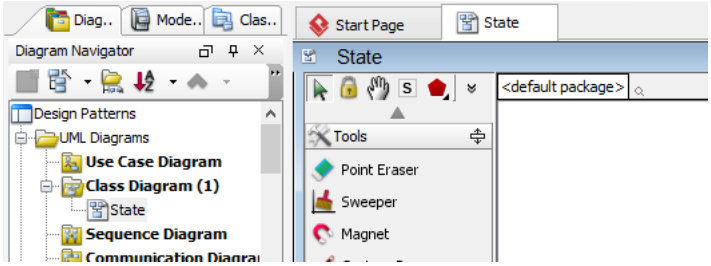
State Pattern Tutorial

Written Date : October 27, 2009

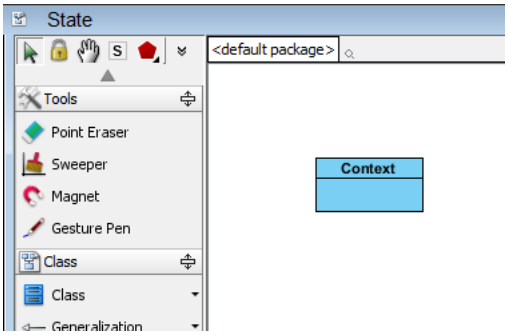
Modeling a Design Pattern with a Class Diagram

1. Create a new project named *Design Patterns*.

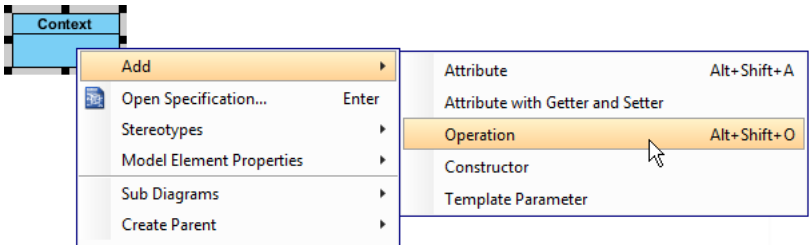
2. Create a class diagram named *State*.



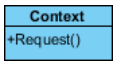
3. Select **Class** from the diagram toolbar. Click on the diagram to create a class and name it *Context*.



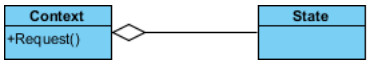
4. Right-click on the *Context* class and select **Add** > **Operation** from the popup menu.



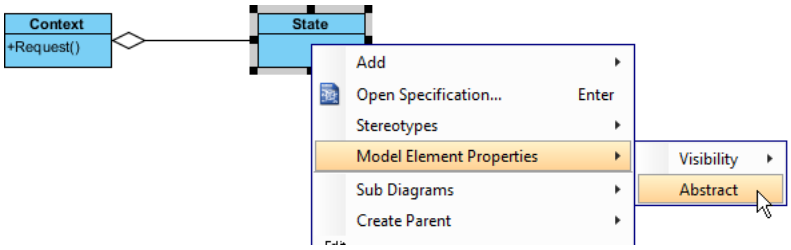
5. Name the operation `Request()`.



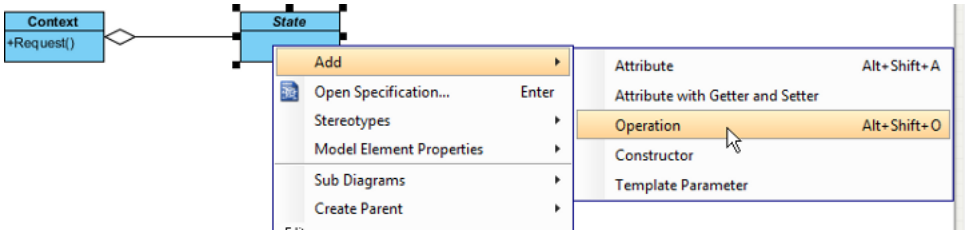
6. Move the mouse cursor over the *Context* class and drag out **Aggregation** > **Class** to create an associated class named *State*.



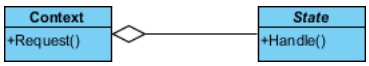
7. Right-click on *State* and select **Model Element Properties** > **Abstract** to set it as abstract.



