UML Class Diagram Editor Specification

v3.0

1 Problem Statement

Users require a tool with which they can easily and efficiently edit UML class diagrams.

2 System Personnel

2.1 Description of Users

Users should be familiar with UML, and have a need for designing a class diagram.

2.2 Description of System Developers

Development team will consist of 5 junior Java developers

- Kyle Hopkins
- Jared Mcandrews
- Jesse Platts
- Vincent Smith
- Vincent Viggiano

3 Operational Settings

3.1 Target Platforms

This program will run on various platforms through the Java Virtual Machine (JVM).

3.2 Required Software Environment

Mac, Windows, or Linux machines with JRE8u73 x64 installed and properly configured.

4 Functional Requirements

4.1 Functional Description

4.1.1 Feature List

- Add and delete class boxes and relationships from canvas
- choose from a variety of UML relationships that can be added to the canvas
- drag and drop as well as manipulate the size of class boxes
- drag and drop as well as manipulate the size and orientation of relationships
- label class boxes with class name, attributes, and methods
- draw relationship lines between classes
- Anchor relationships to class boxes
- Saving and loading files
- Save/load dialogue and file chooser
- Save jpeg of canvas region
- Undo/redo any action applied to the canvas
- Key bindings for file menu interactions and undo/redo

At the end of this iteration users should be able to select canvas interactions from a toolbox. When a button in the toolbox is clicked, it will add its respective component to the canvas. Components will float freely on the canvas, however classbox objects will be bound to the region within the canvas. In order to move a box on the canvas one must left click in the colored region of the classbox. In order to resize a box on the canvas one must right click in the colored mid to lower right region of the classbox and drag. In order to move a relationship line one must left click either endpoint of the line and drag. If the line endpoint is right-clicked and dragged, then the angle of the line will be changed. If either line endpoint is right-clicked and dragged, into the border of a class box, the relationship will be anchored to the class box. Given that the relationship has a symbol, then the endpoint is the furthest end of that symbol. In order to unanchor a relationship, the user must right click on the endpoint anchored to the class box, drag it into the border of the class box and once the class box is active the anchor can be dragged out of the class box border. In order to delete a classbox one must left click on the delete button in the toolbox and then left click on the classbox. In order to delete a relationship one must left click on the delete button in the toolbox and then left click on the relationship. In order to add text to the classbox, one must left click in the desired text field and type the desired text. Typing control and enter together will save the text that is entered for undo/redo. In order to save a file, click on File in the menu bar and select save or save as. In order to open a file, click on File in the menu bar and select open. In order to export as a jpeg, click on File in the menu bar and select Export as jpeg. In order to Undo or Redo an event click on Edit in the menu bar and select Undo or Redo.

4.2 User Interface

4.2.1 Overview

Users will interact primarily through mouse and keyboard. Mouse inputs will be used to process drag and drop events on elements of the diagram, as well to draw lines. Mouse events will also be used in selecting regions of class boxes in which text can be recorded.

4.2.2 Menus

- Menu bar - at this point this is primarily for easy onboarding since users are accustomed to having this bar. Will house information about our project as well as an option to exit the program and start a new diagram.
- Toolbox - for housing UML elements that a user may wish to use in their diagram.

4.2.3 Windows

- Primary window for collecting user interactions and displaying the editor’s view.
- Modals for displaying messages to the user

4.3 Use Cases

Scenario: Add Boxes
As a User
In order to add a class box
When I left-click add a class box
Then a new box should populate the canvas

Scenario: Remove Boxes
As a User
In order to delete a classbox
When I left-click the “Delete” button in the toolbox
Then, the color of the class boxes should change to red.
When I left-click on a classbox while it’s red
Then that classbox should be removed from the canvas
And the color of the remaining class boxes should return to grey.

Scenario: Move Box
As a User
In order to move a class box
When I left left-click on a class box’s grey border
And then I drag it
Then the box’s border should turn blue
And the box will move with the cursor for the duration of the travel and will remain in position after release of the left mouse button.

