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Java Lab Project
String Calculator using JAVA FX

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Project Description:

My String calculator will take inputs a mathematical expression like (2+3/5) and the output of the expression above will be 2.6.

Description of Front-end: There are 3 labels named Title, Input and Output. Again, 2 text fields one for taking input and another for showing output. There are 2 buttons one for doing the calculation and showing output and the other button is used to clear the text fields.

Description of Back-end: I have separated the string into smaller parts and solve then.

There is a small function named math to solve 2 double numbers and one given operator and return one double.

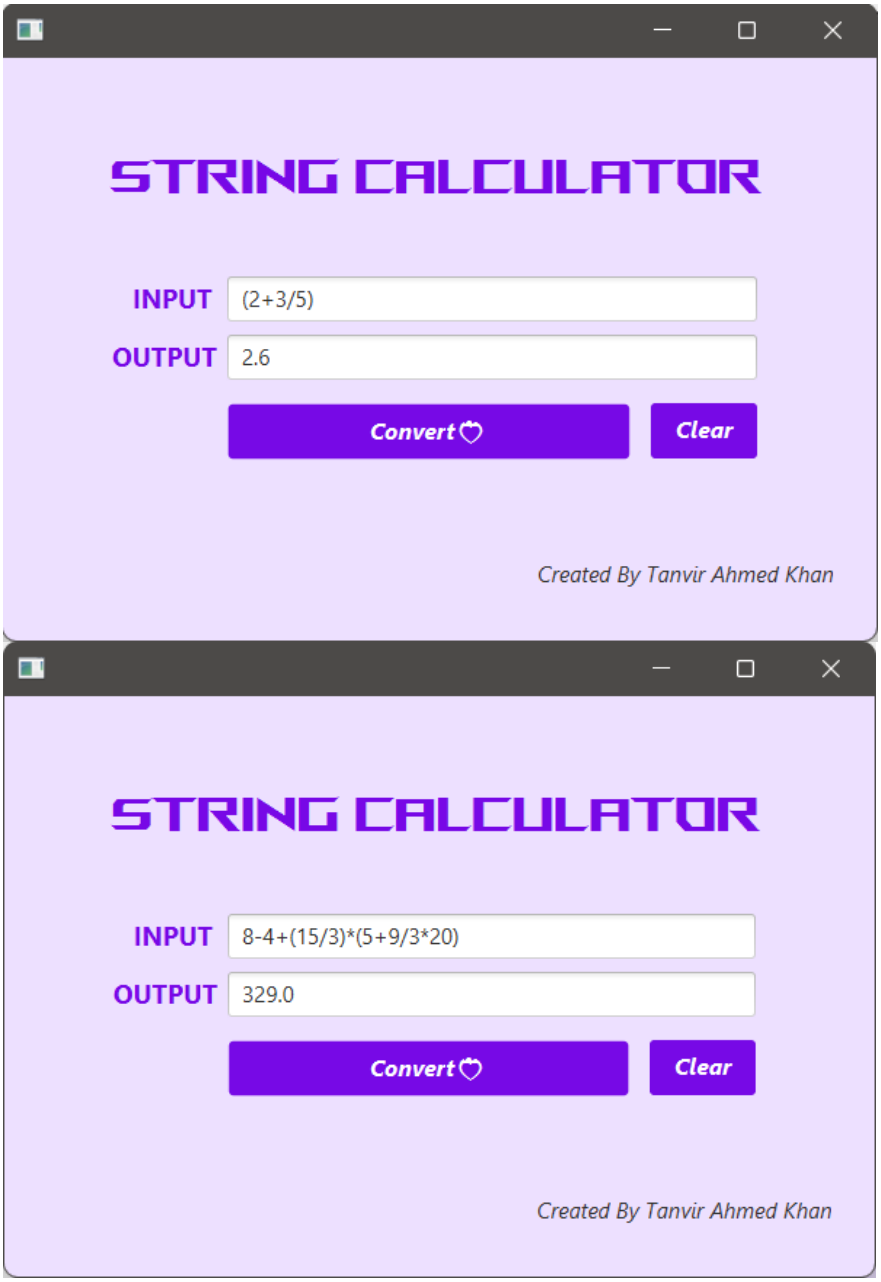
There are 2 same size array one for storing the double numbers and another for marking the operators with numbers.

