

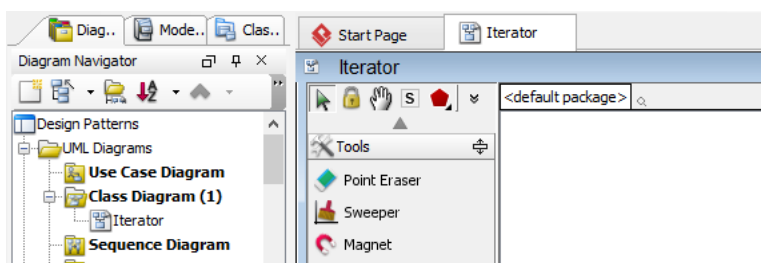


Iterator Pattern Tutorial

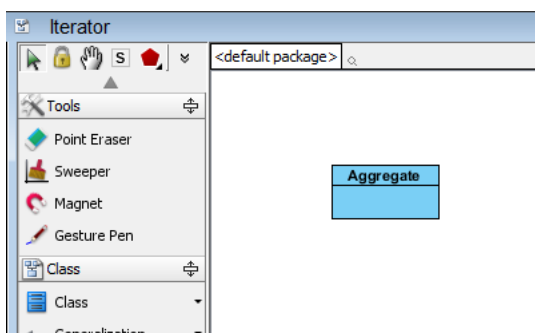
Written Date : October 16, 2009

Modeling a Design Pattern with a Class Diagram

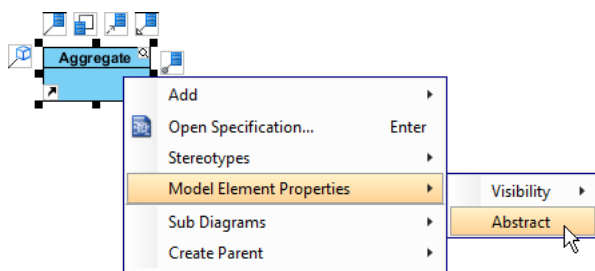
1. Create a new project named *Design Patterns*.
2. Create a class diagram named *Iterator*.



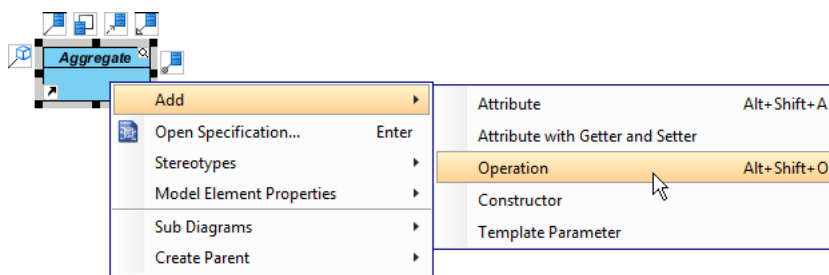
3. Select **Class** from the diagram toolbar. Click on the diagram to create a class. Name it *Aggregate*.



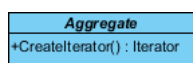
- Right-click on *Aggregate* and select **Model Element Properties** > **Abstract** to set it as abstract.



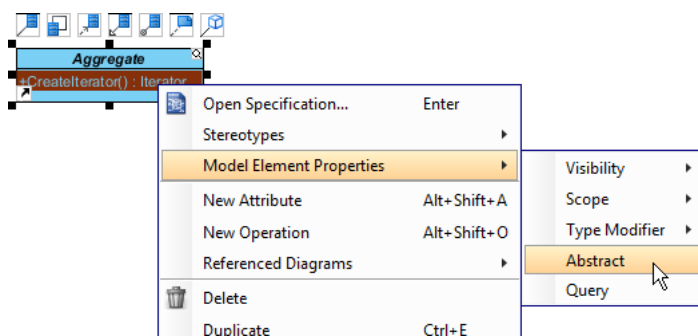
- Right-click on the *Aggregate* class and select **Add** > **Operation** from the popup menu.



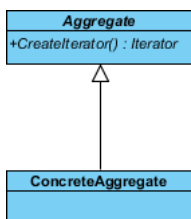
- Name the operation *CreateIterator()* and make it return *Iterator*.



