Assignment A – 5

Aim:
Implement a calcuator employing XML storage.

Problem Statement:
Mobile App for Calculator having Trigonometry functionality is to be designed and tested. The data storage uses 1.text Files, 2. XML Use latest open source software modeling, Designing and testing tool/Scrum-it. Implement the design using HTML-5/Scala/ Python/Java/C++/Ruby on Rails. Perform Positive and Negative testing.

Learning Objective
1 Implementation of the problem statement using Object oriented programming.
2 Write test cases for Positive and Negative testing.

Theory
Introduction

Abstract Windowing Toolkit (AWT) is used for GUI programming in java.

Container:
The Container is a component in AWT that can contain another components like buttons, textfields, labels etc. The classes that extends Container class are known as container.

Window:
The window is the container that have no borders and menubars. You must use frame, dialog or another window for creating a window.

Panel:
The Panel is the container that doesn't contain title bar and MenuBars. It can have other components like button, textfield etc.

Frame:
The Frame is the container that contain title bar and can have MenuBars. It can have other components like button, textfield etc.

Commonly used methods of Component Class:
1)public void add(Component c)

2)public void setSize(int width,int height)
3)public void setLayout(LayoutManager m)
4)public void setVisible(boolean)

Creating a Frame: There are two ways to create a frame:

- By extending Frame class (inheritance)
- By creating the object of Frame class (association)

public void setBounds(int xaxis, int yaxis, int width, int height); have been used in the above example that sets the position of the button.

Changing the state of an object is known as an event. For example, click on button, dragging mouse etc. The java.awt.event package provides many event classes and Listener interfaces for event handling.

Event classes and Listener interfaces:

Event Classes	**Listener Interfaces**
ActionEvent	ActionListener
MouseEvent	MouseListener MouseMotionListener
MouseWheelEvent	MouseWheelListener
KeyEvent	KeyListener
ItemEvent	ItemListener
TextEvent	TextListener
AdjustmentEvent	AdjustmentListener
WindowEvent	WindowListener
ComponentEvent	ComponentListener
ContainerEvent	ContainerListener
FocusEvent	FocusListener

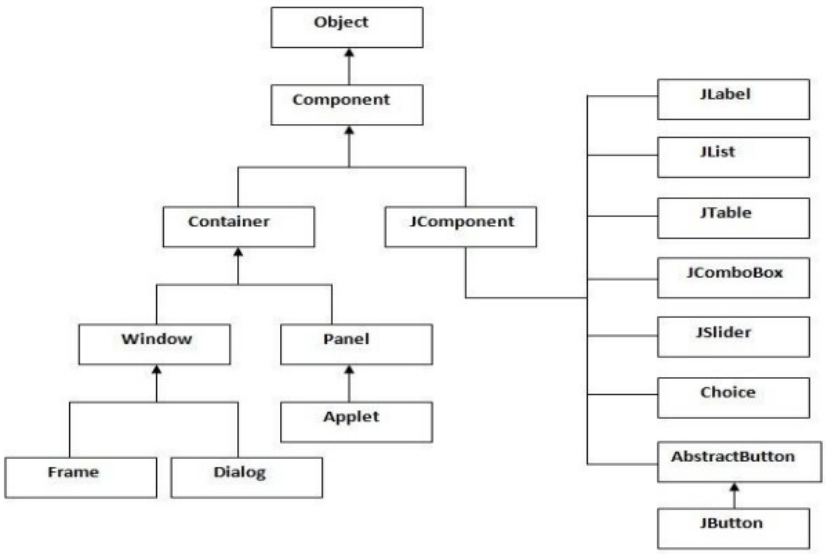
Steps to perform event handling:
Implement the Listener interface and overrides its methods. Register the component with the Listener:

- Swing is a part of JFC (Java Foundation Classes) that is used to create GUI application. It is built on the top of Swing is a part of JFC (Java Foundation Classes) that is used to create GUI application. It is built on the top of AWT and entirely written in java.

