Project: Calculator

MICRO IT PROJECT

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Introduction

- This Calculator project is a web-based application that enables users to perform arithmetic and scientific calculations through an interactive and visually appealing interface.
- It was developed to strengthen skills in HTML, CSS, and JavaScript while understanding UI/UX design, event handling, and functional programming.

Objective of the Project

- Understand client-side scripting through JavaScript.
- Implement advanced calculator functions like power, factorial, trigonometry, and square root.
- Enhance HTML/CSS skills for UI design.
- Build a responsive and usable calculator for educational or practical purposes.

Tools and Technologies Used

- Frontend: HTML5, CSS3
- Scripting: JavaScript
- IDE: Visual Studio Code
- Browser: Google Chrome

System Design and Architecture

- Flow: User clicks a button → input is displayed → script processes the expression → result is shown.
- Display Area: Shows current expression or result.
- Grid of Buttons: Digits, operators, and scientific functions.

User Interface Features

- Clean, modern calculator layout
- Button hover effects
- Highlighted equals and operation keys
- Responsive centered design

Implementation Details

1. Logic: JavaScript functions for evaluation, factorials, power, sin/cos/tan with degree conversion.

2. Event Handling: Buttons trigger JS functions like appendToResult(), calculateResult(), etc.

3. Code Highlights:

- Expression parsing
- Dynamic function calling (Function(...))
- Edge-case handling (e.g., divide by zero, overflow)

Challenges Faced

- Handling complex nested expressions
- Implementing power operator parsing (^ → Math.pow)
- Converting angles from degrees to radians for trigonometry
- Overflow and input validation

Learning Outcomes

- Practical understanding of client-side development
- Mastery over DOM manipulation and inline event handling
- Enhanced debugging and logic structuring skills
- Clean UI/UX development using CSS

Conclusion

- This calculator project was a rich learning experience in full-stack frontend development.
- It enhanced both my programming logic and design skills.
- The final product is a feature-rich, user-friendly calculator.

Future Scope

- Add memory functions (M+, M-, MR)
- Implement history of calculations
- Support for dark/light theme toggle
- Mobile responsiveness with adaptive layout