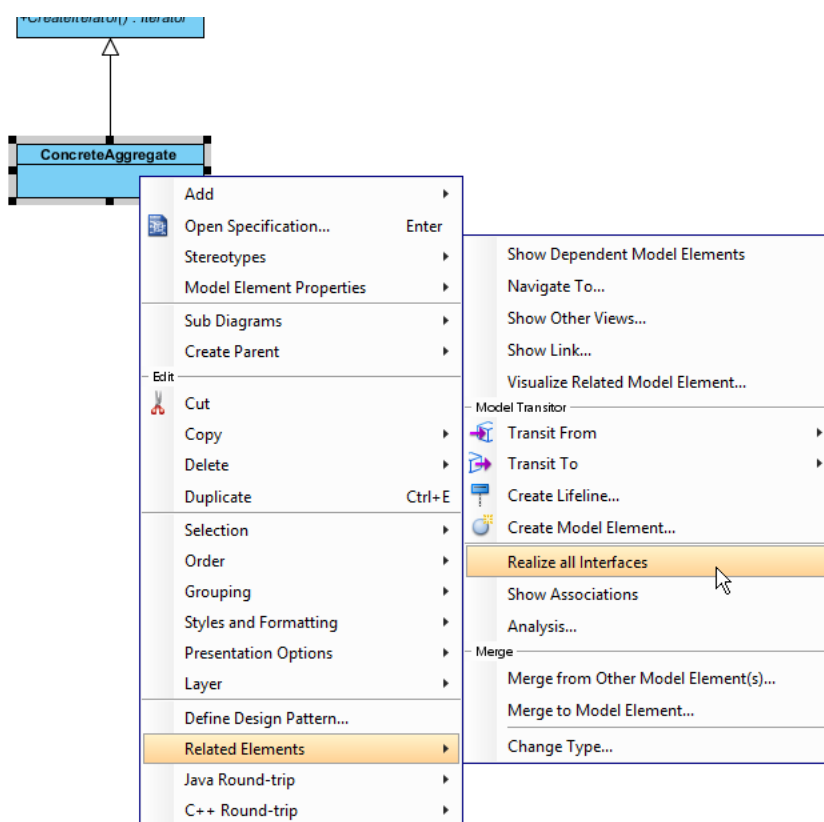
- Right-click on *CreateIterator() : Iterator* and select **Model Element Properties** > **Abstract** to set it as abstract.



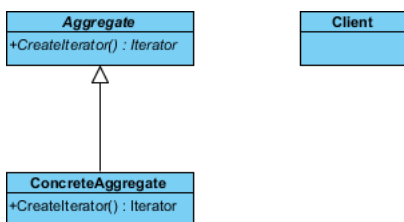
- Move the mouse cursor over the *Aggregate* class and drag out **Generalization > Class** to create a subclass *ConcreteAggregate*.



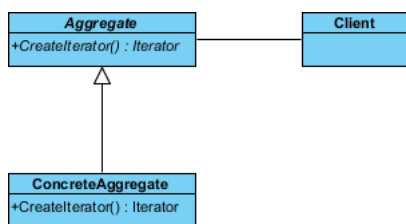
- ConcreteAggregate* will inherit the operations from *Aggregate*. Select *ConcreteAggregate*, right-click on them, and select **Related Elements > Realize all Interfaces** from the popup menu.



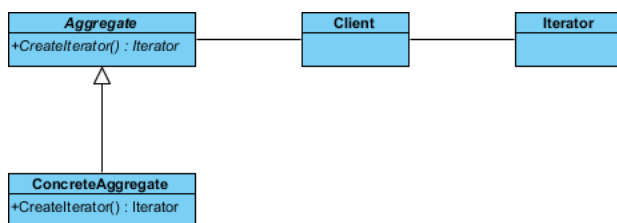
- Create a class *Client* near *Aggregate*.



11. Move the mouse cursor over the *Client* class and drag out **Association > Class** to *Aggregate*.

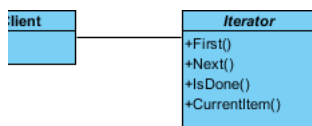


12. Move the mouse cursor over the *Client* class and drag out **Association > Class** to create an associated class *Iterator*.

