Project Report: Calculator Application

1. Introduction

The Calculator project is a simple yet essential software application designed to perform basic arithmetic operations such as addition, subtraction, multiplication, and division. The purpose of this project is to understand the fundamentals of user interface design, event handling, and logical implementation of mathematical operations.

This project is developed using **HTML, CSS, and JavaScript** (or any language you used), and can be executed directly in a web browser without requiring external libraries or dependencies.

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2. Objectives

- To design and implement a functional calculator with a user-friendly interface.
- To understand event handling in programming.
- To provide accurate results for basic mathematical operations.
- To enhance problem-solving and logical thinking skills.

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3. System Requirements

Hardware Requirements:

- Processor: Minimum 1 GHz
- RAM: 2 GB or higher
- Storage: 100 MB free space
- Monitor: Minimum 1024x768 resolution

Software Requirements:

- Operating System: Windows / Linux / macOS
- Tools: Any text editor (VS Code, Sublime, Notepad++)
- Browser: Chrome, Edge, or Firefox (latest version)

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4. Technologies Used

- **Frontend**: HTML, CSS

- **Logic/Functionality**: JavaScript
- **Platform**: Web browser

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5. System Design

The Calculator consists of:

- **Input Section**: Buttons for digits (0-9) and operators (+, −, ×, ÷).
- **Display Section**: Shows the entered values and results.
- **Logic Layer**: Handles calculations when the user clicks buttons.

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6. Implementation

Features:

- User-friendly graphical interface.
- Supports addition, subtraction, multiplication, and division.
- Clear button to reset input.
- Error handling for invalid inputs (e.g., division by zero).

Sample Code Snippet (JavaScript):

```
function calculate() {
  let expression = document.getElementById("display").value;
  try {
    document.getElementById("display").value = eval(expression);
  } catch (e) {
    alert("Invalid Input");
  }
}
```

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7. Testing

The calculator was tested with different types of inputs:

- **Normal cases**: 12 + 8 = 20
- **Edge cases**: 5 ÷ 0 → Error handling
- **Continuous operations**: 10 + 5 − 3 × 2 = 14

All results matched expected outcomes.

8. Applications

- Used for basic daily arithmetic calculations.
- Can be extended to support scientific calculations (square root, exponentiation, trigonometry).
- Useful for students learning programming concepts.

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9. Advantages

- Lightweight and fast.
- Simple and easy to use.
- Works on any platform with a browser.

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10. Limitations

- Limited to basic arithmetic operations.
- No memory function (M+, M−, MR).
- Requires extension for scientific or advanced functions.

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11. Future Scope

- Implement advanced operations (square root, logarithms, trigonometry).
- Add themes (dark/light mode).
- Mobile app version for Android/iOS.
- Voice-based input for accessibility.

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12. Conclusion

The Calculator project successfully demonstrates the use of HTML, CSS, and JavaScript in building an interactive application. It helped in understanding UI design, event-driven programming, and handling user inputs. The project can be further enhanced into a scientific calculator or integrated into larger applications.

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13. References

- Mozilla Developer Network (MDN) Documentation
- W3Schools Tutorials
- JavaScript.info
