**CSE 5322 –002 Software Design Patterns – HomeWork-1 (1001874167)**

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**1.Domain Model Class Diagram (DMCD):**

**Chart, box and whisker chart

Description automatically generated**

**2. Expanded Use Case:**

UC1: Draw Shape:

**TUCBW** : User clicking on one of the buttons on the GUI.

**TUCEW**: User seeing the desired shape drawn at the location pressed, or the last operation undone or

redone.

\* = Nontrivial Step

|  |  |
| --- | --- |
| **Actor: USER** | **System: Paint Box** |
|  | 0. The Paint Box system display a canvas or drawing area and five buttons (Circle, Line, Box, Undo, Redo). |
| **1.TUCBW:**  The User  a**.** clicks on any of shapes button.  b. clicks on the undo/redo button. | \*2. a. The paint box system will set the shape of the state.  b. The paint box system will perform the undo/redo operation. |
| 3. The user clicks on the canvas area in the desired location to draw the shape. | **\***4 The Paint Box will draw shape has selected on the canvas. |
| 5. **TUCEW:** User sees the desired shape drawn at the location pressed, or the last operation undone or redone. |  |

**3. Non–Trivial Steps:**

The non trivial steps from above expanded use cases are given below:

**Step2:**

a. The paint box system will set the shape of the state.

b. The paint box system will perform the undo/redo operation.

**Step 4:**

The Paint Box will draw or perform the operation user has selected on the canvas.

**4. State Diagram:**

Init – state of initialization.

