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A Report

on

Scientific Calculator

4TD2A G18

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Scientific Calculator

Objective

1. Mathematical Functionality: The scientific calculator should be able to perform standard arithmetic operations such as addition, subtraction, multiplication, and division, as well as advanced mathematical operations such as square root, exponentiation, trigonometric functions (sine, cosine, tangent), logarithmic functions, and other scientific calculations.

2. **User-friendly Interface:** The calculator should have a user-friendly interface that allows users to input numbers and operations easily, and display the results in a clear and understandable format. The interface should be intuitive and easy to use, with buttons or other elements for each function.

Technology Used in Project Development

1. Java SE (Standard Edition): Java SE is the core Java platform that provides the basic libraries and APIs for building Java applications. It includes the Java Development Kit (JDK) for developing Java applications, which includes the Java compiler, runtime environment, and libraries.

2. Swing GUI (Graphical User Interface): Swing is a Java GUI toolkit that provides a set of classes and components for building desktop applications with a graphical user interface. It can be used to create the user interface for the scientific calculator, including buttons, labels, text fields, and other GUI elements.

3. Math Libraries: Java provides built-in math libraries such as java.lang.Math, which includes various math functions like square root, exponentiation, trigonometric functions, logarithmic functions, and others. These libraries can be used to perform the scientific calculations required in the calculator.

Functional Modules

1. User Interface (UI) Module: This module is responsible for creating and managing the graphical user interface (GUI) of the calculator. It includes components such as buttons, labels, text fields, and other GUI elements for user input and output. It handles user interactions and passes user input to the appropriate modules for processing.

2. Math Operations Module: This module performs the mathematical calculations required in the calculator. It includes functions for standard arithmetic operations (addition, subtraction, multiplication, division), as well as advanced mathematical operations such as square root, exponentiation, trigonometric functions, logarithmic functions, and others. It implements the actual logic for performing these calculations.

Advantages

➢ Accuracy: A scientific calculator is designed to perform calculations with high precision and accuracy, which is crucial for tasks that require precise calculations. It eliminates the risk of human error in manual calculations, reducing the chances of mistakes and ensuring accurate results.

➢ Efficiency: A scientific calculator allows for efficient and fast calculations, saving time and effort compared to manual calculations. It can handle complex mathematical operations, such as logarithms, exponentials, trigonometric functions, and more, quickly and accurately, making it a valuable tool for tasks that involve repetitive or time-consuming calculations.

➢ Flexibility: A scientific calculator allows for flexibility in terms of input and output options. It can accept various types of input, such as numerical values, variables, equations, and expressions, and provide output in different formats, including decimal, fraction, or scientific notation, depending on the user's preference or requirements.

