**Title: Calculator**

**Synopsis:**

Introduction:

The project aims to develop a versatile calculator application that provides essential arithmetic operations in a user-friendly interface. The calculator will be designed for ease of use across multiple platforms, catering to both basic and advanced user needs.

Objective:

The primary objective of this project is to create a reliable and intuitive calculator application that supports standard arithmetic operations (addition, subtraction, multiplication, division) along with additional functionalities such as memory operations, percentage calculations, and scientific functions (e.g., square root, exponentiation).

Scope:

The calculator application will be developed as a standalone desktop application using Java Swing for the graphical user interface. It will run on Windows, macOS, and Linux operating systems. The project will focus on implementing core calculator functionalities while ensuring a responsive and error-free user experience.

Features:

* Basic arithmetic operations: Addition, subtraction, multiplication, division.
* Additional operations: Square root, percentage, exponentiation.
* Memory functions: Store, recall, and clear memory values.
* User interface elements: Number buttons, operator buttons, clear button, memory buttons.
* Error handling: Division by zero, input validation.

Implementation:

The application will be implemented using object-oriented principles in Java. It will follow a modular design to ensure code reusability and maintainability. The UI will be designed using Java Swing components for a consistent and intuitive user experience.

Testing:

Testing will include unit testing of arithmetic operations and other functions, integration testing of the complete calculator application, and usability testing to ensure the interface meets user expectations. Testing will be conducted on multiple platforms to ensure compatibility.

Conclusion:

The successful completion of this project will result in a robust calculator application that meets the needs of both casual users and professionals requiring a reliable tool for everyday calculations.

Future Enhancements:

Future enhancements could include adding more advanced mathematical functions (trigonometric, logarithmic), supporting different numeral systems (binary, hexadecimal), and optimizing the UI for mobile platform.