Used Car Dealership

Strategy Pattern by
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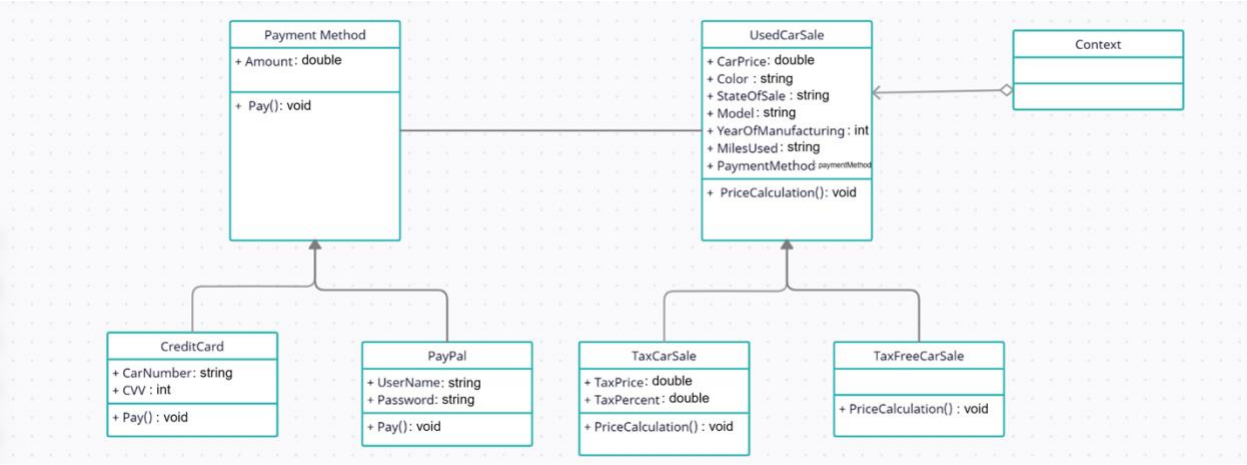
Strategy Pattern: Strategy design pattern is one of the behavioral design patterns. It is used when we have multiple algorithms for a specific task and client decides the actual implementation to be used at runtime. The Strategy Pattern Context class has multiple control strategies provided by the concrete strategy classes, or by the abstract strategy.

Summary:

In this project, Strategy pattern is used in Price calculation of car and also in payment method. We used two different strategies for price calculation. For certain states, buyer does not have to pay tax and vice versa. So, two concrete classes as “TaxCarSale” & “TaxFreeCarSale” is being extended from “UsedCarSale” class. Also in payment method, buyer has two different payment option as credit card & paypal which is also extended from “Payment Method” class.

For testing the code, Junit test and Component test is also implemented in this project.
In component test , positive and negative both testing is added.

UML Diagram:



Source File:

Main:

UsedCarSale.java

```
package project.usedcardealership;

public abstract class UsedCarSale {
    public double CarPrice = 0;
    public String Color = "Red";
    public int YearOfManufacturing = 2020;
    public String Model ="AB231";
    public String StateOfSale ="Ohio";
    public PaymentMethod PaymentType;

    public abstract void PriceCalculation();
}
```

UsedCarDealership.java

```
package project.usedcardealership;

public class UsedCarDealership {

    public static void main(String[] args) {
        //System.out.println("Hello World!");
// Unit Tests

        // Component Test
        RunComponentTest();

        //Negative Test Cases;
        RunNegativeTest();
    }
        public static void RunNegativeTest()
    {
        System.out.println("\nNegative Test\n-----------------------");
        // Paypal Object Creation
        Paypal paypal = new Paypal();
        paypal.Amount= 1500;
        paypal.UserName = "UserX";
        paypal.Password = "Passsword1223";

        //CreditCard Object Creation
        CreditCard cc = new CreditCard();
```

```
    cc.Amount = 3000;
    cc.CVV = 233;
    cc.CardNumber="123465609386565";

    CreditCard cc2 = new CreditCard();
    cc2.Amount = 3000;
    cc2.CVV = 23;
    cc2.CardNumber="1234656909386565";
    cc2.pay();

    TaxCarSale car1 = new TaxCarSale();
    car1.CarPrice= 1500;
    car1.PaymentType = paypal;
    car1.TaxPercent= 0;
    car1.PriceCalculation();
    car1.PaymentType.pay();

    TaxFreeCarSale car2 = new TaxFreeCarSale();
    car2.CarPrice=3000;
    car2.PaymentType= cc;
    car2.PriceCalculation();
    car2.PaymentType.pay();
}
public static void RunComponentTest()
{
     System.out.println("\nComponent Test\n------------------------");
    // Paypal Object Creation
    Paypal paypal = new Paypal();
    paypal.Amount= 1500;
    paypal.UserName = "userX@abc.com";
    paypal.Password = "Passsword1223";

    //CreditCard Object Creation
    CreditCard cc = new CreditCard();
    cc.Amount = 3000;
    cc.CVV = 233;
    cc.CardNumber="1234656909386565";

    TaxCarSale car1 = new TaxCarSale();
    car1.CarPrice= 1500;
    car1.PaymentType = paypal;
    car1.TaxPercent= 5;
    car1.PriceCalculation();
    car1.PaymentType.pay();

    TaxFreeCarSale car2 = new TaxFreeCarSale();
```

```
        car2.CarPrice=3000;
        car2.PaymentType= cc;

        car2.PriceCalculation();
        car2.PaymentType.pay();


    }
}
```