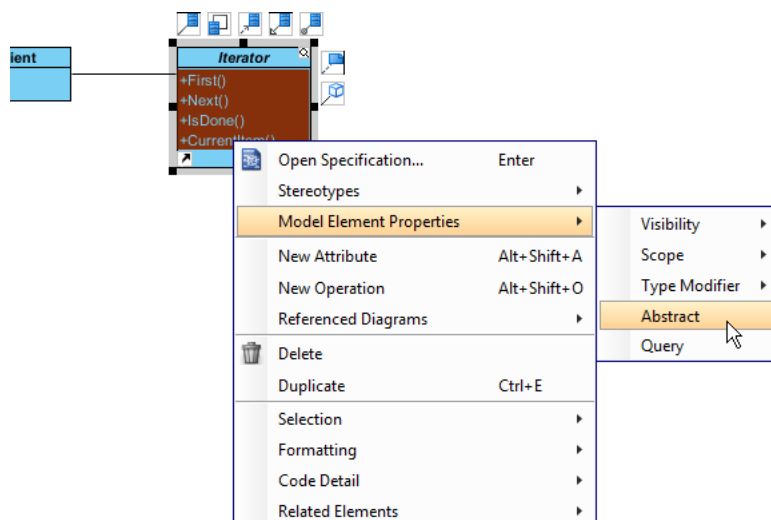


13. Right-click on *Iterator* and select **Model Element Properties > Abstract** to set it as abstract.

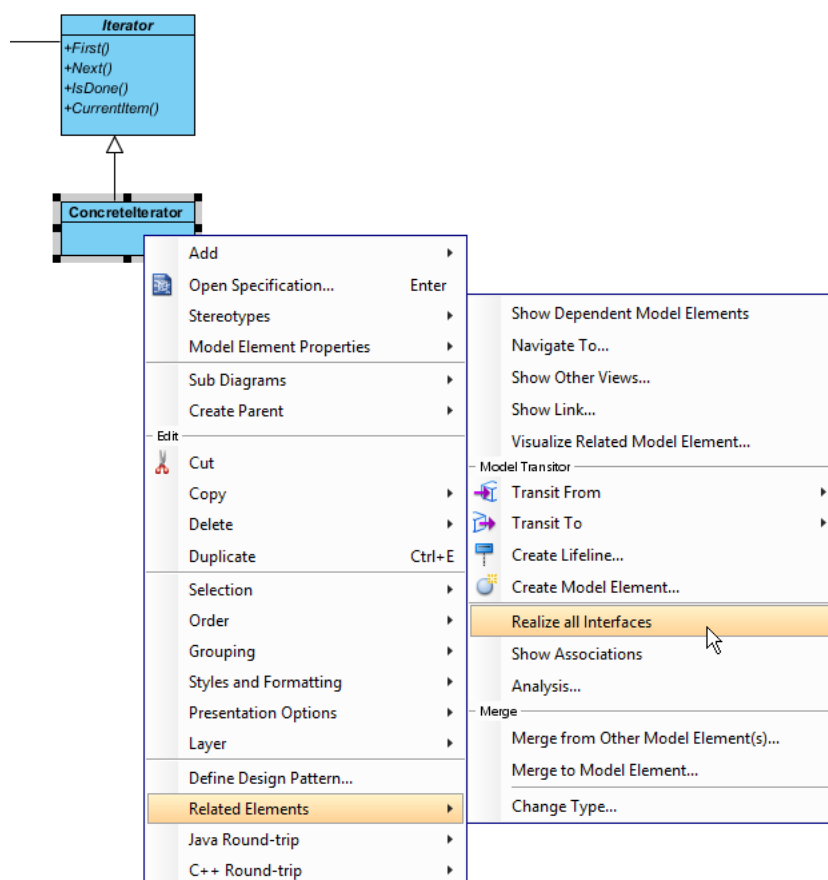
14. Right-click on the *Iterator* class and select **Add > Operation** from the popup menu to add operations: *First()*, *Next()*, *IsDone()*, *CurrentItem()*.



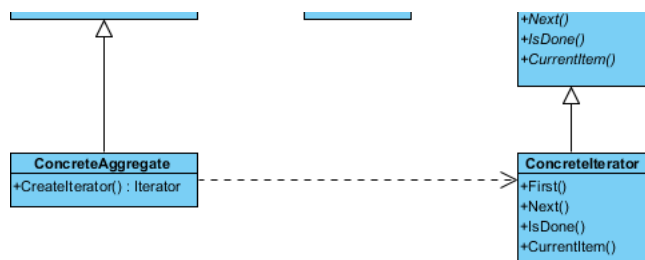
15. Select all operations in *Iterator*. Right-click and select **Model Element Properties > Abstract** to set it as abstract.



