

Assignment: 2

2. Find two compelling scenarios where you can apply creational design patterns (other than singleton) to your system. Draw the corresponding class diagram and sequence diagram for each case and implement it in Java. Explain in a text document how these patterns improve the design of your system.

The Prototype Design pattern is a creational design pattern that lets you copy existing objects without making your code dependent on their classes..

Scenario implementing Prototype Design Pattern in our application:

In our application prototype design pattern is used to build the ‘**Payment**’ class that performs the functionalities of completing the payments. We have several modes of payments such as credit/debit cards, online netbanking & paypal.

Why Prototype:

This application requires there to be multiple payment methods. The Prototype pattern provides the Payment code with a general interface for working with all objects that support cloning. This interface makes the payment code independent from the concrete classes of objects that it clones.

How Prototype pattern will improve the design:

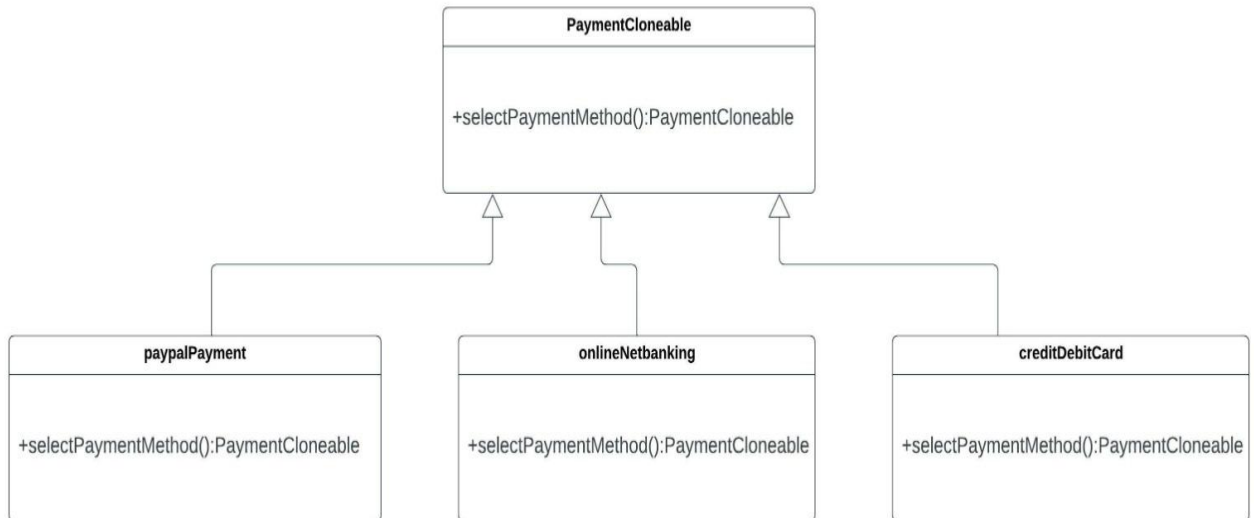
Once a payment is initiated, the end user will be given 3 choices of payments which will be using a few common attributes. Hence, implementing the PaymentCloneable class as a prototype which would be later extended by types of payments which would eliminate all the redundant code.

Implementation:

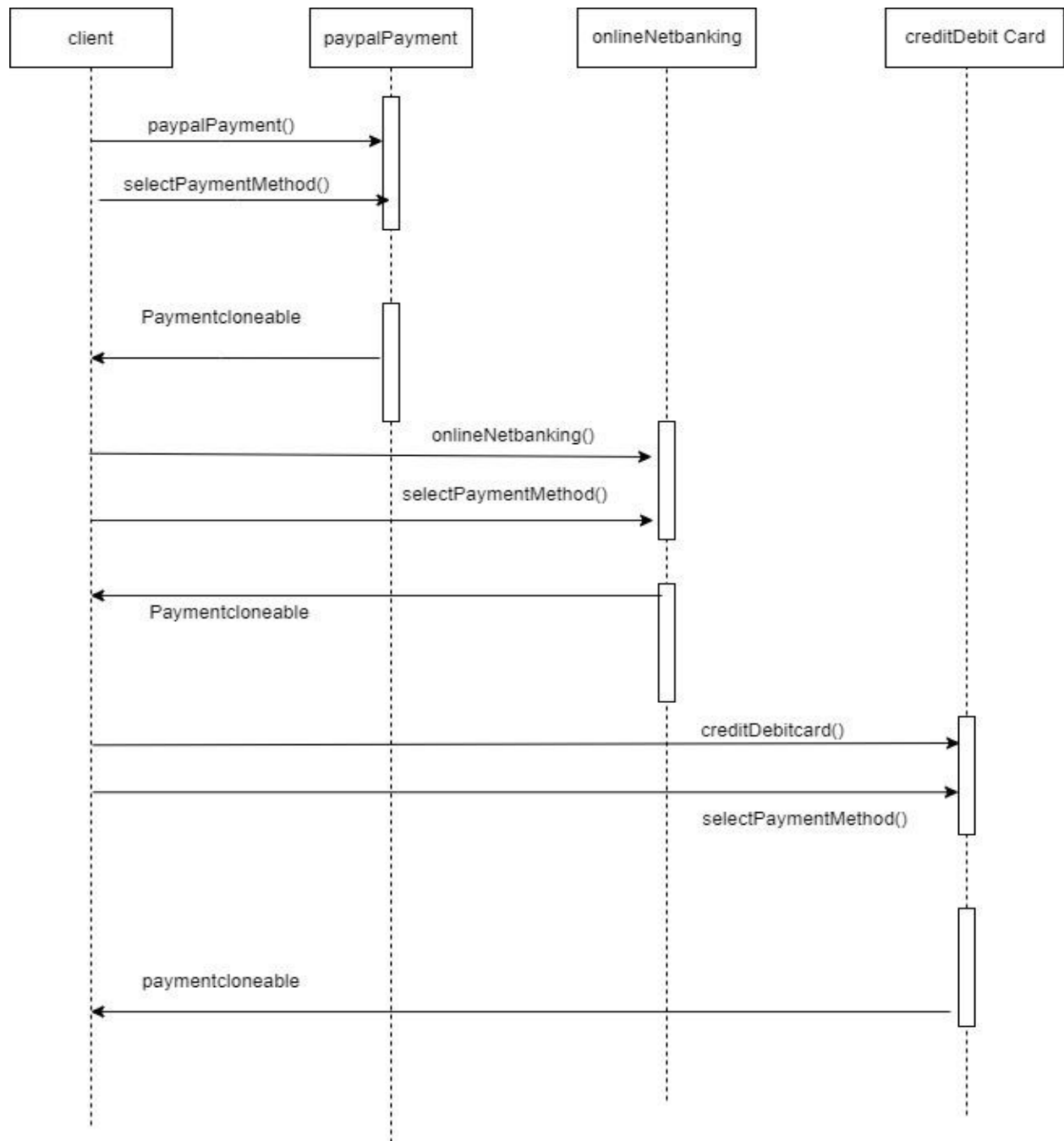
1. Create the prototype interface and declare the ***clone*** method in it. Or just add the method to all classes of an existing class hierarchy, if you have one.
2. A prototype class must define the alternative constructor that accepts an object of that class as an argument. The constructor must copy the values of all fields defined in the class from the passed object into the newly created instance.
3. Optionally, create a centralized prototype registry to store a catalog of frequently used prototypes.

Below are the corresponding class and collaboration diagrams:

Class Diagram:



Sequence State Diagram:



Output Screenshot:

```
<terminated> TestClass [Java Application] /Applications/Eclipse.app/Contents/Eclipse/plugins/org.eclipse.justj.o  
Method to carry out transactions using Credit or Debit Card.  
Method to carry out transactions using Account Number & Routing Code  
Method to carry out transactions using using 3rd party paypal.  
Method to carry out transactions using Account Number & Routing Code
```