PaymentMethod.java

```
package project.usedcardealership;


public abstract class PaymentMethod {
    public double Amount=0;
    public abstract void pay();
}
```

TaxCarSale.java

```
package project.usedcardealership;

public class TaxCarSale extends UsedCarSale{

   public double TaxPercent;
   public double TaxPrice;
   @Override
   public void PriceCalculation() {
      if(TaxPercent == 0)
      {
         System.out.println("Tax cannot be zero percent. Go For Tax Free Sales");
         return;
      }
      TaxPrice = CarPrice*TaxPercent/100;
      CarPrice = TaxPrice+CarPrice;

        System.out.println("Price To Be Paid With Tax: "+ CarPrice);

   }
}
```

TaxFreeCarSale.java

```
package project.usedcardealership;


public class TaxFreeCarSale extends UsedCarSale{

   @Override
   public void PriceCalculation() {
      System.out.println("Price To Be Paid for Tax Free Car Sale: "+ CarPrice);
   }
}
```

CreditCard.java

```
package project.usedcardealership;


public class CreditCard extends PaymentMethod{
    public int CVV;
    public String CardNumber;

        public void pay()
    {
        if(CardNumber.length() == 16){
            if(CVV <99 &&CVV>999){
        System.out.println(Amount+" Paid by Credit Card Number: "+CardNumber);
            }
            else{
                System.out.println("Invalid CVV "+ CVV);
            }
        }
        else{
                    System.out.println("Invalid Card Number "+CardNumber);

        }
    }
}
```

Paypal.java

```
package project.usedcardealership;


public class Paypal extends PaymentMethod {
    public String UserName;
    public String Password;
```

```
    public void pay()
    {
        if(UserName.matches("^(.+)@(.+)$"))
        System.out.println(Amount+" Paid by PayPal User: "+UserName);

        else{
                System.out.println("Username must be a valid email. Invalid Username:
"+UserName);

        }
    }
}
```

UsedCarDealership.java
// **Component Test**

```
package project.usedcardealership;

public class UsedCarDealership {

    public static void main(String[] args) {
        //System.out.println("Hello World!");
// Unit Tests

        // Component Test
        RunComponentTest();

        //Negative Test Cases;
        RunNegativeTest();
    }
        public static void RunNegativeTest()
    {
        System.out.println("\nNegative Test\n-----------------------");
        // Paypal Object Creation
        Paypal paypal = new Paypal();
        paypal.Amount= 1500;
        paypal.UserName = "UserX";
        paypal.Password = "Passsword1223";

        //CreditCard Object Creation
        CreditCard cc = new CreditCard();
        cc.Amount = 3000;
        cc.CVV = 233;
```

```
    cc.CardNumber="123465609386565";

    CreditCard cc2 = new CreditCard();
    cc2.Amount = 3000;
    cc2.CVV = 23;
    cc2.CardNumber="1234656909386565";
    cc2.pay();

    TaxCarSale car1 = new TaxCarSale();
    car1.CarPrice= 1500;
    car1.PaymentType = paypal;
    car1.TaxPercent= 0;
    car1.PriceCalculation();
    car1.PaymentType.pay();

    TaxFreeCarSale car2 = new TaxFreeCarSale();
    car2.CarPrice=3000;
    car2.PaymentType= cc;
    car2.PriceCalculation();
    car2.PaymentType.pay();
}
public static void RunComponentTest()
{
     System.out.println("\nComponent Test\n------------------------");
    // Paypal Object Creation
    Paypal paypal = new Paypal();
    paypal.Amount= 1500;
    paypal.UserName = "userX@abc.com";
    paypal.Password = "Passsword1223";

    //CreditCard Object Creation
    CreditCard cc = new CreditCard();
    cc.Amount = 3000;
    cc.CVV = 233;
    cc.CardNumber="1234656909386565";

    TaxCarSale car1 = new TaxCarSale();
    car1.CarPrice= 1500;
    car1.PaymentType = paypal;
    car1.TaxPercent= 5;
    car1.PriceCalculation();
    car1.PaymentType.pay();

    TaxFreeCarSale car2 = new TaxFreeCarSale();
    car2.CarPrice=3000;
    car2.PaymentType= cc;
```

```
        car2.PriceCalculation();
        car2.PaymentType.pay();


    }
}
```