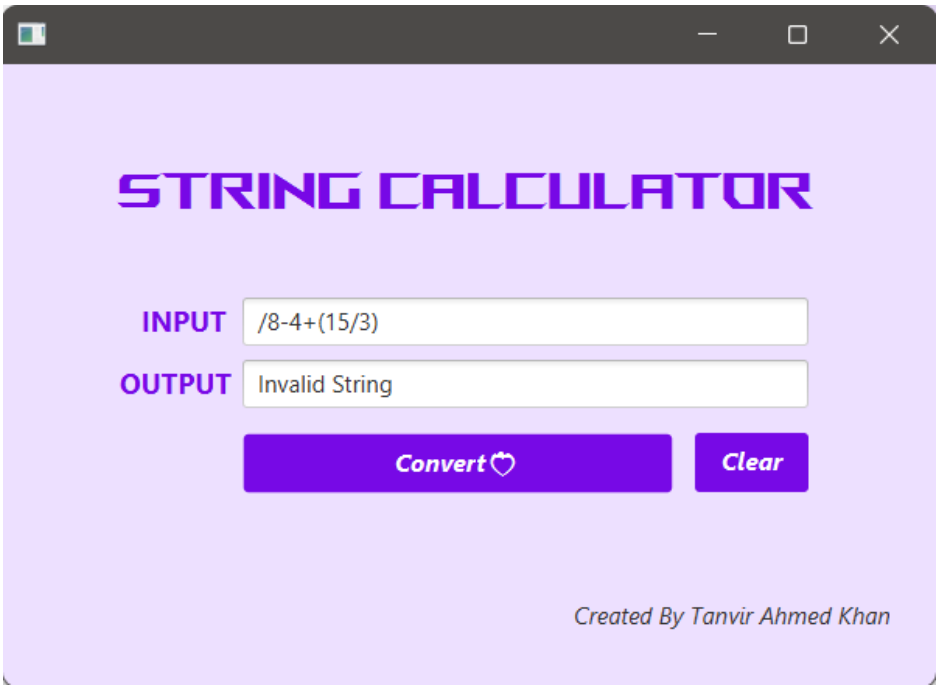
There is a function name calculate, it takes mathematical expression as strings but without the brackets. Then it converts the strings to number and operator array. After that according to the precedence it calculates the numbers and store the answer at the first index of the array and returns the answer as string.

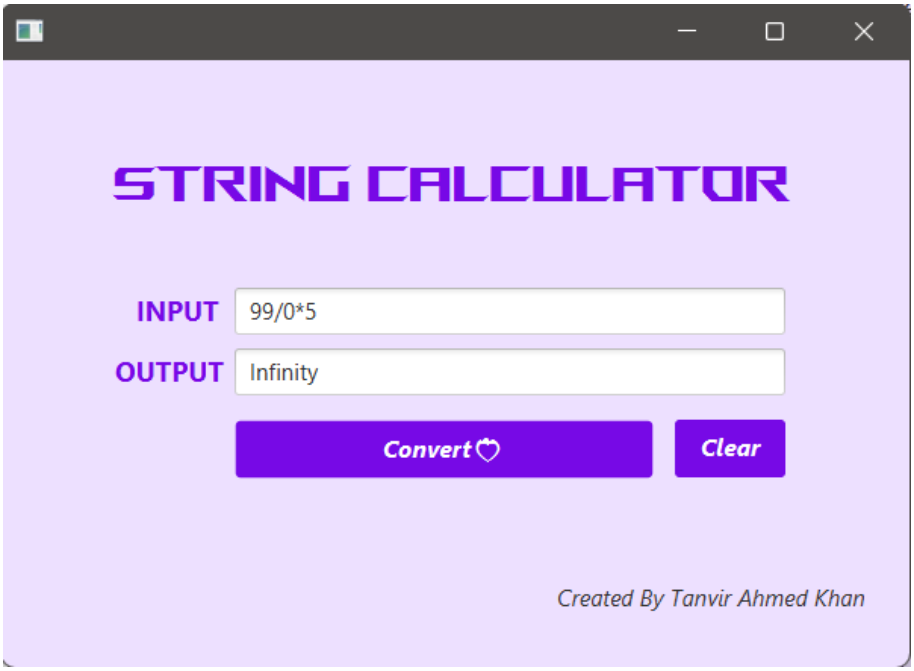
There is another function named calculateWithBrackets. This function takes input with brackets and make separation of the strings from the bracket precedence wise and pass that string to the calculate function without brackets and solve them one by one. It considers the whole string inside another bracket and solve them precisely.

