Assignment questions Mastering java 8

Problem Statement 2:

Enhance the calculator program to enable users to incorporate variables within their expressions, extend support for advanced mathematical operations including square roots, exponentiation, and trigonometric functions through JShell, and implement a history feature for users to recall and reevaluate prior expressions.

Example:

```
public static void main(String[] args) {
        JShell jshell = JShell.create();
        Scanner scanner = new Scanner(System.in);
        String input;
        while (true) {
            input = scanner.nextLine().trim();
            if (input.equalsIgnoreCase("exit")) { break; }
             // Handle variables and advanced functions
            // Evaluate expressions using JShell
            // Store results and expressions in a history data structure
            // Implement error handling for invalid input
            if (input.equals("history")) { // Show previous expressions and their results } }
        jshell.close();
        }
}
```

```java
import jdk.jshell.*;
import java.util.Map;
import java.util.Scanner;
import java.util.TreeMap;

public class Calculator {
    public static void main(String[] args) {
        Map<String, String> history = new TreeMap<>();
        // Create JShell instance
        try (JShell jShell = JShell.create();
             Scanner scanner = new Scanner(System.in)) {

            System.out.println("Welcome to the JShell Calculator!");
            System.out.println("Enter a mathematical expression (e.g., 2 + 2) \n
or type 'exit' to quit. or type 'history' to get previous calculations");
            System.out.println("Type 'history/his' to view previously evaluated
expressions.");

            // Loop to continuously prompt user for input
            while (true) {
```

```
                // Prompt the user to input a mathematical expression
                System.out.print("Please enter a mathematical expression: ");
                String input = scanner.nextLine();

                // Check if the user wants to exit
                if (input.equalsIgnoreCase("exit")) {
                    break;
                }

                // Check if the user wants to see history
                if (input.contains("his")) {
                    if (history.isEmpty()) {
                        System.out.println("No history available yet.");
                    } else {
                        System.out.println("Calculation History:");
                        history.forEach((expression, result) ->
                            System.out.println(expression + " = " + result));
                    }
                    continue;
                }

                // Evaluate the expression in JShell
                try {
                    Iterable<SnippetEvent> events = jShell.eval(input);
                    // Process the result
                    boolean resultDisplayed = false;
                    for (SnippetEvent event : events) {
                        if (event.status() == Snippet.Status.VALID) {
                            String result = event.value();

                            if (result != null) {
                              history.put(input, result); // Store in history
                                System.out.println("Result: " + result);
                                resultDisplayed = true;
                            } else {
                              history.put(input, "invalid"); // Store in history
                                System.out.println("Expression is valid but has
no result.");
                            }
                        }
                    }
                    // If no result is displayed, handle as invalid input
                    if (!resultDisplayed) {
                        System.out.println("Invalid expression. Please try
again.");
                    }
                } catch (Exception e) {
                    System.out.println("Error evaluating expression. Please try
again.");
                }
            }
            System.out.println("Thank you for using JShell Calculator.
Goodbye!");
        }
    }
}
```