Test:

TaxCarSaleTest.java

```
package project.usedcardealership;

import org.junit.After;
import org.junit.AfterClass;
import org.junit.Before;
import org.junit.BeforeClass;
import org.junit.Test;
import static org.junit.Assert.*;

/**
 *
 * @author Fahim
 */
public class TaxCarSaleTest {

    public TaxCarSaleTest() {
    }

    @BeforeClass
    public static void setUpClass() {
    }

    @AfterClass
    public static void tearDownClass() {
    }

    @Before
    public void setUp() {
    }

    @After
    public void tearDown() {
    }
```

```
    /**
     * Test of PriceCalculation method, of class TaxCarSale.
     */
    @Test
    public void testPriceCalculation() {
        System.out.println("PriceCalculation");


        TaxCarSale instance = new TaxCarSale();
        instance.TaxPercent= 4;
        instance.CarPrice = 1000;
        instance.Color= "White";
        instance.PriceCalculation();
    }}
```

TaxFreeCarSaleTest.java

```
package project.usedcardealership;

import org.junit.After;
import org.junit.AfterClass;
import org.junit.Before;
import org.junit.BeforeClass;
import org.junit.Test;
import static org.junit.Assert.*;

/**
 *
 * @author Fahim
 */
public class TaxFreeCarSaleTest {

    public TaxFreeCarSaleTest() {
    }

    @BeforeClass
    public static void setUpClass() {
    }

    @AfterClass
    public static void tearDownClass() {
    }

    @Before
    public void setUp() {
    }
```

```
    @After
    public void tearDown() {
    }

    /**
     * Test of PriceCalculation method, of class TaxFreeCarSale.
     */
    @Test
    public void testPriceCalculation() {
     System.out.println("PriceCalculation");

        TaxFreeCarSale instance = new TaxFreeCarSale();
        instance.PriceCalculation();
    }

}
```

PaypalTest.java

```
package project.usedcardealership;

import org.junit.After;
import org.junit.AfterClass;
import org.junit.Before;
import org.junit.BeforeClass;
import org.junit.Test;
import static org.junit.Assert.*;

/**
 *
 * @author Fahim
 */
public class PaypalTest {

    public PaypalTest() {
    }

    @BeforeClass
    public static void setUpClass() {
    }

    @AfterClass
    public static void tearDownClass() {
    }
```

```
    @Before
    public void setUp() {
    }

    @After
    public void tearDown() {
    }

    /**
     * Test of pay method, of class Paypal.
     */
    @Test
    public void testPay() {
            System.out.println("pay");
        Paypal instance = new Paypal();
        instance.UserName = "user1@abc.com";
        instance.Password = "Pass";
        instance.Amount = 2000;
        instance.pay();
    }

}
```

CreditCardTest.java

```
package project.usedcardealership;

import org.junit.After;
import org.junit.AfterClass;
import org.junit.Before;
import org.junit.BeforeClass;
import org.junit.Test;
import static org.junit.Assert.*;

/**
 *
 * @author Fahim
 */
public class CreditCardTest {

    public CreditCardTest() {
    }
```

```
    @BeforeClass
    public static void setUpClass() {
    }

    @AfterClass
    public static void tearDownClass() {
    }

    @Before
    public void setUp() {
    }

    @After
    public void tearDown() {
    }

    /**
     * Test of pay method, of class CreditCard.
     */
    @Test
    public void testPay() {
        System.out.println("pay");
        CreditCard instance = new CreditCard();

        instance.CVV = 123;
        instance.CardNumber = "1111222244448888";
        instance.Amount = 2000;
        instance.pay();

        // TODO review the generated test code and remove the default call to fail.
        //fail("The test case is a prototype.");
    }

}
```