TP08

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1 Exercise 1

Task 1

1. **The navigator is in this case the context.**
2. **Navigator depends on the RouteStrategy interface so it can use any routing algorithm through a single abstraction without depending on specific strategy implementations.**
3. **Strategy pattern.**

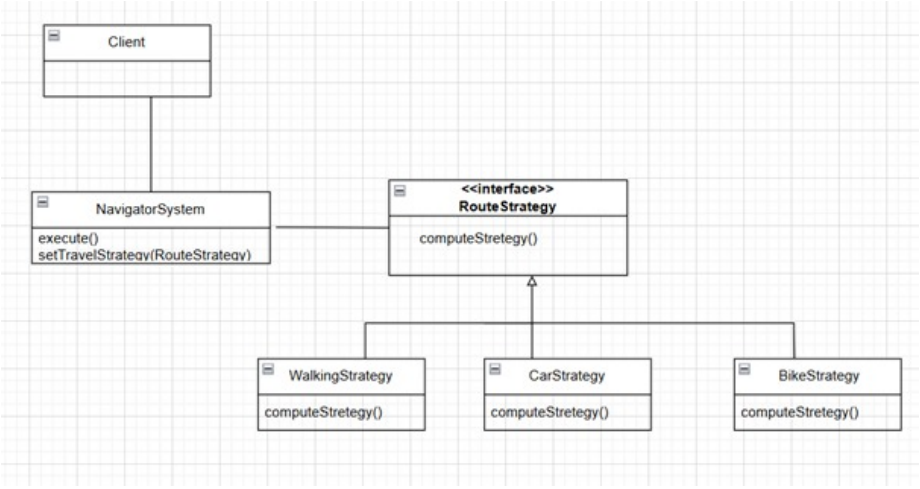
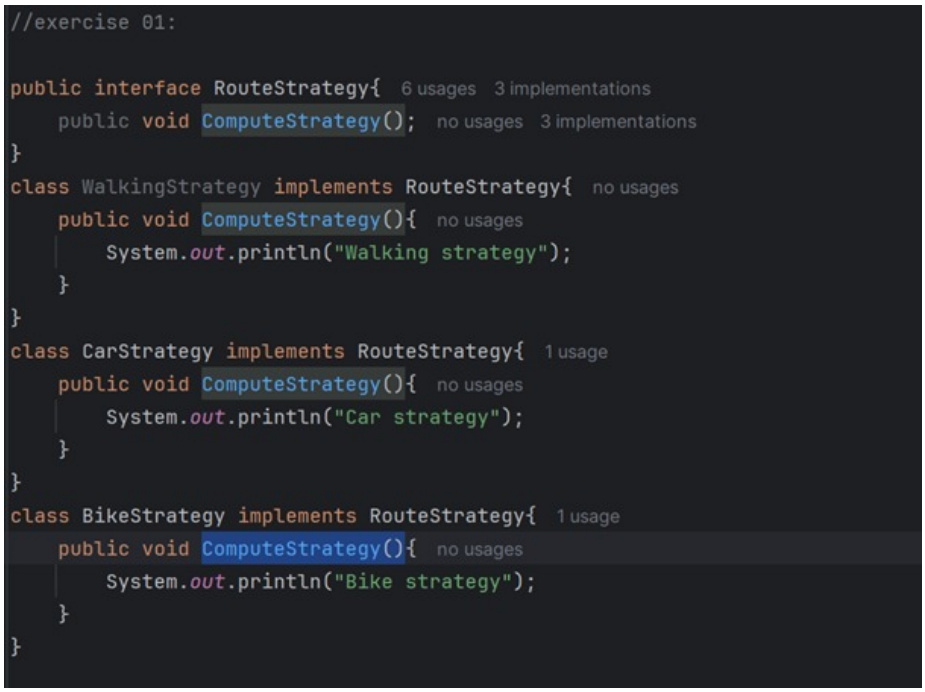