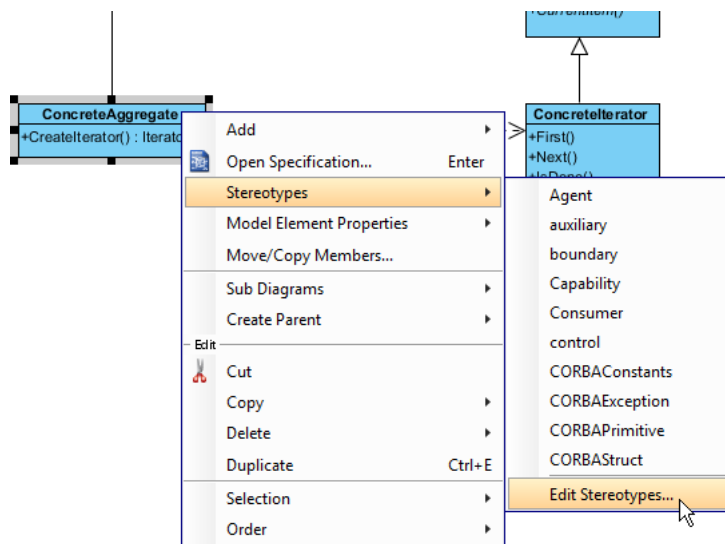
16. *ConcretelIterator* will inherit the operations from *Iterator*. Select *ConcretelIterator*, right-click on them, and select **Related Elements > Realize all Interfaces** from the popup menu.



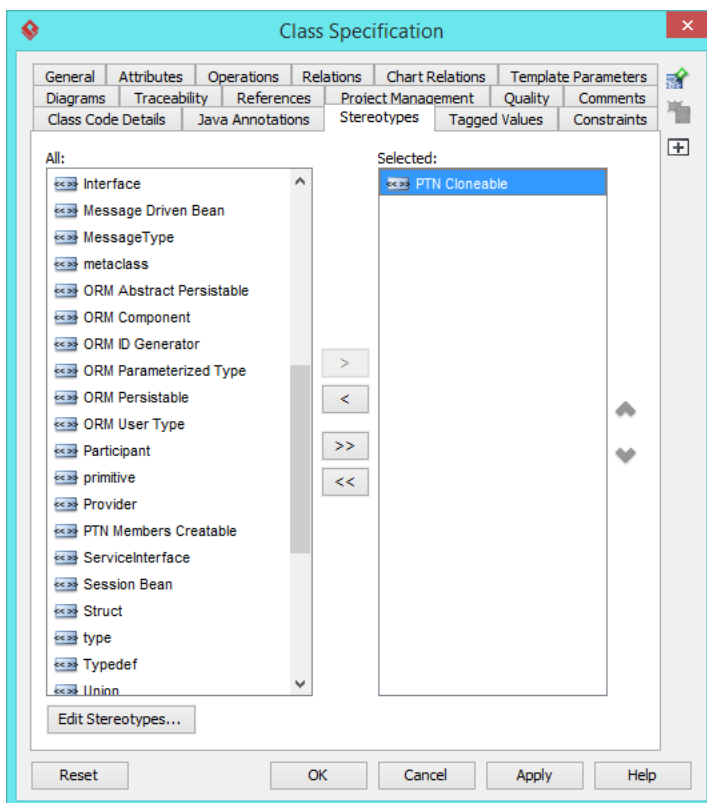
17. Move the mouse cursor over the *ConcreteAggregate* class and drag out **Dependency** > **Class** to class *ConcreteIterator*.



