Visual Paradigm

# Prototype Pattern Tutorial
Written Date : September 30, 2009

This tutorial is aimed to guide the definition and application of Gang of Four (GoF) prototype design pattern. By reading this tutorial, you will know how to develop a model for the prototype pattern, and how to apply it in practice.

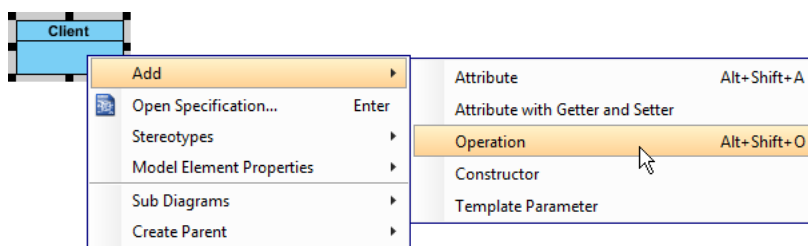## Modeling Design Pattern with Class Diagram

1.   Create a new project *Design Pattern*.

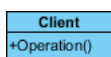2.   Create a class diagram *Prototype*.
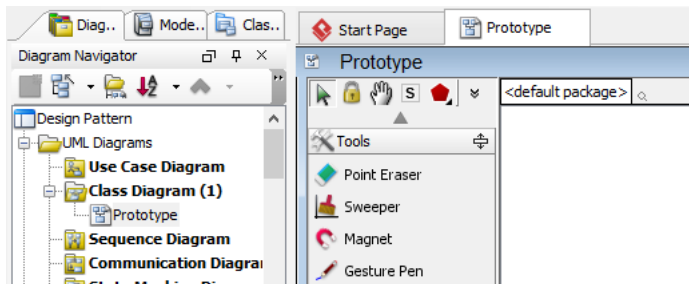
3.   Select **Class** from diagram toolbar. Click on diagram to create a class. Name it as *Client*.
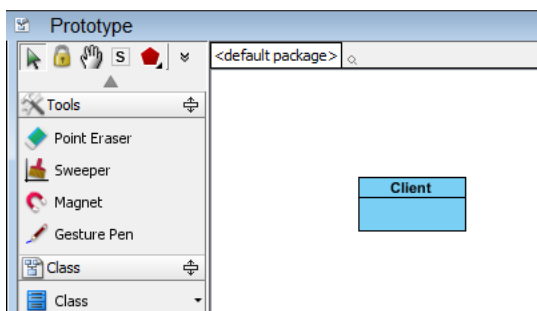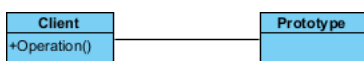
4. Right-click on the *Client* class, and select **Add** > **Operation** from the popup menu.
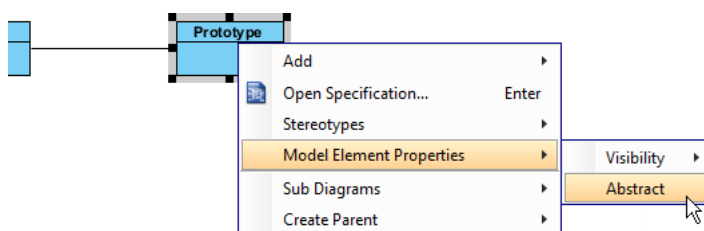
5. Name the operation *Operation()*.

6. Move the mouse cursor over the *Client* class, and drag out **Association** > **Class** to create an associated class *Prototype*.
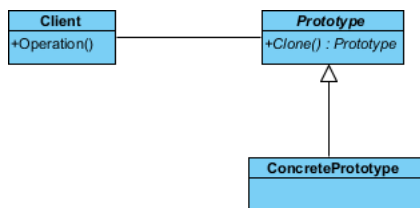
7. Right-click on *Prototype*, and select **Model Element Properties** > **Abstract** to set it as abstract.