Figure 1: Class diagram



```
//exercise 01:

public interface RouteStrategy{  6 usages  3 implementations
    public void ComputeStrategy();  no usages  3 implementations
}
class WalkingStrategy implements RouteStrategy{  no usages
    public void ComputeStrategy(){  no usages
        System.out.println("Walking strategy");
    }
}
class CarStrategy implements RouteStrategy{  1 usage
    public void ComputeStrategy(){  no usages
        System.out.println("Car strategy");
    }
}
class BikeStrategy implements RouteStrategy{  1 usage
    public void ComputeStrategy(){  no usages
        System.out.println("Bike strategy");
    }
}
```

Figure 2: Implementation

2 Exercise 2

1. We will use composite pattern.

```
class SystemNavigator{  2 usages
    private RouteStrategy strategy;  2 usages

    void setRouteStrategy(RouteStrategy strategy){  2 usages
        this.strategy = strategy;
    }
    public void excute(){  2 usages
        strategy.ComputeStrategy();


    }
}
public class TP07 {
    public static void main(String[] args){
        SystemNavigator sn = new SystemNavigator();
        sn.setRouteStrategy(new CarStrategy());
        sn.excute();
        sn.setRouteStrategy(new BikeStrategy());
        sn.excute();
    }
}
```

Figure 3: Implementation

3 Exercise 3

1. We will use the adapter pattern.
2. Participants:

   - Client
   - Target: Payment Processor
   - Adapter 01: Quick Pay Adapter
   - Adapter 02: Safe Transfer Adapter
   - Adaptee 01: Quick Pay
   - Adaptee 02: Safe Transfer

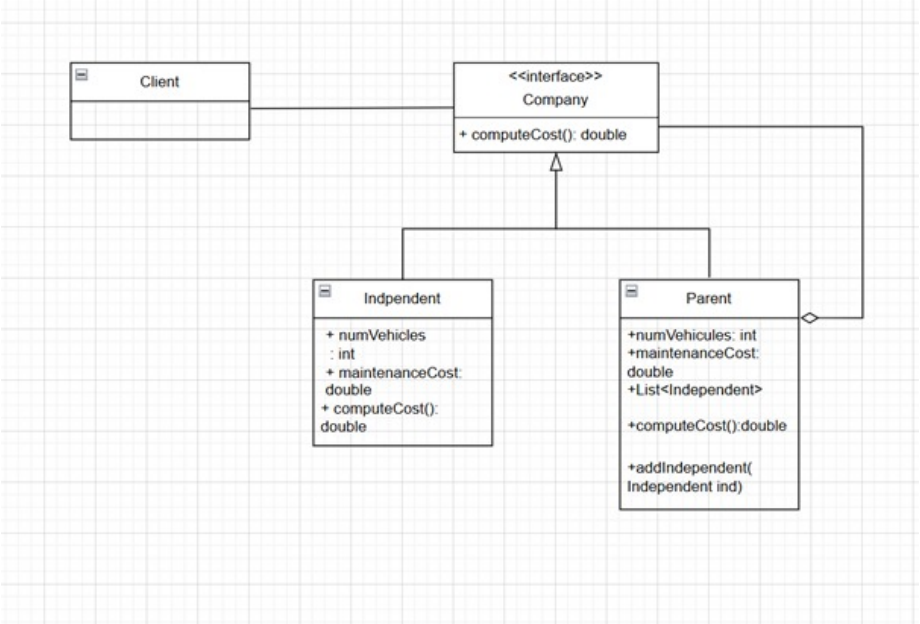


Figure 4: Class diagram(execise 2)

```java
import java.util.*;
interface Company{  2 usages  2 implementations
    double computeCost();  2 usages  2 implementations
}
class Independent implements Company{  6 usages
    int numVehicules;  2 usages
    double MaintenanceCost;  2 usages
    public Independent(int numVehicules, double MaintenanceCost){  2 usages
        this.numVehicules = numVehicules;
        this.MaintenanceCost = MaintenanceCost;
    }

    public double computeCost(){  2 usages
        return numVehicules*MaintenanceCost;
    }
}
```