Advantages of using Swing over JWT

- There are many advantages of Swing over AWT. They are as follows:
  - Swing components are Plateform independent & It is lightweight.
  - It supports pluggable look and feel.
  - It has more powerful componenets like tables, lists, scroll panes, color chooser, tabbed pane etc.
  - It follows MVC (Model View Controller) architecture.
  - **What is JFC ?** - The Java Foundation Classes (JFC) are a set of GUI components

which simplify the development of desktop applications.



Basic Operational Test Cases:

- Check the calculator if it starts by specific means like from searching for calculator in search bar and then executing application. Or by accessing menu item in the Windows.
- Check if the calculator window maximizes to certain window size.
- Check the if the calculator closes when the close button is pressed or if the exit menu is clicked from file > exit option.
- Check if the help document is accessed from Help > Documentation.
- Check if the calculator allows copy and paste functionality.
- Check if the calculator has any specific preferences.
- Check if all the numbers are working (0 to 9) Check if the arithmetic keys (+, -, *, %, /) are working.
- Check if the clear key is working.
- Check if the brackets keys are working.
- Check if the sum or equal key is working.
- Check if the square and square root key is working.

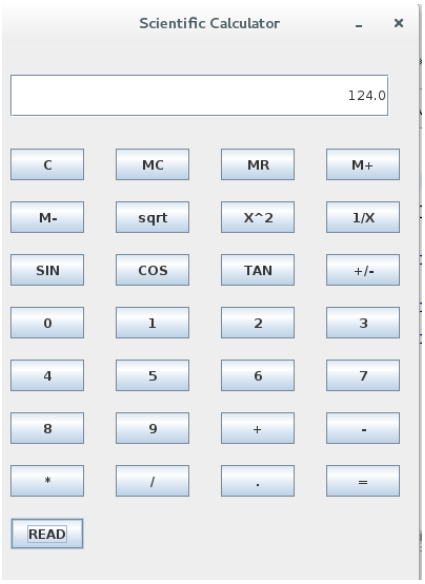
Functionality Test Cases

- Check the addition of two integer numbers.
- Check the addition of two negative numbers.
- Check the addition of one positive and one negative number.
- Check the subtraction of two integer numbers.
- Check the subtraction of two negative numbers.
- Check the subtraction of one negative and one positive number.
- Check the multiplication of two integer numbers.
- Check the multiplication of two negative numbers.
- Check the multiplication of one negative and one positive number.
- Check the division of two integer numbers.

Conclusion

Scientific calculator employing XML storage has been successfully implemented.

Output



Mathematical Model

Let, S be the System Such that,
S= {I, F, O, success}
Where,
I = Input
O = Output
F = Functions

Input:

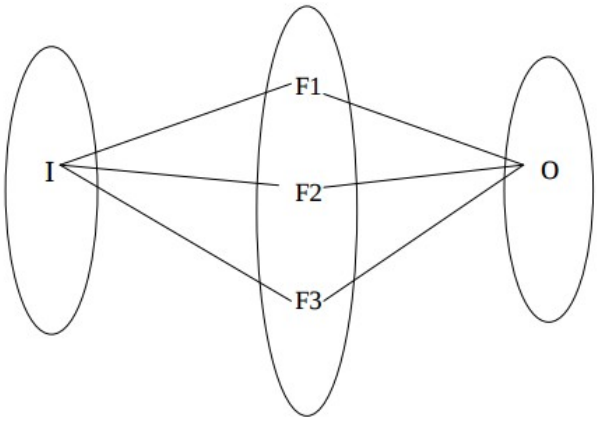
I=set of numbers (decimal, float)

Function:

F1=Arithmetic Operation
F2= Trigonometric Operation
F3= Logarithmic Operation

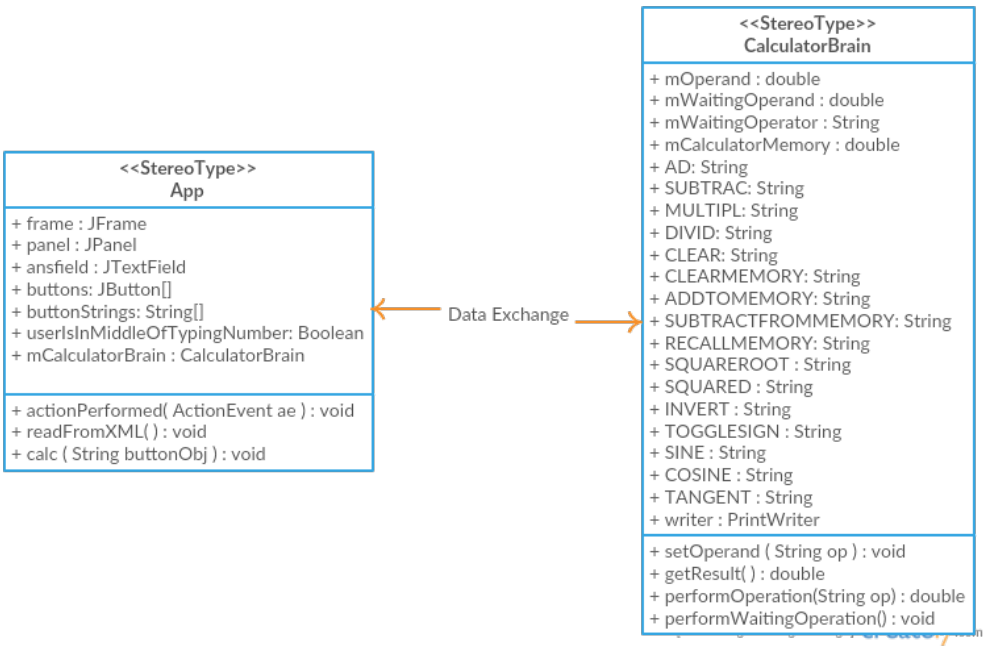
Output:

O=Success Case: operation is performed.

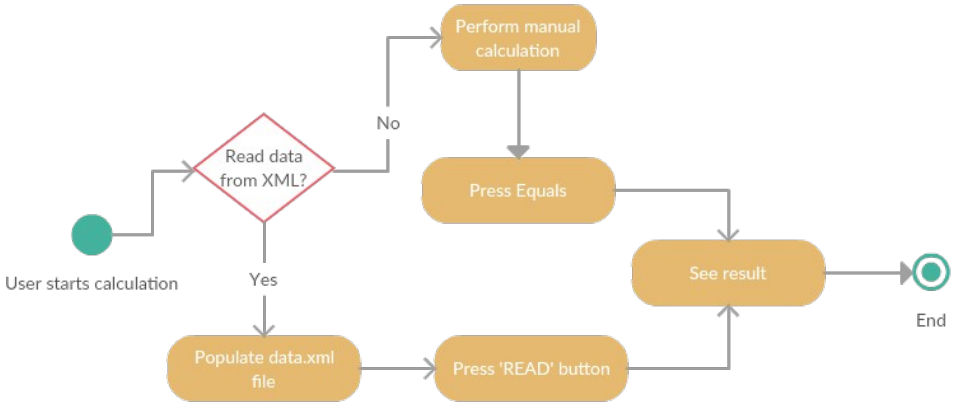


UML Diagrams

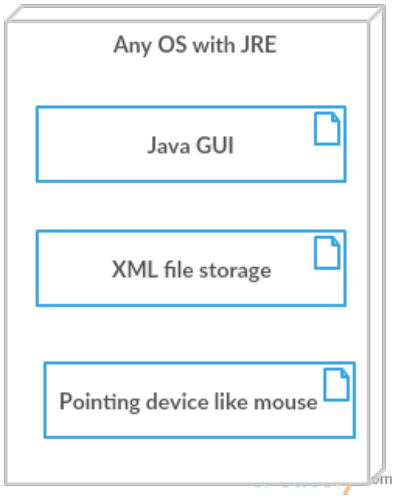
Class diagram



Activity Diagram



Deployment Diagram



Use Case diagram