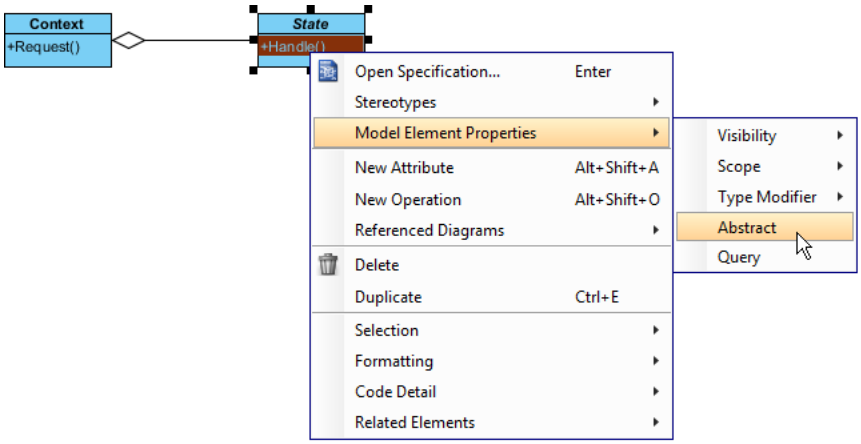
8. Right-click on the *State* class and select **Add** > **Operation** from the popup menu.



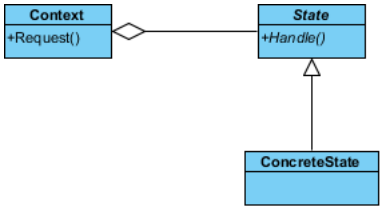
9. Name the operation `Handle()`.



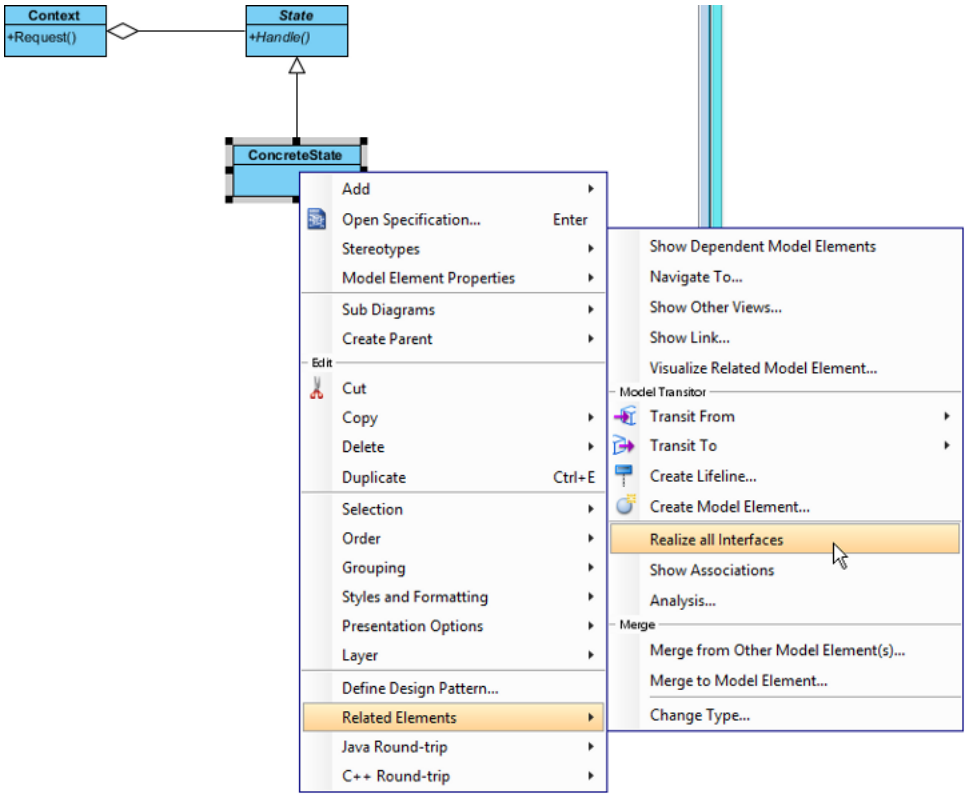
10. Right-click on the *Handle()* operation and select **Model Element Properties** > **Abstract** to set it as abstract.



