Meal {
    private List<Item> items = new
ArrayList<Item>();

    public void addItem(Item item){
        items.add(item);
    }

    public float getCost(){
        float cost = 0.0f;

        for (Item item : items) {
            cost += item.price();
        }
        return cost;
    }

    public void showItems(){

        for (Item item : items) {
            System.out.print("Item\t\t
: " + item.name());
            System.out.print(", \n
Packing\t\t: " + item.packing().pack
());
            System.out.println(", \n
Price\t\t: " + item.price());
        }
    }
}
```

Step 6

Create a MealBuilder class, the actual builder class responsible to create Meal objects.

MealBuilder.java

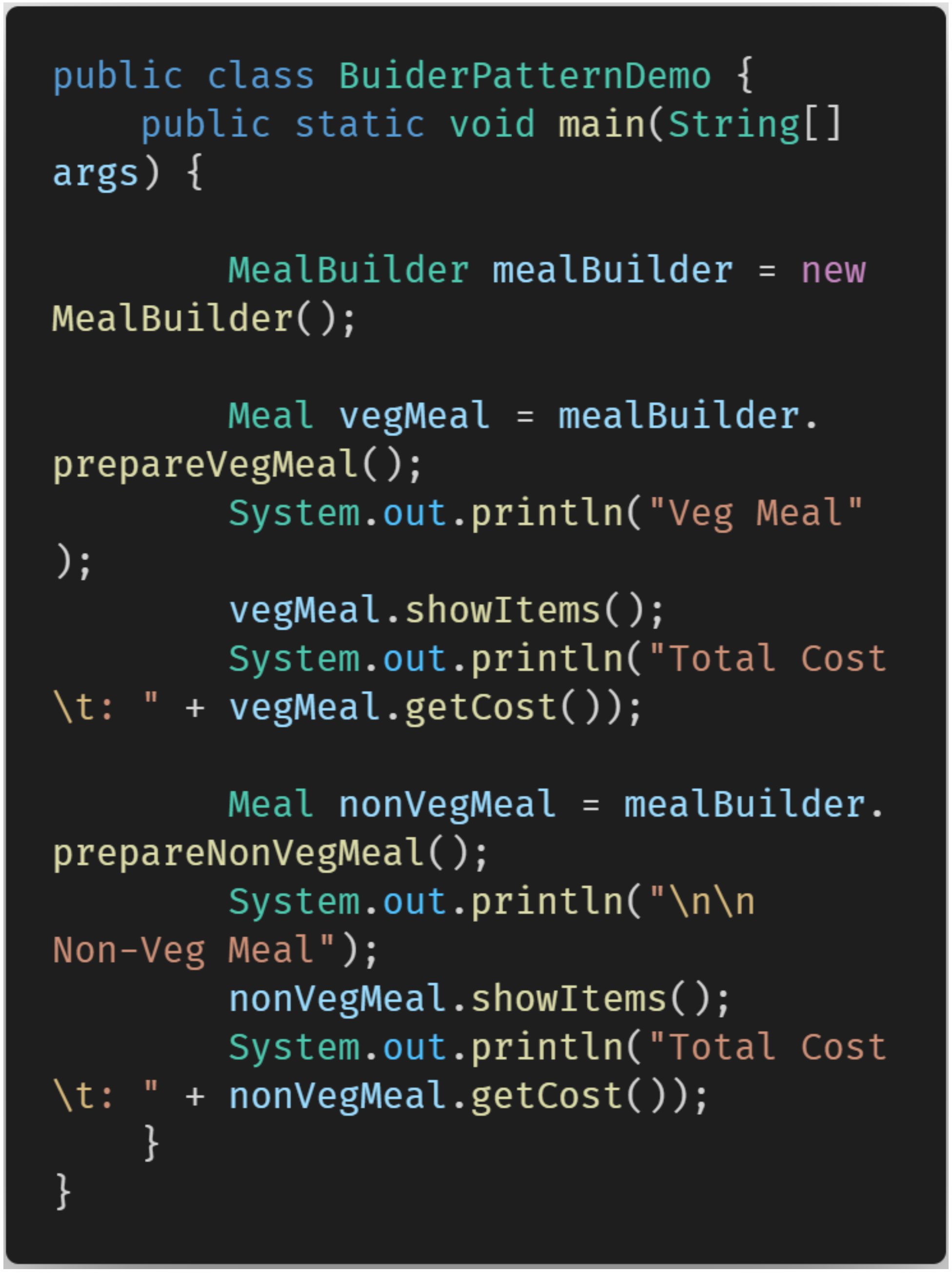