Finally, we take the input from the input text field and check with the special string and validity of the mathematical expression. Next according to the rules, it shows the ID, answer and errors to the output text field area.

Screen Shots:




STRING CALCULATOR
INPUT
/8-4+(15/3)
OUTPUT
Invalid String
Convert
Clear
Created By Tanvir Ahmed Khan


STRING CALCULATOR
INPUT
99/0*5
OUTPUT
Infinity
Convert
Clear
Created By Tanvir Ahmed Khan

CODE:

FXML FILE:

```
<?xml version="1.0" encoding="UTF-8"?>

<?import javafx.scene.paint.*?>
<?import javafx.scene.text.*?>
<?import javafx.scene.control.*?>
<?import java.lang.*?>
<?import javafx.scene.layout.*?>

<AnchorPane maxHeight="-Infinity" maxWidth="-Infinity" minHeight="-Infinity" minWidth="-Infinity" prefHeight="400.0" prefWidth="600.0" style="-fx-background-color: #ede0ff;" xmlns="http://javafx.com/javafx/8" xmlns:fx="http://javafx.com/fxml/1" fx:controller="calculatorbytanvir.FXMLDocumentController">
  <children>
    <TextField fx:id="input" layoutX="154.0" layoutY="150.0" prefHeight="31.0" prefWidth="364.0" promptText="Enter Your Mathmetical Expression" />
    <TextField fx:id="output" layoutX="154.0" layoutY="190.0" prefHeight="31.0" prefWidth="364.0" promptText="Converted Expression" />
    <Label layoutX="89.0" layoutY="152.0" prefHeight="21.0" prefWidth="73.0" text="INPUT   " textFill="#7709e6">
      <font>
        <Font name="System Bold" size="18.0" />
      </font>
    </Label>
    <Label layoutX="75.0" layoutY="192.0" text="OUTPUT  " textFill="#7709e6">
      <font>
        <Font name="System Bold" size="18.0" />
      </font>
    </Label>
    <Button fx:id="convertbtn" layoutX="155.0" layoutY="238.0" mnemonicParsing="false" onAction="#convert" prefHeight="37.0" prefWidth="275.0" style="-fx-background-color: #7709e6;" text="Convert ♡ " textFill="WHITE">
      <font>
        <Font name="System Bold Italic" size="16.0" />
      </font>
    </Button>
    <Label layoutX="73.0" layoutY="57.0" prefHeight="49.0" prefWidth="451.0" style="-fx-effect: #00ff44;" text="String Calculator" textFill="#7709e6">
      <font>
        <Font name="ROGFonts-Regular" size="33.0" />
      </font>
    </Label>
```

```
    <Button fx:id="ClearBTN" layoutX="445.0" layoutY="237.0" mnemonicParsing="false"
onAction="#clearbtn" prefHeight="37.0" prefWidth="73.0" style="-fx-background-color: #7709e6;"
text="Clear" textFill="WHITE">
      <font>
        <Font name="System Bold Italic" size="16.0" />
      </font>
    </Button>
    <Label layoutX="367.0" layoutY="345.0" text="Created By Tanvir Ahmed Khan">
      <font>
        <Font name="Segoe UI Italic" size="15.0" />
      </font>
    </Label>
  </children>
</AnchorPane>
```