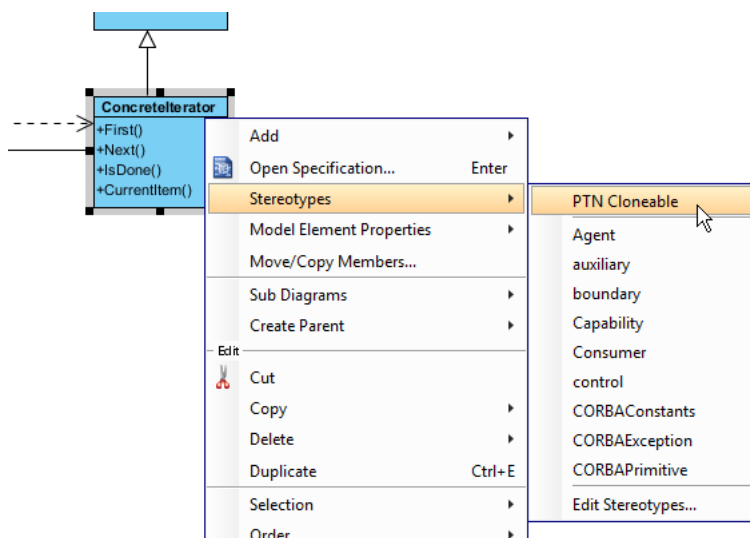
18. Move the mouse cursor over the *ConcreteIterator* class and drag out **Association** > **Class** to class *ConcreteAggregate*.
19. In practice, there may be multiple *ConcreteAggregate* classes. To represent this, stereotype the class *ConcreteAggregate* as **PTN Cloneable**. Right-click on the *ConcreteAggregate* class and select **Stereotypes** > **Stereotypes...** from the popup menu.



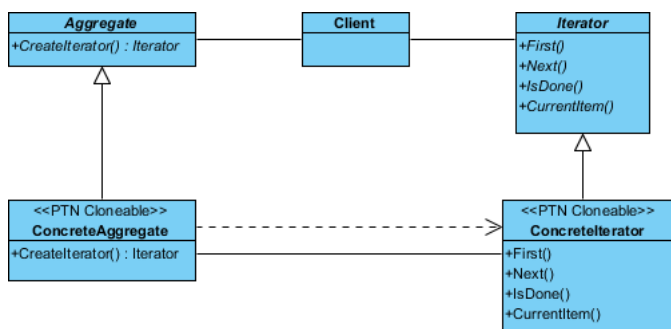
20. In the **Stereotypes** tab of the class specification, select **PTN Cloneable** and click **>** to assign it to the class. Click **OK** to confirm.



- There may be multiple *ConcreteIterator* classes. Right-click on the *ConcreteIterator* class and select **Stereotypes > PTN Cloneable** from the popup menu.

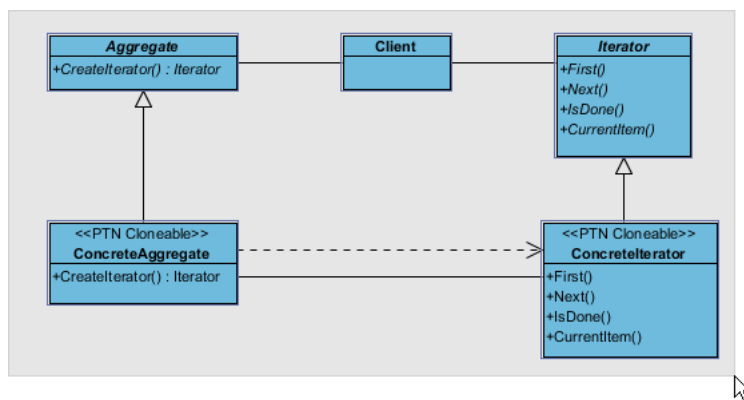


The diagram becomes:

