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

**Modeling Design Pattern with Class Diagram**

1. Create a new project *Design Patterns*.
2. Create a class diagram *Memento*.
3. Select **Class** from diagram toolbar. Click on diagram to create a class. Name it as *Originator*. 
4. Right-click on the *Originator* class, and select **Add > Operation** from the popup menu.

5. Name the operation *SetMemento(m : Memento).*

6. Repeat steps 4 and 5 to create operation *CreateMemento() : Memento.*

7. Right-click on the *Originator* class, and select **Add > Attribute** from the popup menu.

8. Name the attribute state.

9. Move the mouse cursor over the *Originator* class, and drag out **Dependency > Class** to create a dependent class *Memento.*

10. Create two operations in class *Memento: GetState*() and *SetState()*.

11. Create attribute state in class *Memento.*
12. Create a class **Caretaker** near class **Memento**.

13. Move the mouse cursor over the **Caretaker** class, and drag out **Aggregation > Class** to connect to **Memento**.

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

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**Applying Design Pattern on Class Diagram**

In this section, we will try to make use of the memento pattern to model a part of a sales ordering system, with regards to the state of sales order.

1. Create a new project **Order Processing System**.
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 **Memento** from the list of patterns.

5. At the bottom of pane, rename **Originator** and **Caretaker** to **Order** and **Transaction**.

6. Click **OK** to confirm editing and apply the pattern to diagram.
7. Tidy up the diagram. It should become:

```
<table>
<thead>
<tr>
<th>Originator</th>
<th>Memento</th>
<th>Transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>state</td>
<td>state</td>
<td></td>
</tr>
<tr>
<td>+GetMemento(): Memento()</td>
<td>+GetState()</td>
<td></td>
</tr>
<tr>
<td>+CreateMemento(): Memento()</td>
<td>+SetState()</td>
<td></td>
</tr>
</tbody>
</table>
```

Resources
1. Design Patterns.vpp
2. Memento.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/)