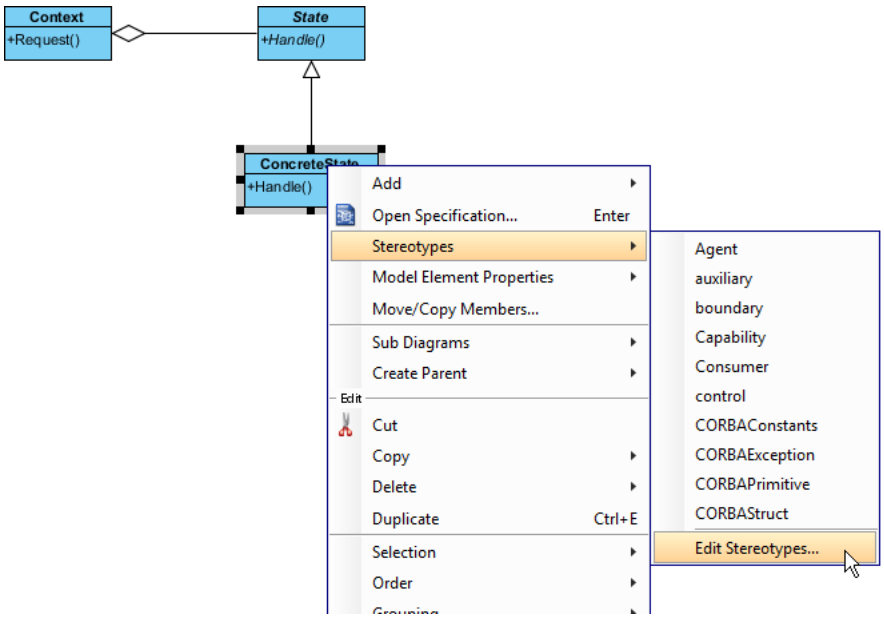
11. Move the mouse cursor over the *State* class and drag out **Generalization** > **Class** to create a subclass named *ConcreteState*.



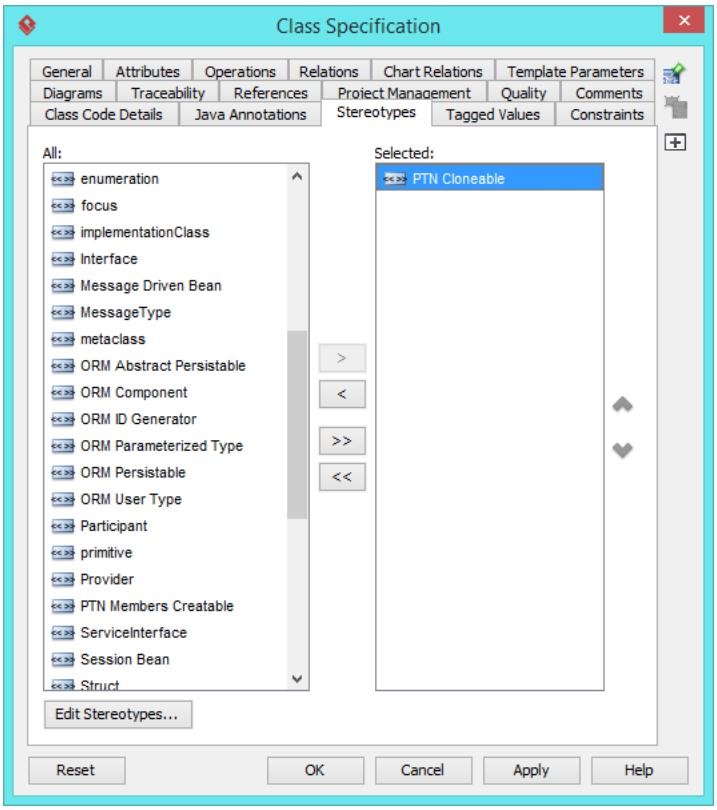
12. We need to make the concrete state inherit operations from the state class. Right-click on *ConcreteState* and select **Related Elements** > **Realize all Interfaces** from the popup menu.



13. In practice, there may be multiple concrete states. To represent this, stereotype the `ConcreteState` class as **PTN Cloneable**. Right-click on *ConcreteState* and select **Stereotypes** > **Stereotypes...** from the popup menu.