8. Add an operation *Clone()* to *Prototype*. Make it return *Prototype*.

9. Right-click on *Clone()*, and select **Model Element Properties** > **Abstract** to set it as abstract.
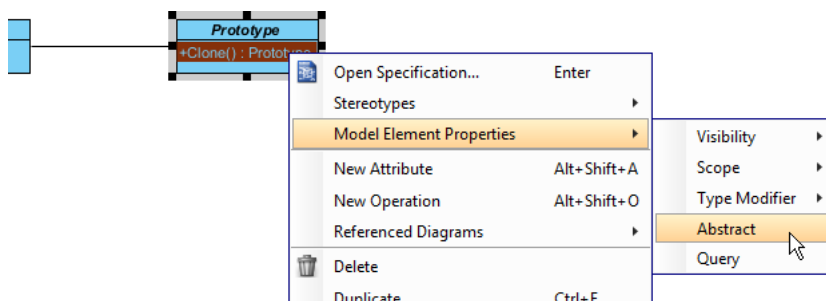
10. Move the mouse cursor over the *Prototype* class, and drag out **Generalization** > **Class** to create a subclass *ConcretePrototype*.


11. Make *ConcretePrototype* inherit the abstract operations provided from *Prototype* by right clicking on *ConcretePrototype*, and selecting **Related Elements** > **Realize all Interfaces** from the popup menu.