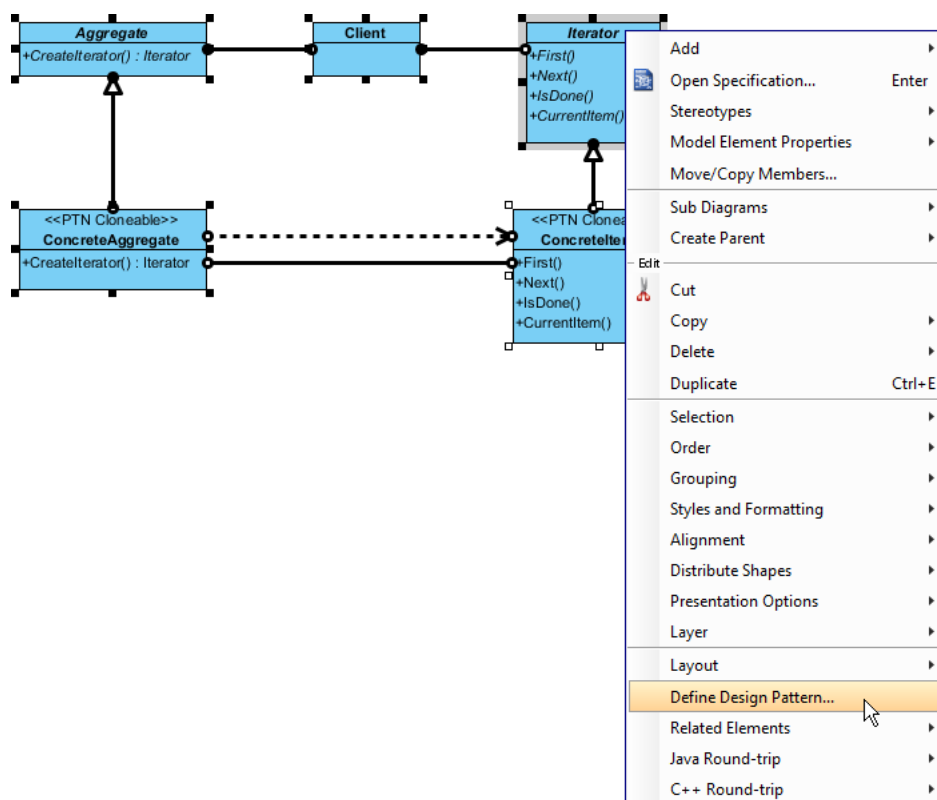


Defining a Pattern

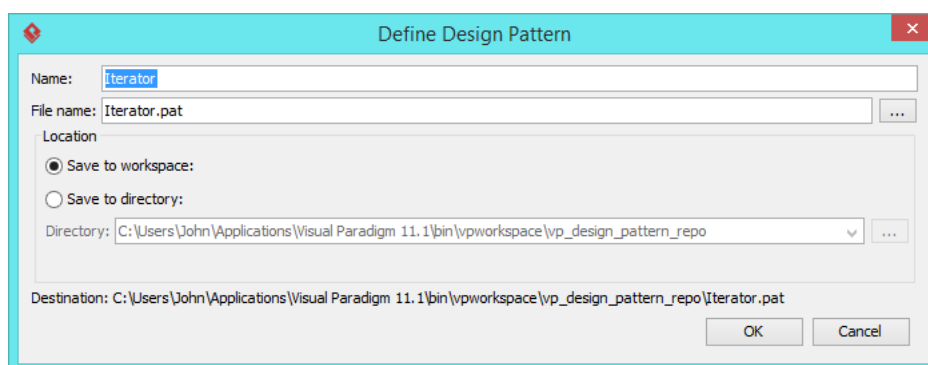
- Select all classes on the class diagram.



- Right-click on the selection and select **Define Design Pattern...** from the popup menu.



- In the **Define Design Pattern** dialog box, specify the pattern name *Iterator*. Keep the file name as is. Click **OK** to proceed.