Figure 5: Composite and leaf implementation(exercise2)

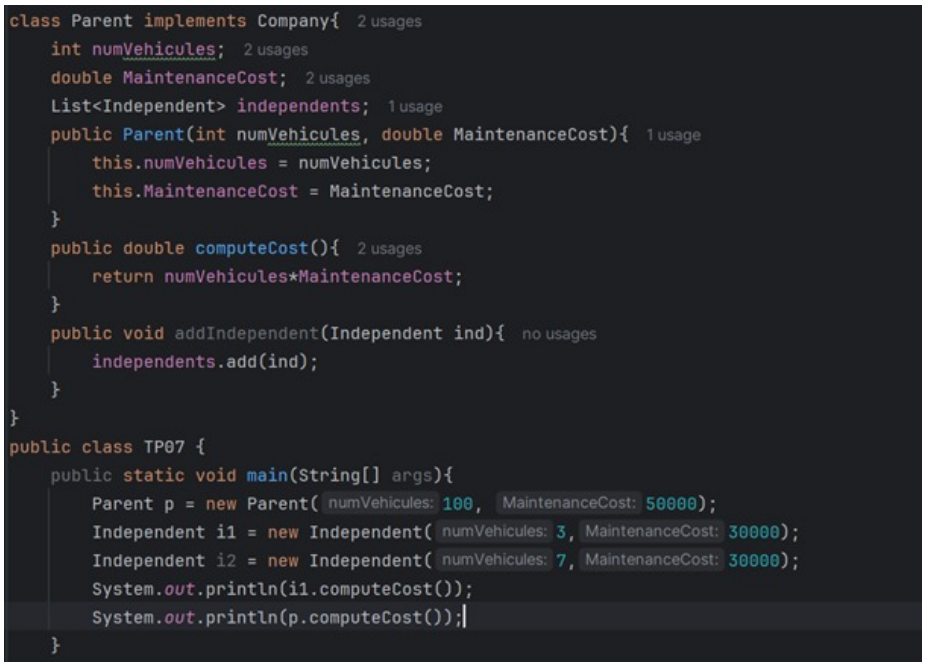


Figure 6: Component implementation(exercise 2)

4 Exercise 04

1. We will choose the observer pattern, because Multiple components (Logger, LabelUpdater, NotificationSender) need to react to changes in GUI elements (Buttons, Sliders)