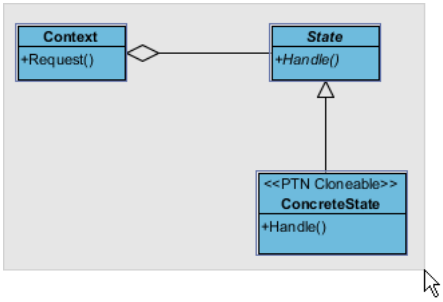


14. In the **Stereotypes** tab of the **Class Specification** dialog box, select **PTN Cloneable** and click > to assign it to the *ConcreteState* class. Click **OK** to confirm.

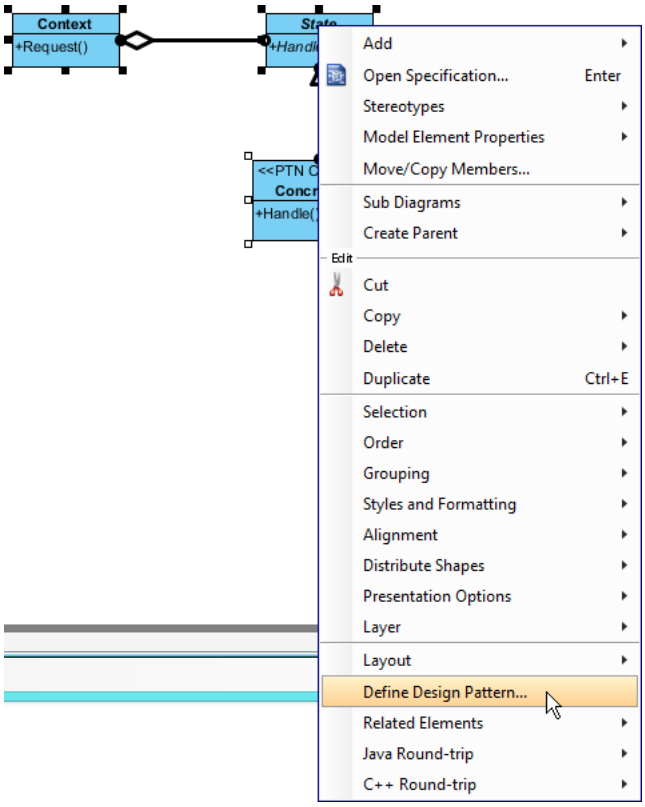


Defining the Pattern

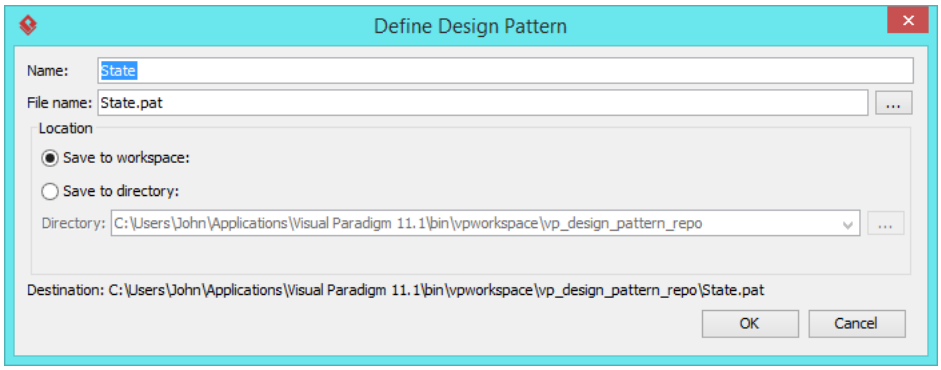
1. Select all classes on the class diagram.



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 as *State*. Keep the file name as is. Click **OK** to proceed.