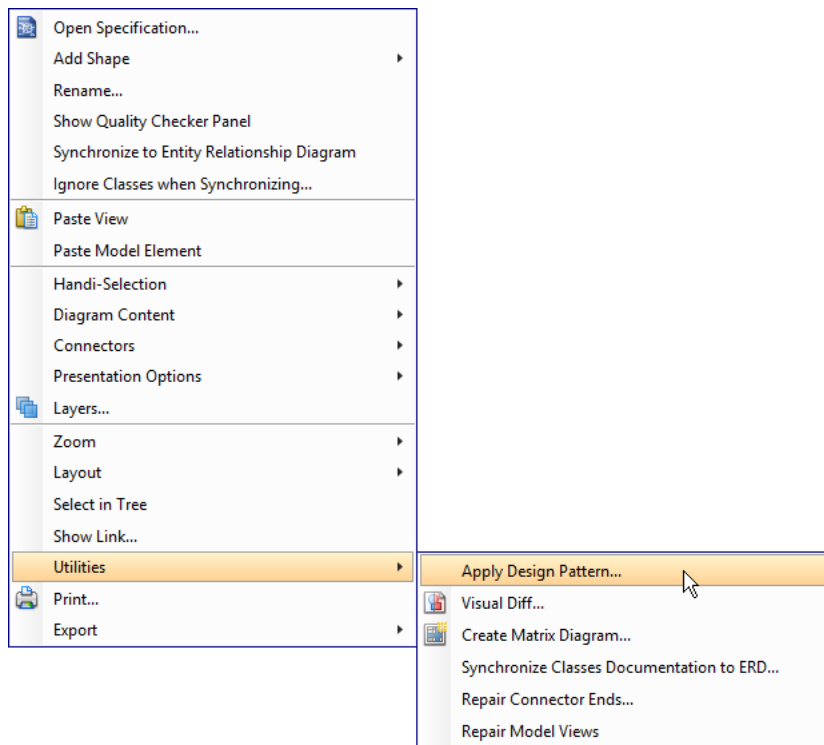


Applying a Design Pattern on a Class Diagram

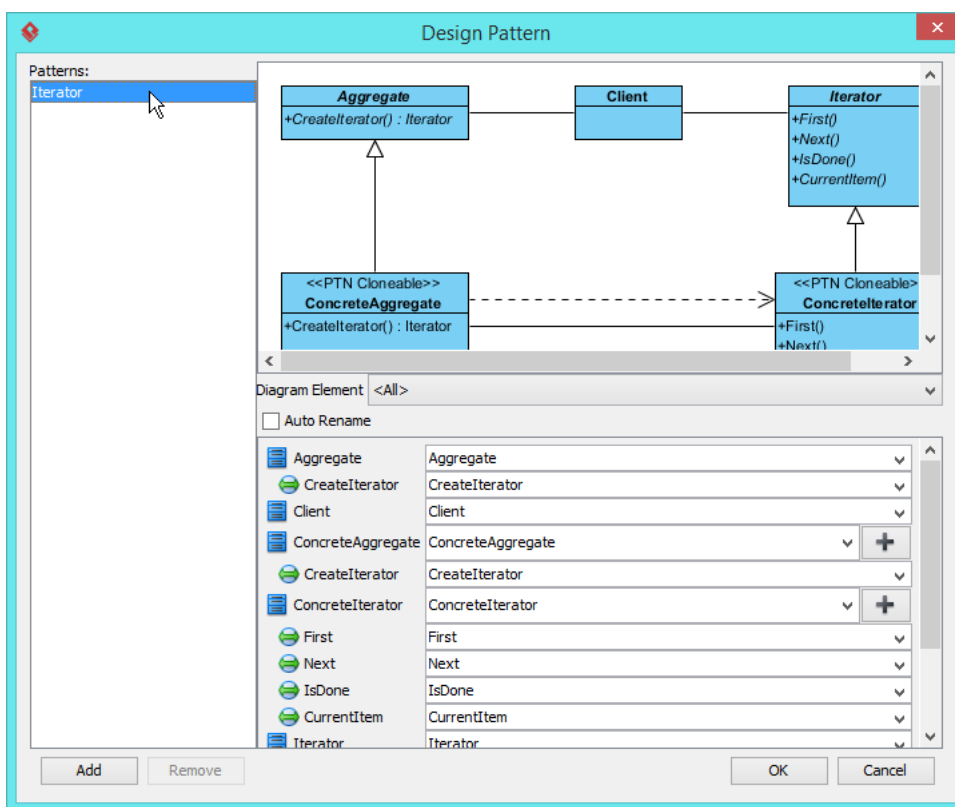
In this section, we are going to apply the iterator pattern to model the use of an iterator in a diagram editor.

- Create a new project *Diagram Editor*.
- Create a class diagram *Domain Model*.

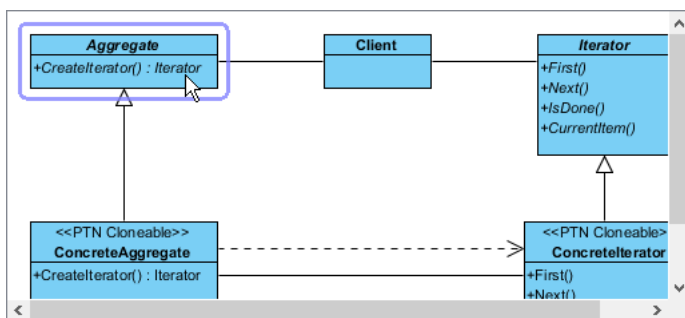
3. Right-click on the class diagram and select **Utilities > Apply Design Pattern...** from the popup menu.