```
public class MealBuilder {

    public Meal prepareVegMeal (){
        Meal meal = new Meal();
        meal.addItem(new VegBurger());
        meal.addItem(new Coke());
        return meal;
    }

    public Meal prepareNonVegMeal (){
        Meal meal = new Meal();
        meal.addItem(new ChickenBurger
());
        meal.addItem(new Pepsi());
        return meal;
    }
}
```

Step 7

BuiderPatternDemo uses MealBuider to demonstrate builder pattern.

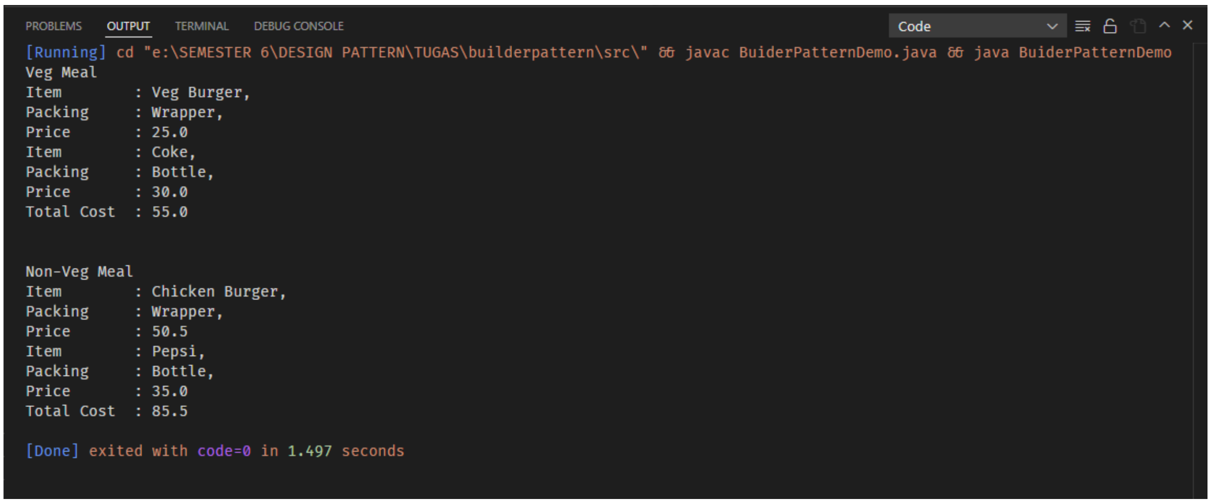
BuilderPatternDemo.java



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

        MealBuilder mealBuilder = new
MealBuilder();

        Meal vegMeal = mealBuilder.
prepareVegMeal();
        System.out.println("Veg Meal"
);
        vegMeal.showItems();
        System.out.println("Total Cost
\t: " + vegMeal.getCost());

        Meal nonVegMeal = mealBuilder.
prepareNonVegMeal();
        System.out.println("\n\n
Non-Veg Meal");
        nonVegMeal.showItems();
        System.out.println("Total Cost
\t: " + nonVegMeal.getCost());
    }
}
```

Step 8

Verify the output.



```
[Running] cd "e:\SEMESTER 6\DESIGN PATTERN\TUGAS\builderpattern\src\" && javac BuiderPatternDemo.java && java BuiderPatternDemo
Veg Meal
Item        : Veg Burger,
Packing     : Wrapper,
Price       : 25.0
Item        : Coke,
Packing     : Bottle,
Price       : 30.0
Total Cost  : 55.0


Non-Veg Meal
Item        : Chicken Burger,
Packing     : Wrapper,
Price       : 50.5
Item        : Pepsi,
Packing     : Bottle,
Price       : 35.0
Total Cost  : 85.5

[Done] exited with code=0 in 1.497 seconds
```