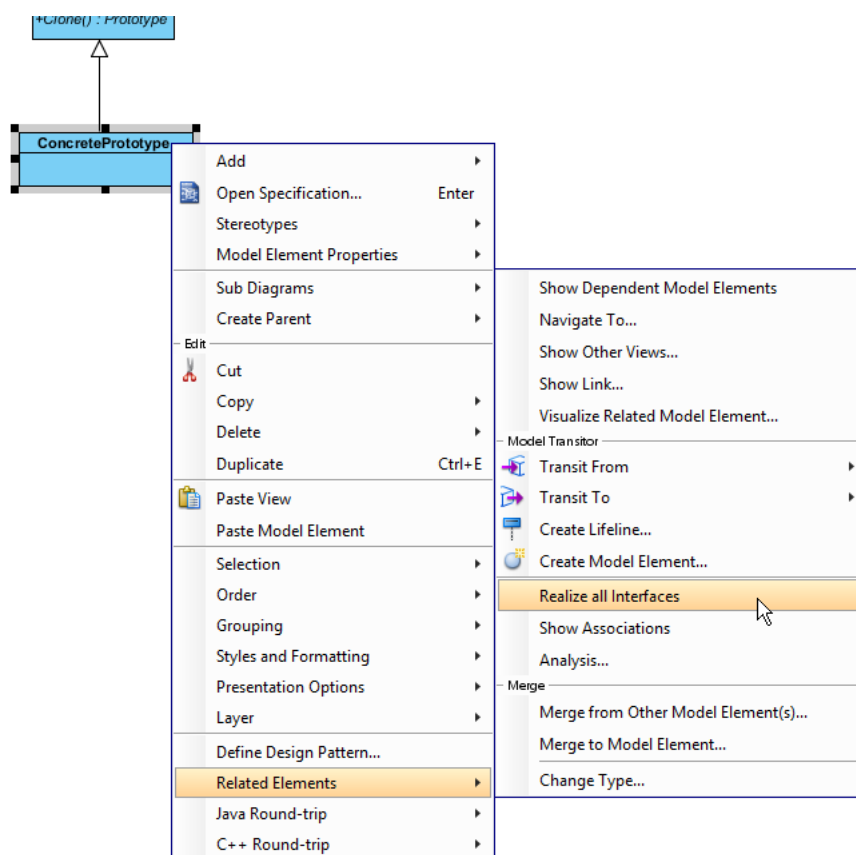
12. In practice, there may be multiple *ConcretePrototype* classes. To represent this, stereotype the *ConcretePrototype* class as **PTN Cloneable**. Right-click on *ConcretePrototype* class and select **Stereotypes** > **Stereotypes...** from the popup menu.
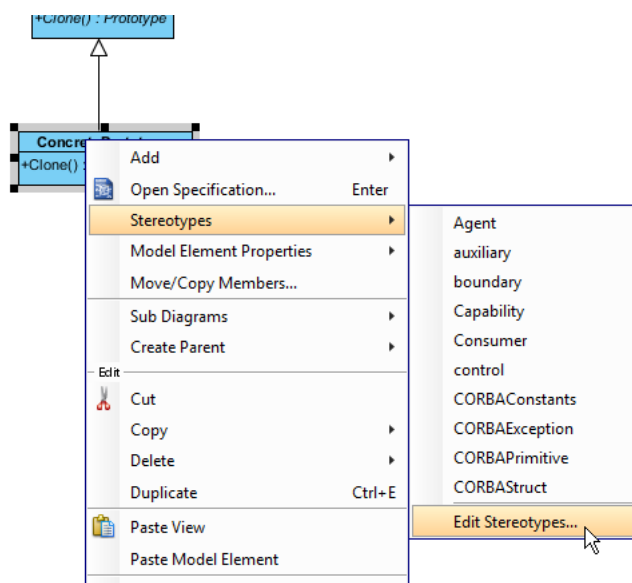
13. In the **Stereotypes** tab of class specification, select **PTN Cloneable** and click > to assign it to the class. Click **OK** to confirm.
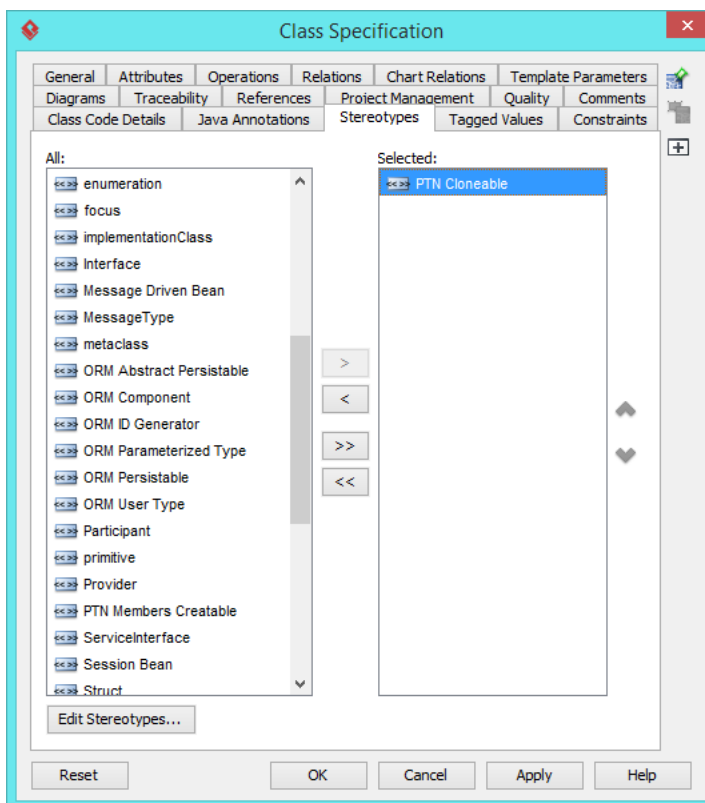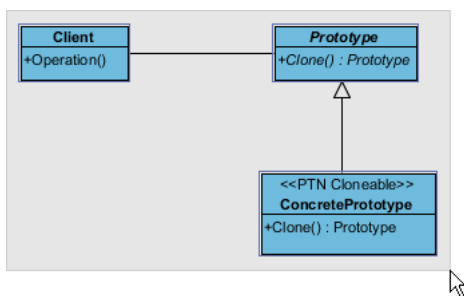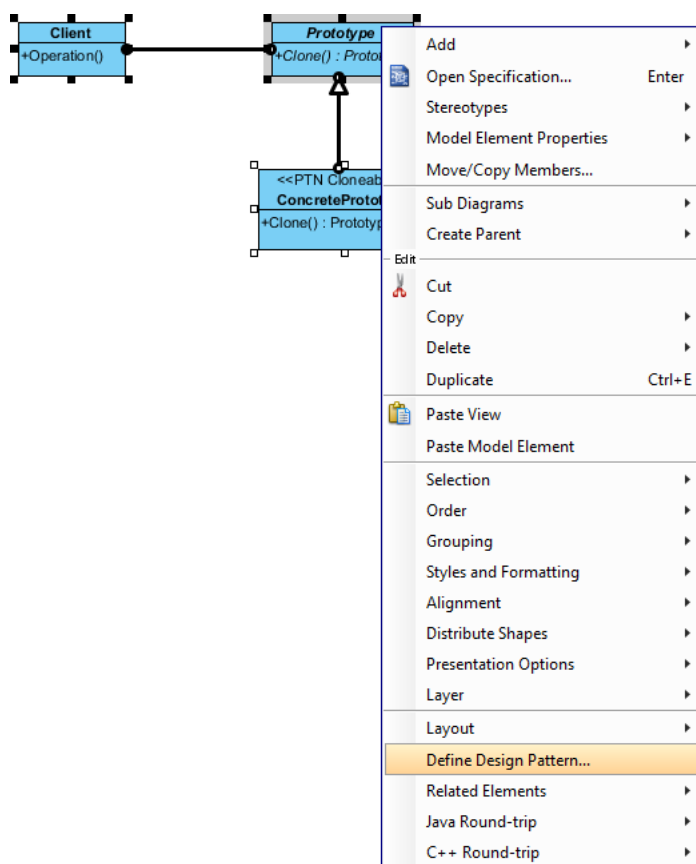