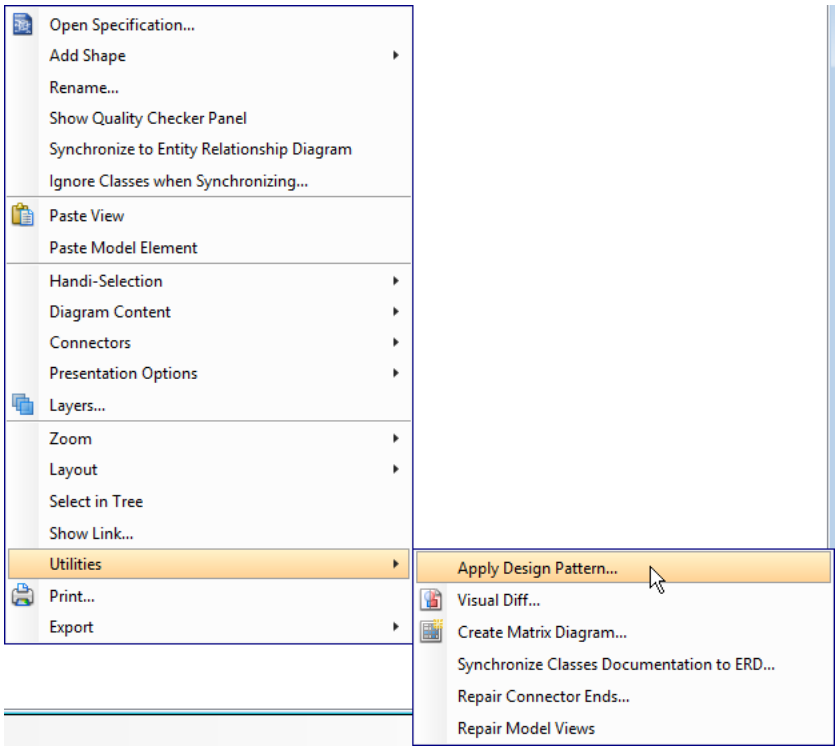


Applying a Design Pattern to a Class Diagram

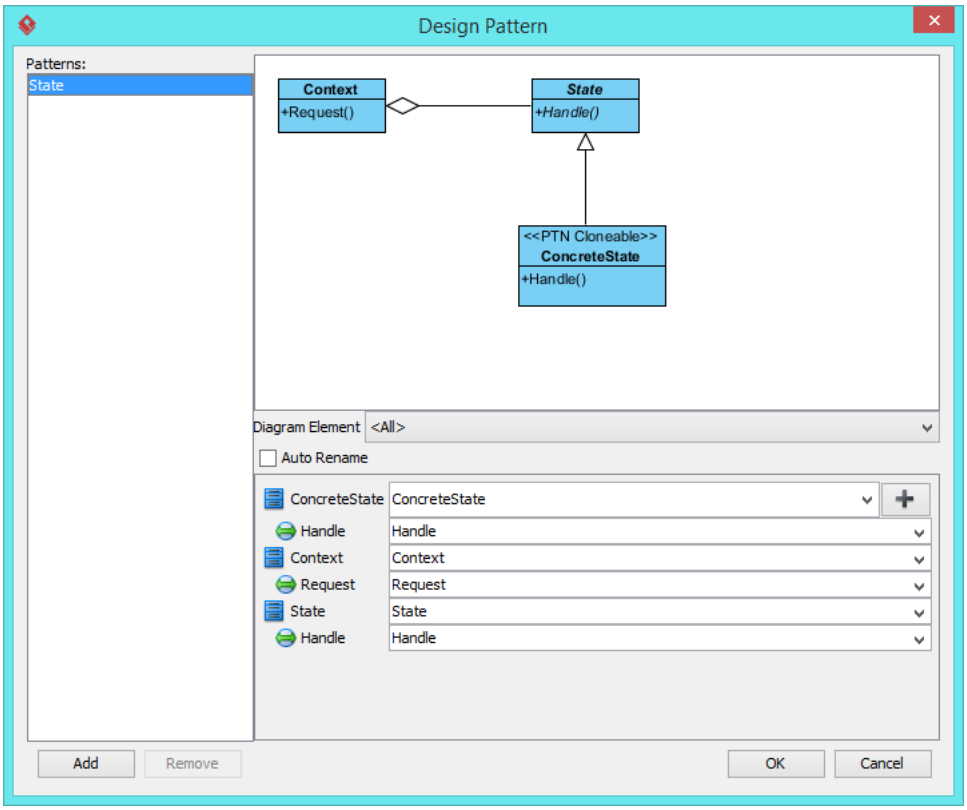
In this section, we are going to apply the state pattern in modeling a 'Life' concept.