CalculatorByTanvir.Java File:

```
package calculatorbytanvir;

import java.net.URL;
import java.util.ResourceBundle;
import javafx.event.ActionEvent;
import javafx.fxml.FXML;
import javafx.fxml.Initializable;
import javafx.scene.control.Button;
import javafx.scene.control.TextField;

public class FXMLDocumentController implements Initializable {
    @FXML
    private TextField input;
    @FXML
    private TextField output;
    @FXML
    private Button convertbtn;
    @FXML
    private Button ClearBTN;

    @Override
    public void initialize(URL url, ResourceBundle rb) {
        // TODO
    }

    static double math(double num1, double num2, int op){
        switch(op){
```

```
        case 1: return num1/num2;
        case 2: return num1*num2;
        case 3: return num1-num2;
        case 4: return num1+num2;
    }
    return 0;
}

static String calculate(String inp){
    String op = "/*-+";
    double a=0,b=0;
    double ans[] = new double[500];
    int operator[] = new int[500];
    int ptr = 0,idx=0;
    for(int i=1;i<inp.length();i++){
        for(int j=0;j<op.length();j++){
            if(op.charAt(j)==inp.charAt(i)){
                ans[idx] = Double.parseDouble(inp.substring(ptr,i));
                operator[idx+1] = j+1;
                idx++;
                ptr=i+1;
            }
        }
    }
    ans[idx] = Double.parseDouble(inp.substring(ptr));
    idx++;
    for(int j=1;j<=4;j++){
        boolean tanvir = false;
        for(int i=0;i<idx;i++){
            if(operator[i]==j){
                tanvir = true;
                ans[i-1]=math(ans[i-1],ans[i],j);
                for(int k=i;k<idx-1;k++){
                    double temp = ans[k];
                    ans[k] = ans[k+1];
                    ans[k+1] = temp;

                    int t = operator[k];
                    operator[k]=operator[k+1];
                    operator[k+1]=t;
                }
                idx--;
                i=0;
                if(idx<0) break;
            }
```

```
            }
            if(tanvir) j--;
        }

        return String.valueOf(ans[0]);
    }

    // Separating the String inside brackets and calculating them first using the
cal function
    static String calculateWithBrackets(String inp ){

        inp = "("+inp+")";

        while(inp.contains("(")){
            String ans = "";
            int ptr1=0,ptr2=0;
            for(int i=0;i<inp.length();i++){
                if(inp.charAt(i)=='('){
                    ptr1=i+1;
                }
                if(inp.charAt(i)==')'){
                    ptr2=i; break;
                }
            }
            String temp = calculate(inp.substring(ptr1,ptr2));
            ans = inp.substring(0,ptr1-1) + temp +
inp.substring(ptr2+1);
            inp = ans;
        }
        return inp;
    }

    @FXML
    private void convert(ActionEvent event) {

        String inp = input.getText();
        String valid ="0123456789+-/*()";
        String dataInput = inp;
        String answer = "";
        boolean f = false,v =true,c=true;

        try{
            for(int i=0;i<inp.length();i++){
                f = false;
                for(int j=0;j<valid.length();j++){
```

```
                    if(inp.charAt(i)==valid.charAt(j)) f = true;
                }
                if(!f){
                    v=false; break;
                }
            }
            answer = calculateWithBrackets(inp);
        }
        catch(Exception e){
            c = false;
            System.out.println(e);
            System.out.println("Errors");
        }
        finally{
            if(inp.equals("id")) output.setText("20203036");
            else if(v && c) output.setText(answer);
            else output.setText("Invalid String");
        }
    }
    @FXML
    private void clearbtn(ActionEvent event) {
        input.setText(null);
        output.setText(null);
    }
}
```

FXMLController.java File:

```
package calculatorbytanvir;

import javafx.application.Application;
import javafx.fxml.FXMLLoader;
import javafx.scene.Parent;
import javafx.scene.Scene;
import javafx.stage.Stage;

public class CalculatorByTanvir extends Application {

    @Override
    public void start(Stage stage) throws Exception {
        Parent root =
FXMLLoader.load(getClass().getResource("FXMLDocument.fxml"));

        Scene scene = new Scene(root);

        stage.setScene(scene);
        stage.show();
    }
    public static void main(String[] args) {
        launch(args);
    }

}
```