The diagram should look like this:
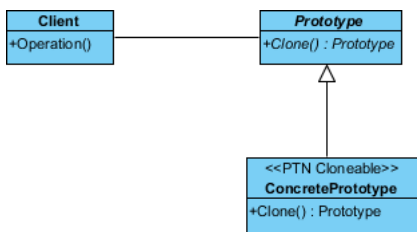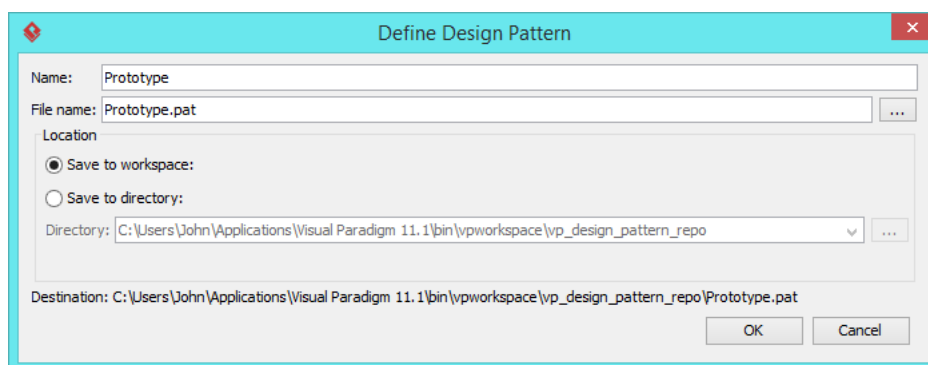

