**WEEK 1 TASKS**

**TASK 1 :-** Create a basic calculator application in Java.

**PROGRAM :-**

Import javax.swing.\*;

Import java.awt.\*;

Import java.awt.event.ActionEvent;

Import java.awt.event.ActionListener;

Public class BasicCalculatorGUI extends JFrame {

Private JTextField numField1;

Private JTextField numField2;

Private JButton addButton;

Private JButton subtractButton;

Private JButton multiplyButton;

Private JButton divideButton;

Private JLabel resultLabel;

Public BasicCalculatorGUI() {

setTitle(“Basic Calculator”);

setSize(300, 200);

setDefaultCloseOperation(EXIT\_ON\_CLOSE);

JPanel panel = new JPanel();

Panel.setLayout(new GridLayout(5, 2));

numField1 = new JTextField();

numField2 = new JTextField();

addButton = new JButton(“+”);

subtractButton = new JButton(“-“);

multiplyButton = new JButton(“\*”);

divideButton = new JButton(“/”);

resultLabel = new JLabel(“Result: “);

addButton.addActionListener(new ActionListener() {

public void actionPerformed(ActionEvent e) {

performOperation(‘+’);

}

});

subtractButton.addActionListener(new ActionListener() {

public void actionPerformed(ActionEvent e) {

performOperation(‘-‘);

}

});

multiplyButton.addActionListener(new ActionListener() {

public void actionPerformed(ActionEvent e) {

performOperation(‘\*’);

}

});

divideButton.addActionListener(new ActionListener() {

public void actionPerformed(ActionEvent e) {

performOperation(‘/’);

}

});

Panel.add(new JLabel(“Number 1:”));

Panel.add(numField1);

Panel.add(new JLabel(“Number 2:”));

Panel.add(numField2);

Panel.add(addButton);

Panel.add(subtractButton);

Panel.add(multiplyButton);

Panel.add(divideButton);

Panel.add(resultLabel);

Add(panel);

}

Private void performOperation(char operation) {

Try {

Double num1 = Double.parseDouble(numField1.getText());

Double num2 = Double.parseDouble(numField2.getText());

Double result = 0.0;

Switch (operation) {

Case ‘+’:

Result = num1 + num2;

Break;

Case ‘-‘:

Result = num1 – num2;

Break;

Case ‘\*’:

Result = num1 \* num2;

Break;

Case ‘/’:

If (num2 != 0) {

Result = num1 / num2;

} else {

resultLabel.setText(“Result: Error (Division by zero)”);

return;

}

Break;

}

resultLabel.setText(“Result: “ + result);

} catch (NumberFormatException e) {

resultLabel.setText(“Result: Invalid input”);

}

}

Public static void main(String[] args) {

SwingUtilities.invokeLater(new Runnable() {

Public void run() {

BasicCalculatorGUI calculator = new BasicCalculatorGUI();

Calculator.setVisible(true);

}

}); } }

**Code Explanation :-**

* This Java program creates a basic calculator GUI using Swing.
* It extends the `JFrame` class, defining text fields, buttons, and labels for number input, operation buttons, and result display.
* The `performOperation` method calculates the result based on the selected operation and updates the result label.
* The calculator handles addition, subtraction, multiplication, and division, including division by zero error handling.
* The GUI layout is organized using a `GridLayout` with 5 rows and 2 columns.
* Action listeners are added to the operation buttons, triggering the corresponding calculation when pressed.
* The main method initiates the GUI in the event dispatch thread for Swing using `SwingUtilities.invokeLater`.
* It sets up a window with a title, size, and close operation.
* User input is parsed as doubles, and exceptions, such as invalid input or division by zero, are handled.
* The result is displayed dynamically on the GUI as the user interacts with the calculator.

**TASK 2 :-** Develop a simple number guessing game in Java.

**PROGRAM :-**

Import java.util.Random;

Import java.util.Scanner;

Public class NumberGuessingGame {

Public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

Random random = new Random();

Int lowerBound = 1;

Int upperBound = 100;

Int numberToGuess = random.nextInt(upperBound – lowerBound + 1) + lowerBound;

Int numberOfTries = 0;

Boolean hasGuessedCorrectly = false;

System.out.println(“Welcome to the Number Guessing Game!”);

System.out.println(“I have selected a number between “ + lowerBound + “ and “ + upperBound + “. Try to guess it.”);

While (!hasGuessedCorrectly) {

System.out.print(“Enter your guess: “);

Int userGuess = scanner.nextInt();

numberOfTries++;

if (userGuess < lowerBound || userGuess > upperBound) {

System.out.println(“Please guess a number between “ + lowerBound + “ and “ + upperBound + “.”);

} else if (userGuess < numberToGuess) {

System.out.println(“Too low! Try again.”);

} else if (userGuess > numberToGuess) {

System.out.println(“Too high! Try again.”);

} else {

hasGuessedCorrectly = true;

System.out.println(“Congratulations! You’ve guessed the number “ + numberToGuess + “ in “ + numberOfTries + “ tries.”);

}

}

Scanner.close(); } }

**Code Explanation :-**

* The Java program implements a simple number guessing game.
* It uses `Scanner` for user input and `Random` for generating a random number.
* The game’s target number is between 1 and 100, inclusive.
* User guesses are compared to the random number, providing hints if too high or too low.
* The game continues until the user correctly guesses the number.
* Input validation ensures guesses within the specified range.
* The program tracks the number of attempts (`numberOfTries`).
* The game congratulates the user upon a correct guess, displaying the number and attempts.
* The loop continues until the correct guess is made, controlled by `hasGuessedCorrectly`.
* The program closes the scanner to release resources after the game ends.