➢ Problem-solving: A scientific calculator can help in solving complex problems that require mathematical calculations, such as equations, systems of equations, matrices, vectors, and more. It can save time and effort in solving these problems, providing accurate results and facilitating decision-making.
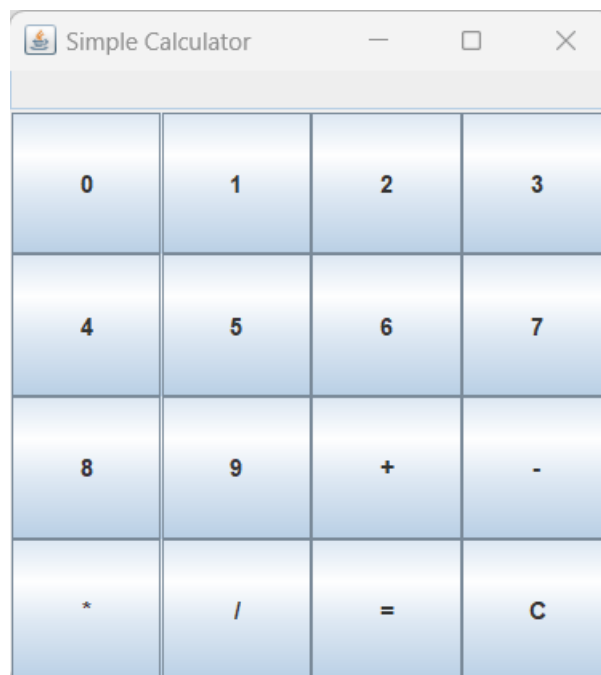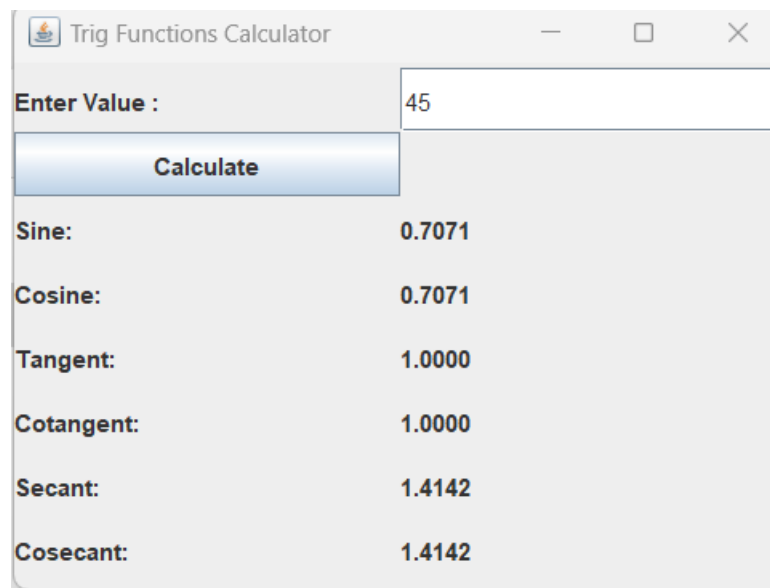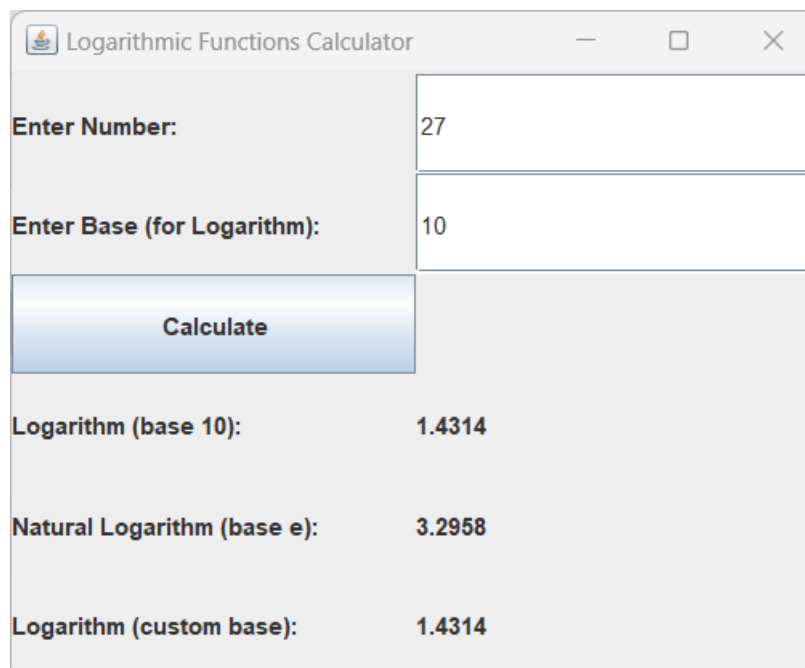
Screenshots

Figure 1: Simple Functions
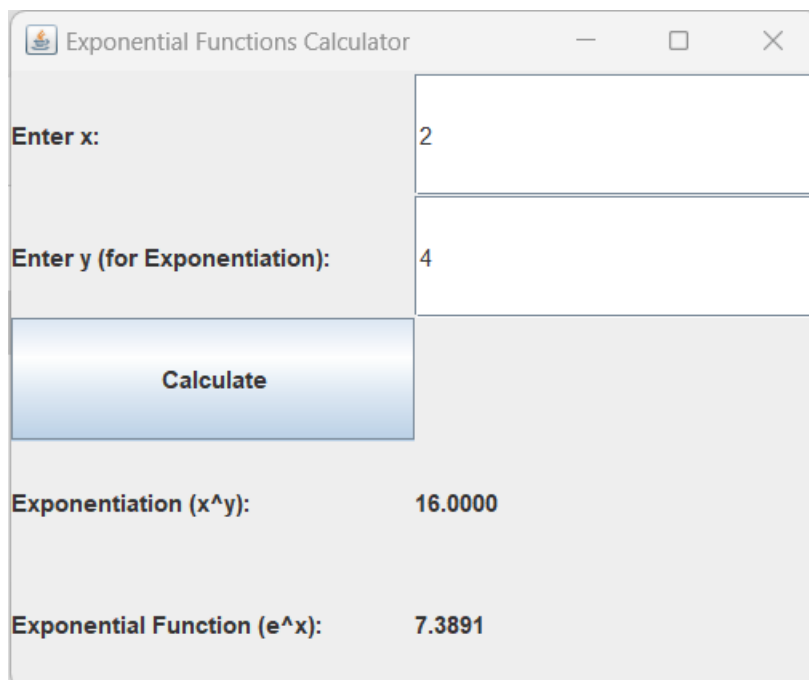
Figure 2: Trigonometry Functions

Figure 3: Logarithmic Functions

Figure 4: Exponential Functions

Figure 5: Math Functions

References

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