Defining Pattern

1. Select all classes on the class diagram.

2. Right-click on the selection and select **Define Design Pattern...** from the popup menu.
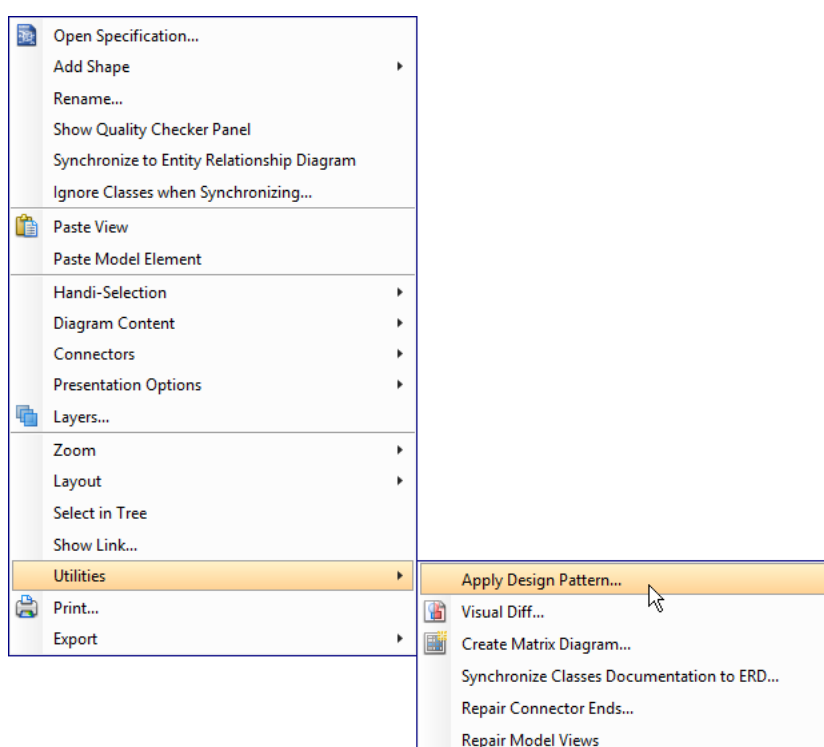
3. In the **Define Design Pattern** dialog box, specify the pattern name *Prototype*. Keep the file name as it. Click **OK** to proceed.


Applying Design Pattern on Class Diagram

In this section, we will try to make use of the prototype pattern to model a part of diagram editor.

