Project 4
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In our project we developed a digital voltmeter using the ATMega32 microcontroller. The voltmeter uses a keypad for input and an LCD for displaying the voltage readings. Teh primary objective was to create a functional voltmeter capable of taking analog-to-digital samples and displaying the instantaneous, maximum, minimum, and average voltage values.

The circuit is built around the ATMega32 microcontroller, which is connected to the keypad which serves as the user interface for controlling the voltmeter. The LCD displays the status and voltage reading. Finally the analog input is connected to the ADC channels of the microcontroller to read voltage values. In our program we have programmed the keypad to control the voltmeter based on specific buttons that are pressed. If key 1 is pressed then it resets all the voltage readings to '----' and stops sampling. Key 2 toggles the sampling of voltage readings on and off. Finally, key 3 toggles between normal sampling mode and differential mode (the difference between the two ADC channels).

The main components of our C program include initialization in which we set up the ADC, LCD, and the keypad. The keypad scanning, which detects which key is pressed. ADC sampling which reads the voltage values from the ADC channels at regular intervals of 500 ms (we are assuming our code will take 50 ms to process and then wait for 450 ms). Finally the display updates all values of current, minimum, and average voltage readings.