Project: Simple Calculator using ATmega32

This project demonstrates a basic calculator built with the ATmega32 microcontroller.

It supports four main operations: addition, subtraction, multiplication, and division.

Components used:

- ATmega32 Microcontroller
- 16x2 LCD Display
- 4x4 Matrix Keypad
- Resistors and a potentiometer for LCD contrast
- Jumper wires and breadboard (or Proteus for simulation)

How it works:

1. The user enters the first number using the keypad.
2. Selects the desired operation (+, -, *, /).
3. Enters the second number.
4. Presses '=' to display the result on the LCD.
5. A clear button can reset the screen.

LCD & Keypad Connection:

- LCD connected in 4-bit mode to Port C (D4-D7, RS, E).
- Keypad connected to Port D (rows and columns).
- RW pin of LCD is tied to GND.
- Microcontroller clock set to 8 MHz.

Software:

- Custom LCD driver: LCD.c, LCD.h, LCD_CFG.h
- Custom Keypad driver: KEYPAD.c, KEYPAD.h, KEYPAD_CFG.h
- Macros used for pin definitions for clarity and easy changes.
- Modular design for code reusability.

Simulation:

- Implemented in Proteus to test all calculator functions.
- Displays my name in Arabic on the LCD as a bonus feature.
- Handles division by zero with an error message.