Scenario: Insert Box Attributes
As a User
In order to insert text to change information in a class box
When I click on one of the three text fields
And type with the keyboard the information that should be entered or changed
Then the text area will be updated with the newly entered text. If the user types control enter the update will be saved for undo/redo events.

Scenario: Resize Classbox
In order to resize a class box
When I right-click on a class box’s grey border in the mid to lower right region
And then I drag it
Then the box’s border should turn blue
And the box should be resized with the mouse.

Scenario: Add Relationship
As a User
In order to add a relationship to the canvas
When I left-click the add relationship button in the toolbox
Then a new relationship will be displayed on the canvas.

Scenario: Remove Relationships
As a User
In order to delete a relationship
When I left-click the “Delete” button in the toolbox
Then, the color of the relationships should change to red.
When I left-click on a relationship while it’s red
Then that relationship should be removed from the canvas
And the color of the remaining relationships should return to grey.

Scenario: Move Relationship
As a User
In order to move a relationship to another location on the canvas
When I left-click either endpoint of the relationship
And drag the mouse pointer to any other point visible on the canvas
Then the relationship will move with the cursor for the duration of the travel and will remain in position after release of the left mouse button.

Scenario: Modify Relationship
As a User
In order to change the size and positioning (of one of the endpoints) of a relationship
When I right-click either endpoint of the relationship
And drag the mouse pointer
Then the endpoint that was clicked will move with the cursor for the duration of the click
And the relationship will be modified accordingly.

Scenario: Anchor Relationship To Classbox
As a User
In order to anchor a relationship to a class box
When I right-click either endpoint of the relationship
And drag the mouse pointer to the border of a class box
Then the box's border should turn blue and an anchor will be set when the mouse button is released.

Scenario: Remove An Anchor From A Classbox
As a User
In order to remove an anchor from class box
When I right-click the endpoint of the relationship located on the border of the class box
And drag the mouse pointer to the border of a class box
Then the box's border should turn blue and the mouse can be dragged off of the border of the class box, and the anchor will be removed from the class box.

Scenario: Undo Action
As a User
In order to undo any action applied to an element canvas to the canvas
After at least one element has been added, removed, or manipulated on the canvas
When I left-click the undo button in the toolbox
Then a the most recent previous action will be displayed on the canvas.

Scenario: Redo Action
As a User
In order to redo any action applied to an element on the canvas
After there has been at least one action “undone” with the undo button
When I left-click the redo button in the toolbox
Then the last action undone will be reverted on the canvas.

Scenario: Save A File
As a User
In order to save a file
When I left-click the File text located in the menu bar
Then a drop down menu will be displayed from the menu bar
When I select save
Then a file will be saved in the root directory, if a file is already there then I will be presented with a confirmation prompt

Scenario: Save A File, Using File Chooser Dialogue
As a User
In order to save a file using a file chooser dialogue
When I left-click the File text located in the menu bar
Then a drop down menu will be displayed from the menu bar
When I select save as
Then I will be presented with a file chooser dialogue
When I enter a filename and folder path and click save
Then the file will be saved

Scenario: Export As Jpeg
As a User
In order to export as a jpeg
When I left-click the File text located in the menu bar
Then a drop down menu will be displayed from the menu bar
When I select Export as .jpeg
Then I will be presented with a file chooser dialogue
When I enter a filename and folder path and click save
Then the file will be saved

5 Non-Functional Requirements

5.1 Reliability

The program should not crash, and it should open and close cleanly.

5.2 Performance

Pretty good. Drag and drop should allow for smooth movement of the element across the canvas. Button press should add elements to the canvas near instantaneously.

5.3 Usability

Should be intuitive and not cause frustration.

5.4 Portability

Anyone who has the .jar of our project, and a properly configured environment as specified in section 3.2 should be able to run this program. The project should be as portable as java can make it.

6 Future Enhancements

- Set a minimum size to which windows can be shrunk
- Add confirmation modal to clear canvas
- Allow users to grab anywhere on a relationship to move it
- Improve process of adding/removing anchors
- Add grid background to canvas
- Add feature for taking notes
- Add cardinality feature
- Ability to use left clicking for most actions