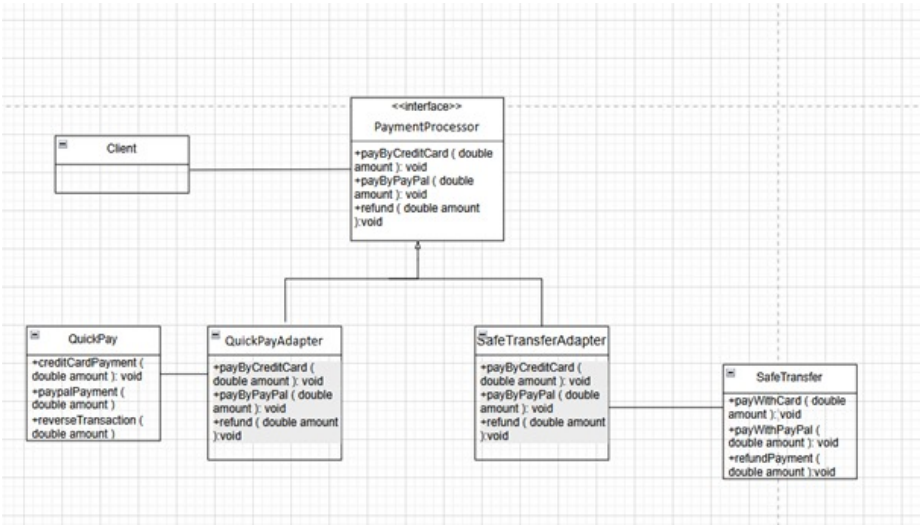


Figure 7: Class diagram(exercise 3)

```
interface PaymentProcessor {  3 usages  2 implementations
    void payByCreditCard ( double amount ) ;  2 usages  2 implementations
    void payByPayPal ( double amount ) ;  2 usages  2 implementations
    void refund ( double amount ) ;  2 usages  2 implementations
}
class QuickPay {  2 usages
    public void creditCardPayment(double amount) {  1 usage
        System.out.println(" QuickPay : Processing credit card payment $" +
                amount);
    }

    public void paypalPayment(double amount) {  1 usage
        System.out.println(" QuickPay : Processing PayPal payment $" +
                amount);
    }

    public void reverseTransaction(double amount) {  1 usage
        System.out.println(" QuickPay : Reversing transaction $" + amount);
    }
}
```

Figure 8: Target and adaptee 01 implementation(exercise 3)

```
class SafeTransfer {  2 usages
    public void payWithCard ( double amount ) {  1 usage
        System.out.println(" SafeTransfer : Paying with credit card $" +
                amount);
    }
    public void payWithPayPal ( double amount ) {  1 usage
        System . out . println (" SafeTransfer : Paying with PayPal $" + amount ) ;
    }
    public void refundPayment ( double amount ) {  1 usage
        System . out . println (" SafeTransfer : Refunding payment $" + amount ) ;
    }
}
```

Figure 9: Adaptee 02(exercise 3)

```
class QuickPayAdapter implements PaymentProcessor {  1 usage

    private QuickPay quickPay;  4 usages
    public QuickPayAdapter() {  1 usage
        this.quickPay = new QuickPay();
    }
    public void payByCreditCard(double amount) {  2 usages
        quickPay.creditCardPayment(amount);
    }
    public void payByPayPal(double amount) {  2 usages
        quickPay.paypalPayment(amount);
    }
    public void refund(double amount) {  2 usages
        quickPay.reverseTransaction(amount);
    }
}
```

Figure 10: Adapter 01(exercise 03)

```java
class SafeTransferAdapter implements PaymentProcessor {  1 usage

    private SafeTransfer safeTransfer;  4 usages

    public SafeTransferAdapter() {  1 usage
        this.safeTransfer = new SafeTransfer();
    }

    public void payByCreditCard(double amount) {  2 usages
        safeTransfer.payWithCard(amount);
    }

    public void payByPayPal(double amount) {  2 usages
        safeTransfer.payWithPayPal(amount);
    }

    public void refund(double amount) {  2 usages
        safeTransfer.refundPayment(amount);
    }
}
```

Figure 11: Adapter 02(exercise 3)