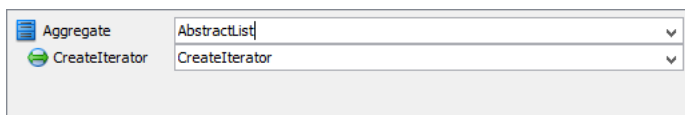
- In the **Design Pattern** dialog box, select *Iterator* from the list of patterns.



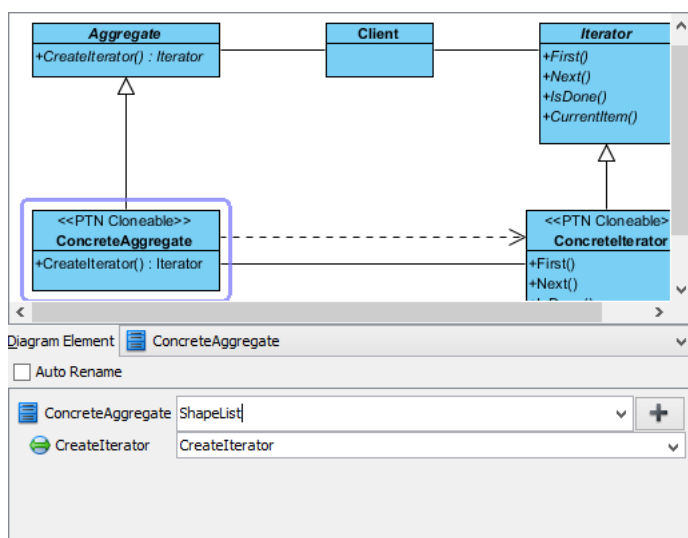
- Click on *Aggregate* in the overview.



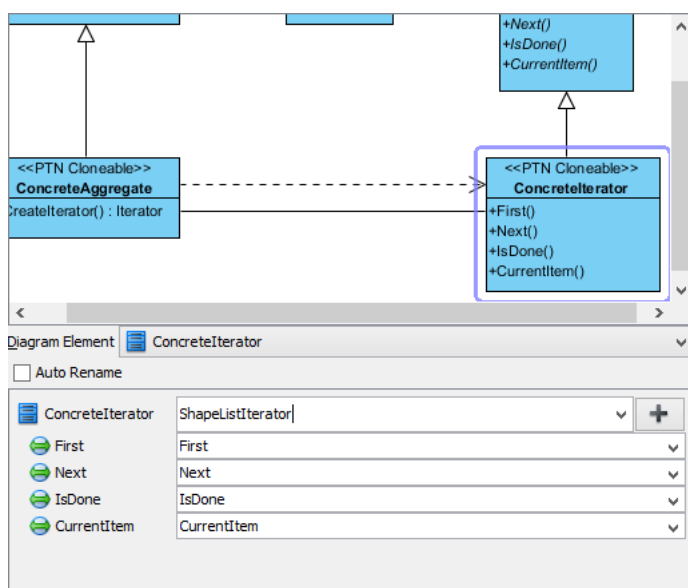
- Rename *Aggregate* to *AbstractList* at the bottom pane.



7. Select *ConcreteAggregate* in the overview, and rename it to *ShapeList* at the bottom pane.

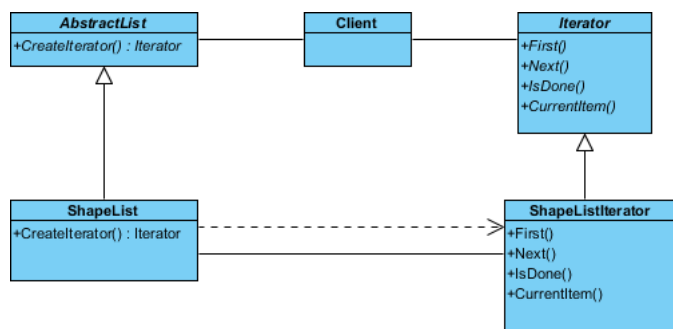


8. Select *ConcreteIterator* in the overview, and rename it to *ShapeListIterator* at the bottom pane.



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. [Iterator.pat](#)

Related Links

- [Full set of UML tools and UML diagrams](#)



Visual Paradigm home page
(<https://www.visual-paradigm.com/>)

Visual Paradigm tutorials
(<https://www.visual-paradigm.com/tutorials/>)