1. Create a new project named *Life*.
2. Create a class diagram named *Domain Model*.

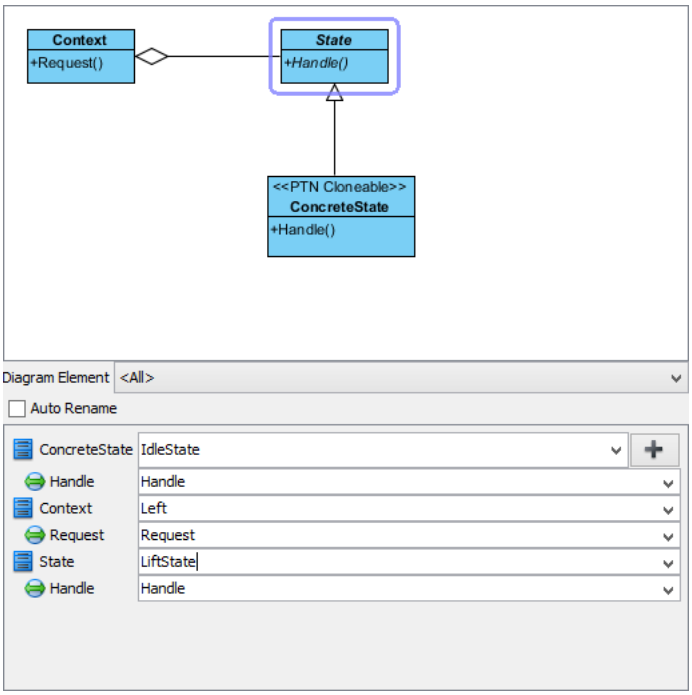
3. Right-click on the class diagram and select **Utilities** > **Apply Design Pattern...** from the popup menu.



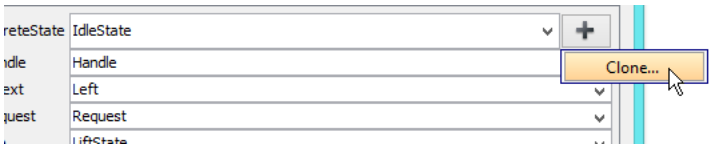
4. In the **Design Pattern** dialog box, select *State* from the list of patterns.



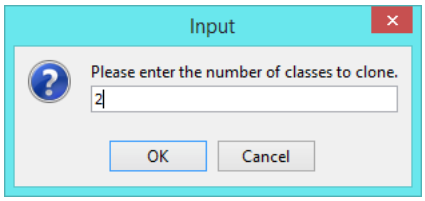
5. In the bottom pane, rename *Context*, *State*, and *ConcreteState* to *Life*, *LifeState*, and *IdleState*, respectively.



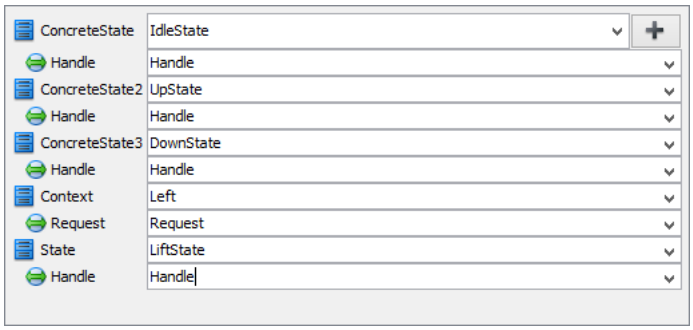
6. We need two more concrete states for 'up' and 'down'. Click the **+** button in the `ConcreteState` row and select **Clone...** from the popup menu.



7. Enter `2` as the number of classes to clone and click **OK** to confirm.

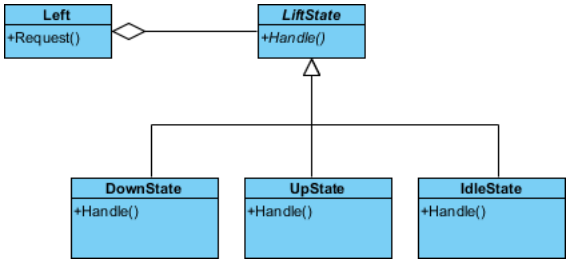


8. Rename *ConcreteState2* and *ConcreteState3* to *UpState* and *DownState*.



9. Click **OK** to apply the pattern to the diagram.

10. Tidy up the diagram. Here is the result:



Resources

1. Design Patterns.vpp

2. State.pat

Related Links

- Full set of UML tools and UML diagrams

Visual Paradigm home page
(https://s.visual-paradigm.com/)

Visual Paradigm tutorials
(https://s.visual-paradigm.com/tutorials/)