**Timeline

Description automatically generated**

**5. State Pattern:**

**Chart, box and whisker chart

Description automatically generated**

**6. Scenario Description:**

**1. Scenario Description for button click on the panel:**

1. User clicks on one of the desired buttons (Box, Circle, Line, Undo or Redo) on the Paint GUI.

2. The Paint GUI listens to the action performed by the user on the Paint GUI.

2.1 If the Circle button is clicked then,

2.1.1 Paint GUI will set the state to Circle on ShapeState.

2.2 If the Line button is clicked then,

2.2.1 Paint GUI will set the state to Line on ShapeState.

2.3 If the Box button is clicked then,

2.3.1 Paint GUI will set the state to Box on ShapeState.

2.4 If the Redo button is clicked then,

2.4.1 Paint GUI will call redo operation on the PaintGUI controller.

2.4.1.1 PaintGUI controller will call the redo operation on shape controller.

2.4.1.2 Shape Controller will execute the redo Command.

2.4.1.3 Redo Command will Draw the Shape Object.

2.4.1.4 Redo Command will return the undo List and redo List to Shape Controller.

2.5 If the Undo button is clicked then,

2.5.1 Paint GUI will call undo operation on the Paint GUI controller

2.5.1.1 PaintGUI controller will call the undo operation on shape controller.

2.5.1.2 Shape Controller will execute the undo Command.

2.5.1.3 Undo Command will remove the shape object.

2.5.1.4 Undo Command will return the undo list and redo list to Shape Controller.

**2. Scenario Description for drawing a shape on Canvas Click:**

1. User clicks on canvas at a desired location on Paint GUI using mouse pressed event.

2. The Paint GUI will call the handleButtonClick event on Paint GUI controller.

2.1. The paint GUI controller will get the state of the shape from ShapeState.

2.2 The Paint GUI controller will create the positions of mouse click on the Shape.

2.3 The Paint GUI controller will add shape using the Shape Controller.

2.4 The Paint GUI controller will call Draw operation on the Shape Controller.

2.4.1 If the shape to draw is line ,then

2.4.1.1 Shape Controller call draw method on the Line.

2.4.2 If the shape to draw is Circle then,

2.4.2.1 Shape Controller call draw method on the Circle.

2.5.3 If the shape to draw is Box,

2.5.3.1 Shape Controller will call draw method on Box.

**7. Scenario Tables:**

**1. Scenario Table for button click on the panel**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | Subject | Subject Action | Other Data/Objects | Object Acted Upon |
|  | User | Clicks | On buttons | Paint GUI |
|  | Paint GUI | Call | Action performed | Paint GUI |
| 2.1 | If Circle Button Clicked | | | |
| 2.1.1 | Paint GUI | Set | State | ShapeState |
| 2.2 | If Line Button Clicked | | | |
| 2.2.1 | PaintGUI | Set | State | ShapeState |
| 2.3 | If Box button is clicked |  |  |  |
| 2.3.1 | Paint GUI | Set | State | Shape |
| 2.4 | If Redo Button Clicked | | | |
| 2.4.1 | Paint GUI | Call redo operation |  | PaintGUI controller |
| 2.4.1.1 | Shape Controller | Execute |  | Redo Command |
| 2.4.1.2 | Redo Command | draw |  | Shape |
| 2.4.1.3 | Redo Command | Returns | undoList,redoList | Shape Controller |
| 2.4 | If Undo Button Clicked | | | |
| 2.4.1 | Paint GUI | Call undo operation |  | PaintGUI controller |
| 2.4.1.1 | Shape Controller | Execute |  | Undo Command |
| 2.4.1.2 | Undo Command | draw |  | Shape |
| 2.4.1.3 | Undo Command | Returns | undoList,redoList | Shape Controller |

**2.Scenario Table for drawing a shape on Canvas Click:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | Subject | Subject Action | Other Data/Objects | Object Acted Upon |
|  | User | Clicks | Desired location | Paint GUI |
|  | Paint GUI | Calls | handleButtonClick | Paint GUI controller |
| 2.1 | Paint Controller | Get | State of shape | ShapeState |
| 2.2 | Paint GUI controller | Create object | Mouse positions | Shape |
| 2.3 | Paint GUI controller | Adds | Shape | ShapeController |
| 2.4 | Paint GUI controller | Calls Draw operation |  | Shape Controller |
| 2.4.1 | If shape is Line | | | |
| 2.4.1.1 | ShapeController | Calls draw |  | Line |
| 2.4.2 | If shape is Circle | | | |
| 2.4.2.1 | Shape Controller | Calls draw |  | Circle |
| 2.4.3 | If shape is Box | | | |
| 2.4.3.1 | Shape Controller | Calls draw |  | Box |

**8. Informal Sequence Diagram:**

1. **Button click on the panel**

**Diagram, schematic

Description automatically generated**

1. **Informal Sequence Drawing a shape on Canvas Click:**

**Diagram, schematic

Description automatically generated**

**9. Design Sequence Diagram:**

1. **Button click on the panel**

**Diagram

Description automatically generated**

1. **Drawing a shape on Canvas Click:**

**Diagram

Description automatically generated**

**10. Design Class Diagram from Design Sequence Diagram:**

**Diagram

Description automatically generated**

**11. Code : Submitted in Zip file**

**12. Screenshots:**

(a) Adding a line, a circle and two boxes, and produce a screen shot to show the resulting window

1.Adding a Line:

Graphical user interface

Description automatically generated

2.Adding a circle:

Graphical user interface, application, Word

Description automatically generated

3. Adding 2 boxes:

Chart, box and whisker chart

Description automatically generated

(b) Clicking the Undo button three times, and produce a screen shot to show the resulting window.

1. Undo the First time:

Graphical user interface

Description automatically generated with medium confidence

2. Undo Second Time:

Graphical user interface, application, Word

Description automatically generated

3. Undo Third time:

Graphical user interface, chart, application

Description automatically generated

 (c) Clicking the Redo button two times and then add a box. Produce a screen shot to show the resulting window.

1.Redo First time:

A picture containing chart

Description automatically generated

2. Redo Second Time:

A picture containing diagram

Description automatically generated

1. Add a box:

Chart

Description automatically generated with low confidence