1. Create a new project *My Diagram Tool*.

2. Create a class diagram *Domain Model*.

3. Right-click on the class diagram and select **Utilities** > **Apply Design Pattern...** from the popup menu.
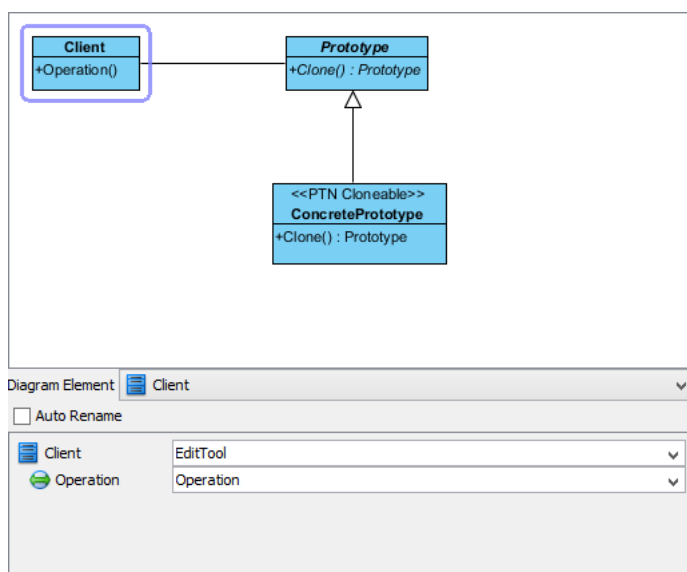
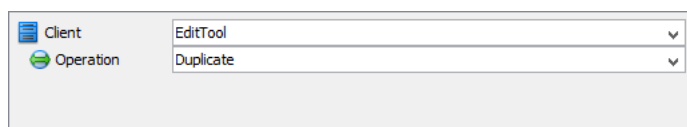4.   In the **Design Pattern** dialog box, select *Prototype* from the list of patterns.
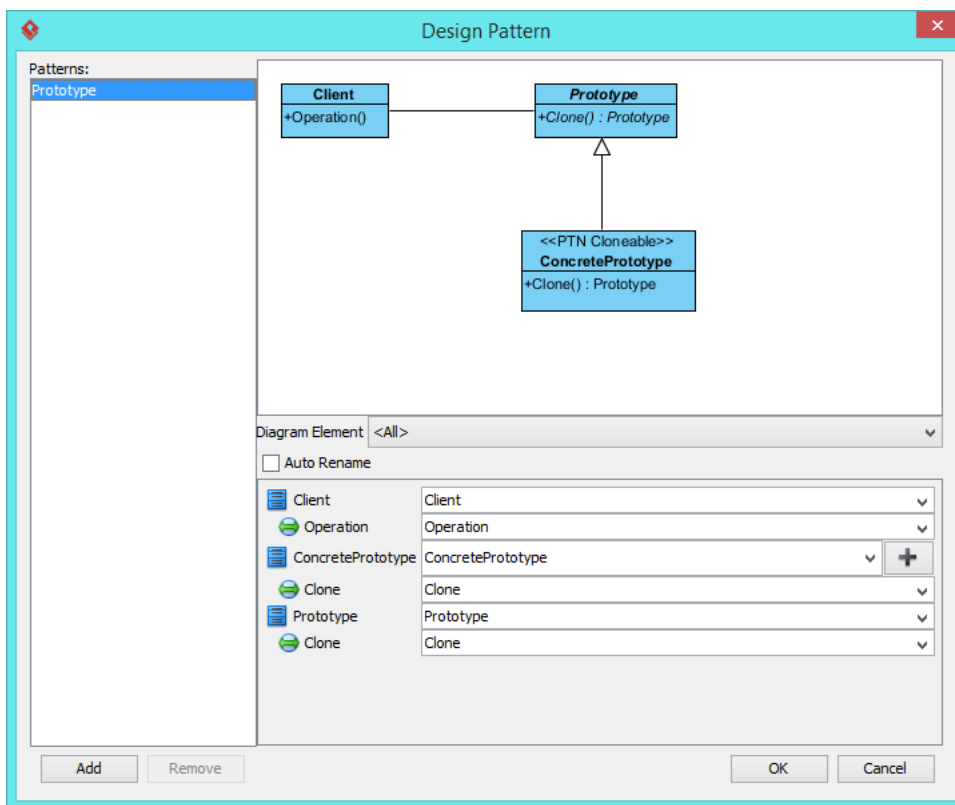
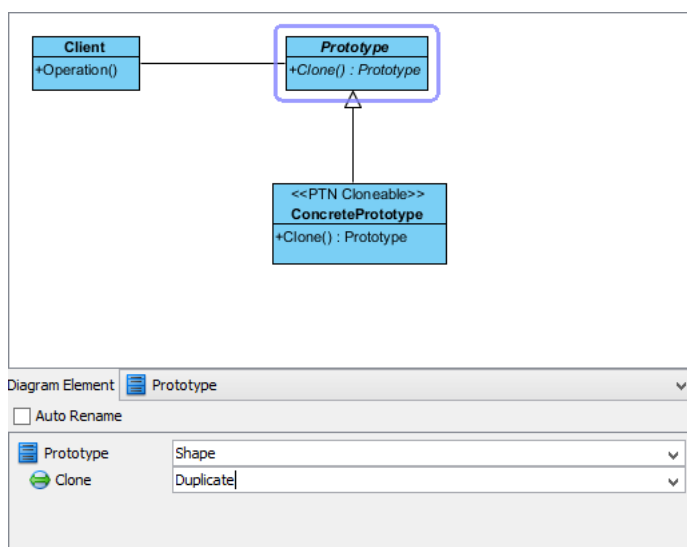5.   Click on *Client* in the overview.
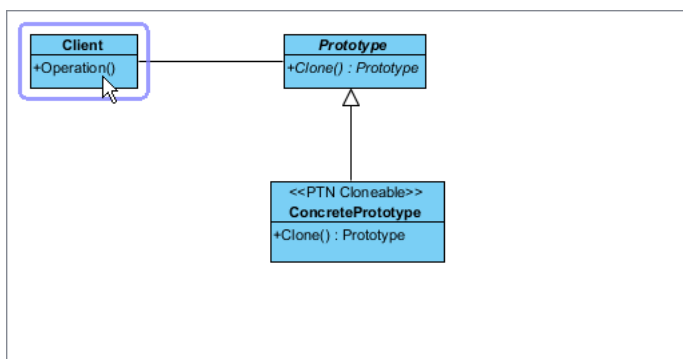
6.   Rename it to *EditTool* at the bottom pane.