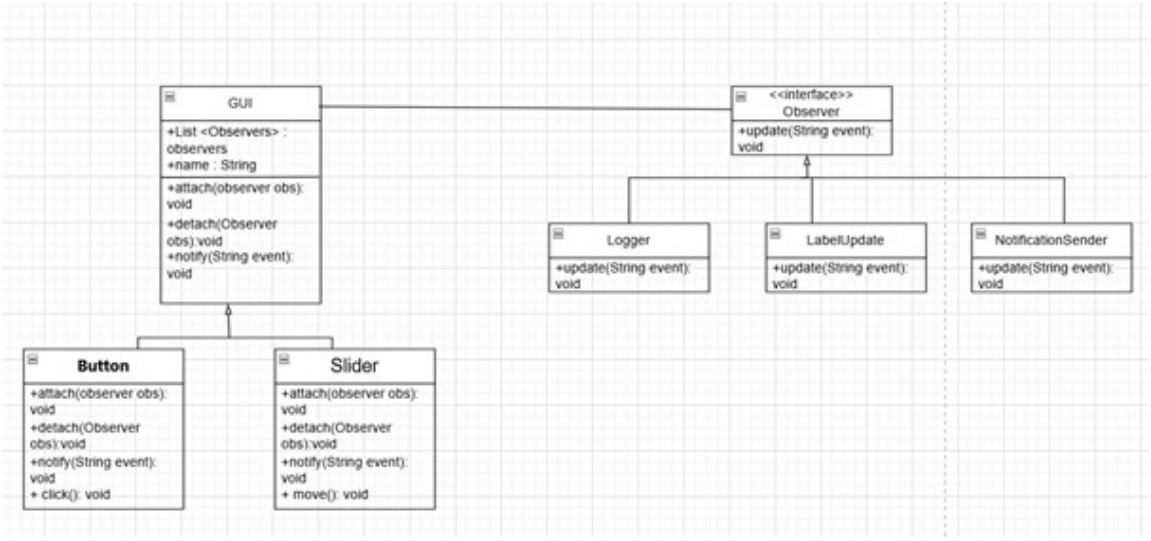


Figure 12: Class diagram (Exercise 04)

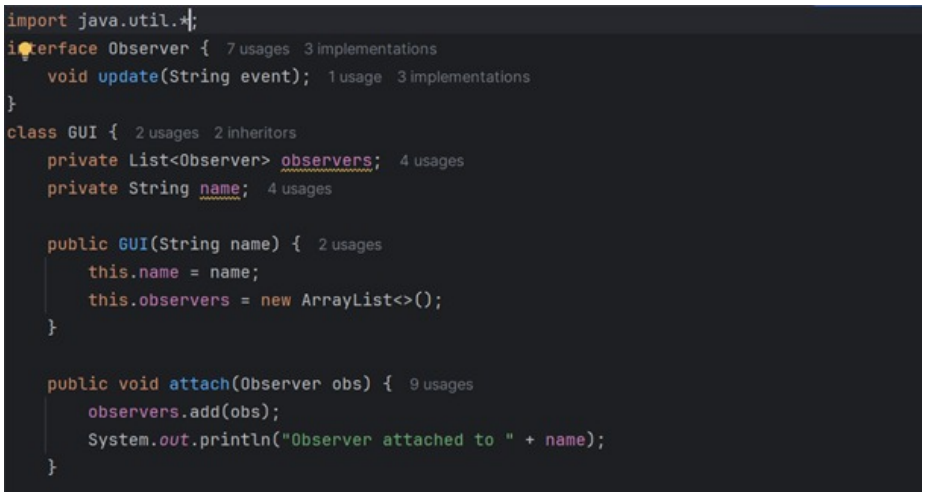


Figure 13: Observer and subject implementation(exercise 04)

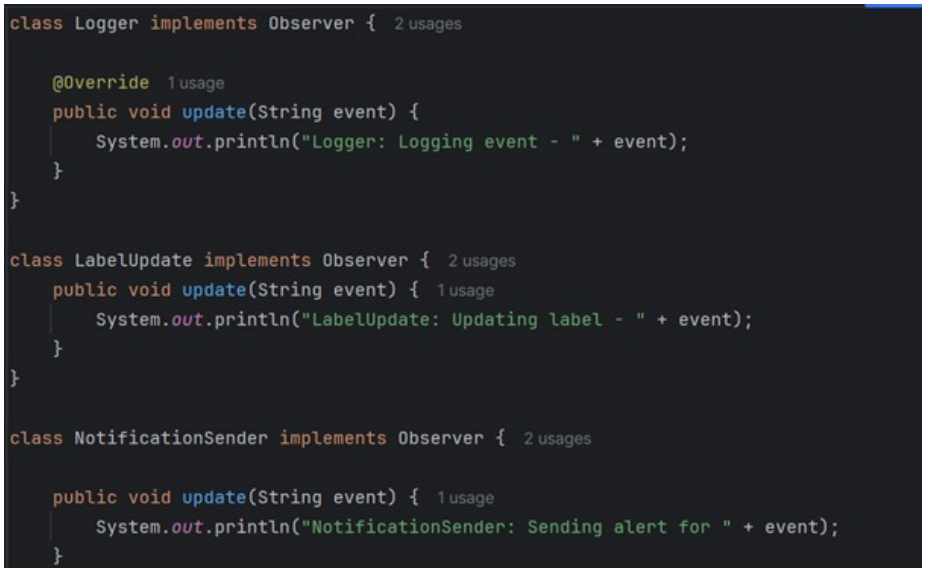
Figure 14: Subject methods(exercise 4)

```
class Button extends GUI {  4 usages

    public Button(String name) {  2 usages
        super(name);
    }

    public void click() {  2 usages
        System.out.println("\n" + getName() + " was clicked!");
        notify( event: "CLICK");
    }
}
```

