Vidyavardhini's College of Engineering and Technology

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Implement a program on Applet or AWT Controls
Date of Performance:
Date of Submission:

Aim: Implement a program on Applet or AWT Controls

Objective:

To develop application like Calculator, Games, Animation using AWT Controls.

Theory:

Java AWT (Abstract Window Toolkit) is an API to develop Graphical User Interface (GUI) or windows-based applications in Java.

Java AWT components are platform-dependent i.e. components are displayed according to the view of operating system. AWT is heavy weight i.e. its components are using the resources of underlying operating system (OS). The java.awt package provides classes for AWT API such as TextField, Label, TextArea,
RadioButton, CheckBox, Choice, List etc.

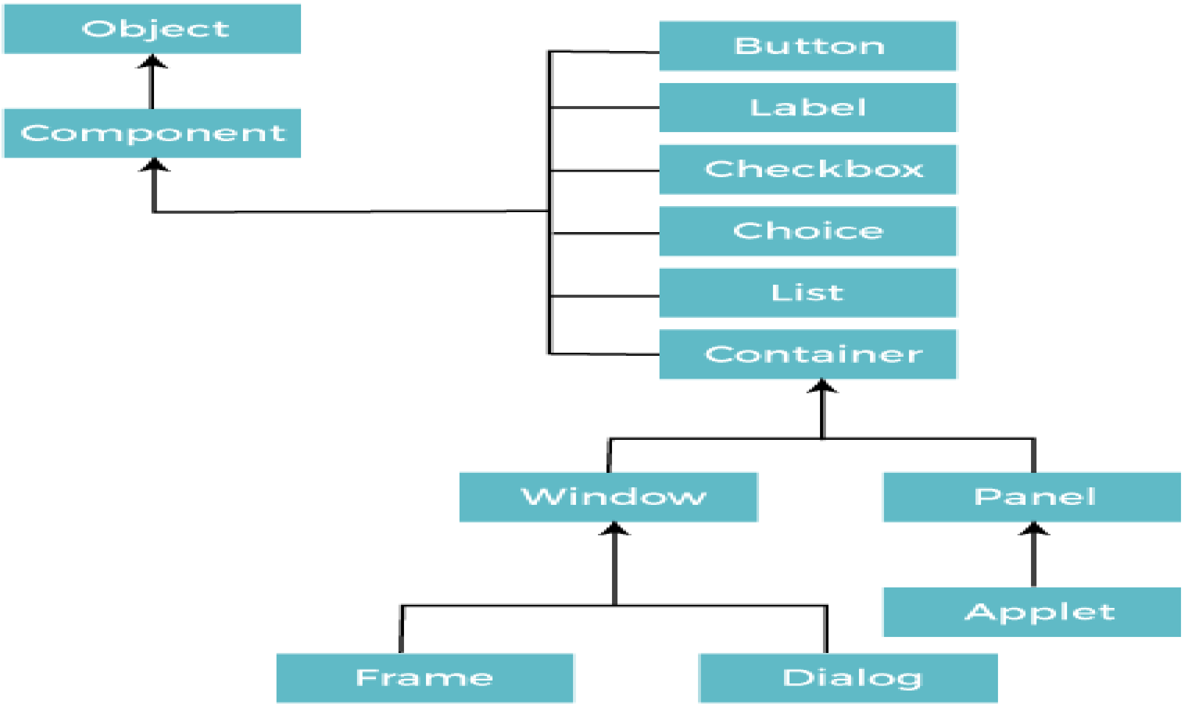
1. A general interface between Java and the native system, used for windowing, events and layout managers. This API is at the core of Java GUI programming and is also used by Swing and Java 2D. It contains the interface between the native windowing system and the Java application1.
2. A basic set of GUI widgets such as buttons, text boxes, and menus1. AWT also provides Graphics and imaging tools, such as shape, color, and font classes2. AWT also avails layout managers which helps in increasing the flexibility of the window layouts2

Java AWT calls the native platform calls the native platform (operating systems) subroutine for creating API components like TextField, ChechBox, button, etc.

For example, an AWT GUI with components like TextField, label and button will have different look and feel for the different platforms like Windows, MAC OS, and Unix. The reason for this is the platforms have different view for their native components and AWT directly calls the native subroutine that creates those components.

In simple words, an AWT application will look like a windows application in Windows OS whereas it will look like a Mac application in the MAC OS.

Java AWT Hierarchy



Code:

```
import java.awt.*;
import java.awt.event.*;

public class SimpleCalculator extends Frame implements ActionListener {
```

```
// Declaring AWT controls (components)
TextField tf1, tf2, tfResult;
Label label1, label2, label3;
Button btnAdd, btnSub, btnMul, btnDiv, btnClear;

// Constructor to set up the GUI
public SimpleCalculator() {
   // Setting layout and title
   setLayout(new FlowLayout());
   setTitle("Simple Calculator");

   // Creating components
   label1 = new Label("First Number: ");
   tf1 = new TextField(10);

   label2 = new Label("Second Number: ");
   tf2 = new TextField(10);

   label3 = new Label("Result: ");
   tfResult = new TextField(10);
   tfResult.setEditable(false);  // Result should not be editable

   // Creating buttons for operations
   btnAdd = new Button("+");
   btnSub = new Button("-");
   btnMul = new Button("*");
   btnDiv = new Button("/");
   btnClear = new Button("Clear");

   // Adding components to the frame
   add(label1); add(tf1);
```

```
    add(label2); add(tf2);
    add(label3); add(tfResult);
    add(btnAdd); add(btnSub); add(btnMul); add(btnDiv); add(btnClear);

    // Adding ActionListener to buttons
    btnAdd.addActionListener(this);
    btnSub.addActionListener(this);
    btnMul.addActionListener(this);
    btnDiv.addActionListener(this);
    btnClear.addActionListener(this);

    // Setting size of frame and visibility
    setSize(300, 300);
    setVisible(true);

    // Adding window listener to close the window
    addWindowListener(new WindowAdapter() {
        public void windowClosing(WindowEvent we) {
            dispose();
        }
    });
}

// ActionListener method to handle button clicks
public void actionPerformed(ActionEvent e) {
    try {
        // Retrieving numbers from text fields
        int num1 = Integer.parseInt(tf1.getText());
        int num2 = Integer.parseInt(tf2.getText());
        int result = 0;
```

```
            // Checking which button was clicked
            if (e.getSource() == btnAdd) {
                result = num1 + num2;
            } else if (e.getSource() == btnSub) {
                result = num1 - num2;
            } else if (e.getSource() == btnMul) {
                result = num1 * num2;
            } else if (e.getSource() == btnDiv) {
                result = num1 / num2;
            } else if (e.getSource() == btnClear) {
                // Clearing all text fields
                tf1.setText("");
                tf2.setText("");
                tfResult.setText("");
                return;
            }
            // Setting the result to the result text field
            tfResult.setText(String.valueOf(result));
        } catch (NumberFormatException ex) {
            tfResult.setText("Invalid Input");
        } catch (ArithmeticException ex) {
            tfResult.setText("Cannot divide by 0");
        }
    }

    // Main method to run the calculator
    public static void main(String[] args) {
        new SimpleCalculator();
    }
}
```

Conclusion:

Comment on application development using AWT Controls.