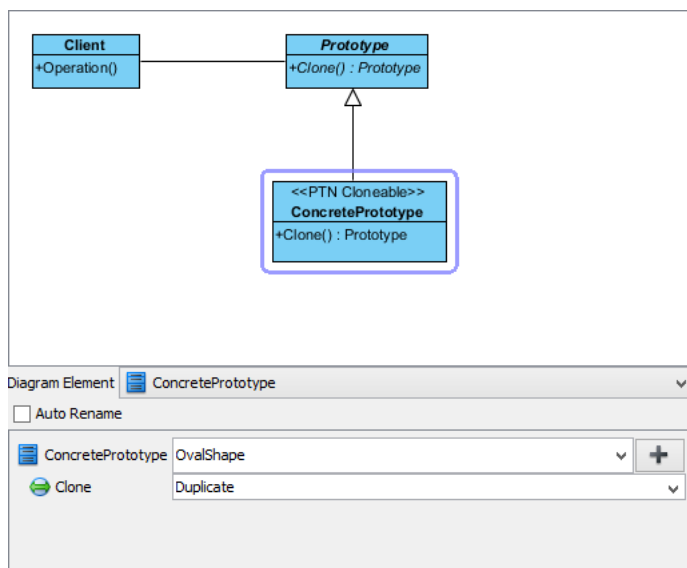

7.   Rename *Operation* to *Duplicate*.

8.   Select *Prototype* in overview.

9.   Rename *Prototype* to *Shape* at the bottom pane, and rename the operation *Clone* to *Duplicate*.
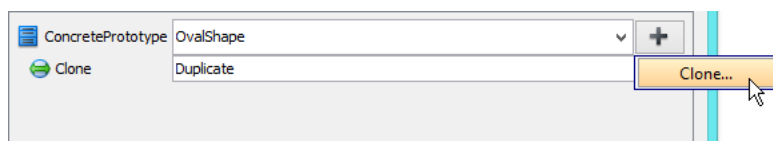

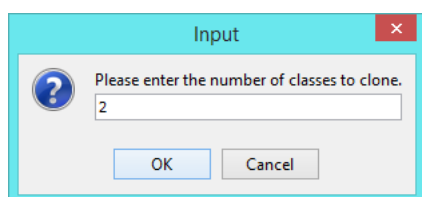10.   Select *ConcretePrototype* in overview.

11. Rename *ConcretePrototype* to *OvalShape* at the bottom pane, and rename the operation *Clone* to *duplicate*.
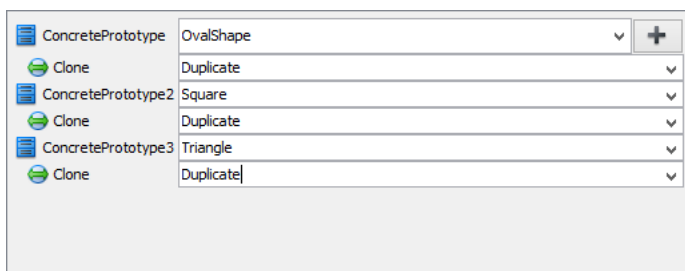

12. We need to have two more concrete prototype classes for square and triangle. Keep *ConcretePrototype* selecting, click the + button, and select **Clone...** from the popup menu.
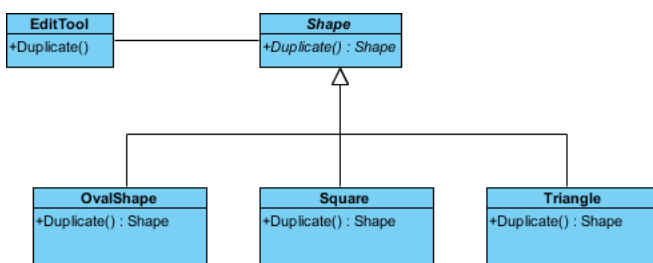

13. Enter *2* to be the number of classes to clone.

14. Rename *ConcretePrototype2* and *ConcretePrototype3* to *Square* and *Triangle* respectively. Rename the two *Clone* operations to duplicate.

15. Click **OK** to confirm editing and apply the pattern to diagram.

16. Tidy up the diagram. It should become:

Resources
1. Design Patterns.vpp

2. Prototype.pat

Related Links
• Full set of UML tools and UML diagrams

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