Figure 15: Concrete subject implementation(exercise 4)

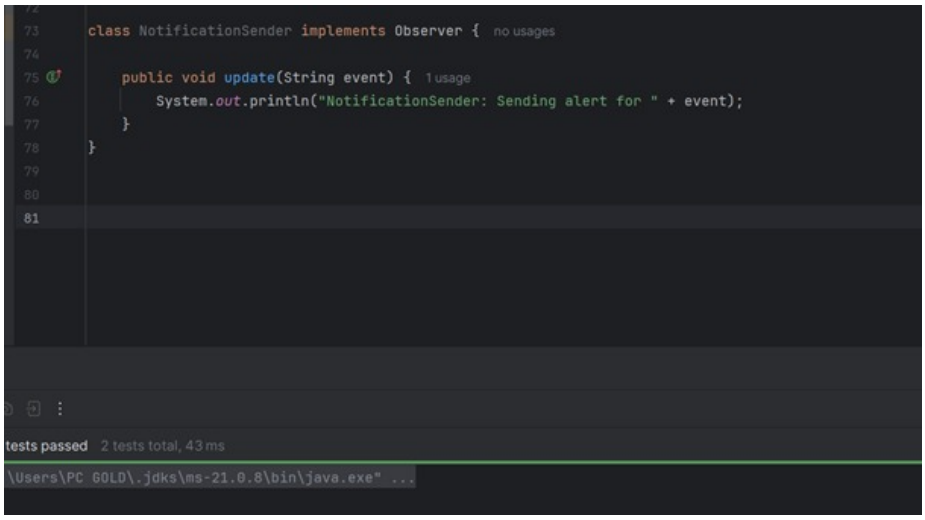
```
class Slider extends GUI {  4 usages

    public Slider(String name) {  2 usages
        super(name);
    }

    public void move() {  3 usages
        System.out.println("\n" + getName() + " was moved!");
        notify( event: "MOVE");
    }
}
```

Figure 16: Concrete subject(exercise 4)



```
class Logger implements Observer {  2 usages

    @Override  1 usage
    public void update(String event) {
        System.out.println("Logger: Logging event - " + event);
    }
}

class LabelUpdate implements Observer {  2 usages
    public void update(String event) {  1 usage
        System.out.println("LabelUpdate: Updating label - " + event);
    }
}

class NotificationSender implements Observer {  2 usages

    public void update(String event) {  1 usage
        System.out.println("NotificationSender: Sending alert for " + event);
    }
```

Figure 17: concrete observers(exercise 4)



```
73  class NotificationSender implements Observer {  no usages
74
75      public void update(String event) {  1 usage
76          System.out.println("NotificationSender: Sending alert for " + event);
77      }
78  }
79
80
81

tests passed  2 tests total, 43 ms
\Users\PC GOLD\.jdks\ms-21.0.8\bin\java.exe" ...
```

Figure 18: valid test (exercise 4)