Embedded Systems Report
DAY 5
ADC Interfacing

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Learning Objective:

- The primary objective of this project is to understand how to interface an Analog-to-Digital Converter (ADC) with a 8051 microcontroller, and to read the digital output from the ADC.

Input and Output:

Input:

- Analog signals from a potentiometer (represented as RV2 in the circuit diagram).
- Control signals from the microcontroller to the ADC to start the conversion process and read the data.

Output:

- Digital representation of the analog signal displayed using LEDs.
- Converted digital value stored in a variable (ADC_Value) in the microcontroller.

Logic:

- The microcontroller ports are initialized to communicate with the ADC.
- Specific pins of the microcontroller (P2.4, P2.5, P2.6, and P2.7) are designated to control the ADC and read its output.
- The ADC receives an analog signal from the potentiometer.
- Control signals are sent from the microcontroller to initiate the conversion process (ALE = 1, SC = 1).
- A delay is introduced (MSDelay) to ensure the ADC has sufficient time to convert the analog signal to a digital value.
- Reading ADC Output:
- Once the conversion is complete (EOC = 1), the microcontroller reads the digital output from the ADC.
- The output is stored in the ADC_Value variable.
- This digital value is then used to drive the LEDs to provide a visual indication of the analog input level.
- The main loop continuously sets the address bits (ADDR_A, ADDR_B, ADDR_C) to select the ADC channel.
- The ADC conversion process is repeated, and the results are read and displayed continuously.

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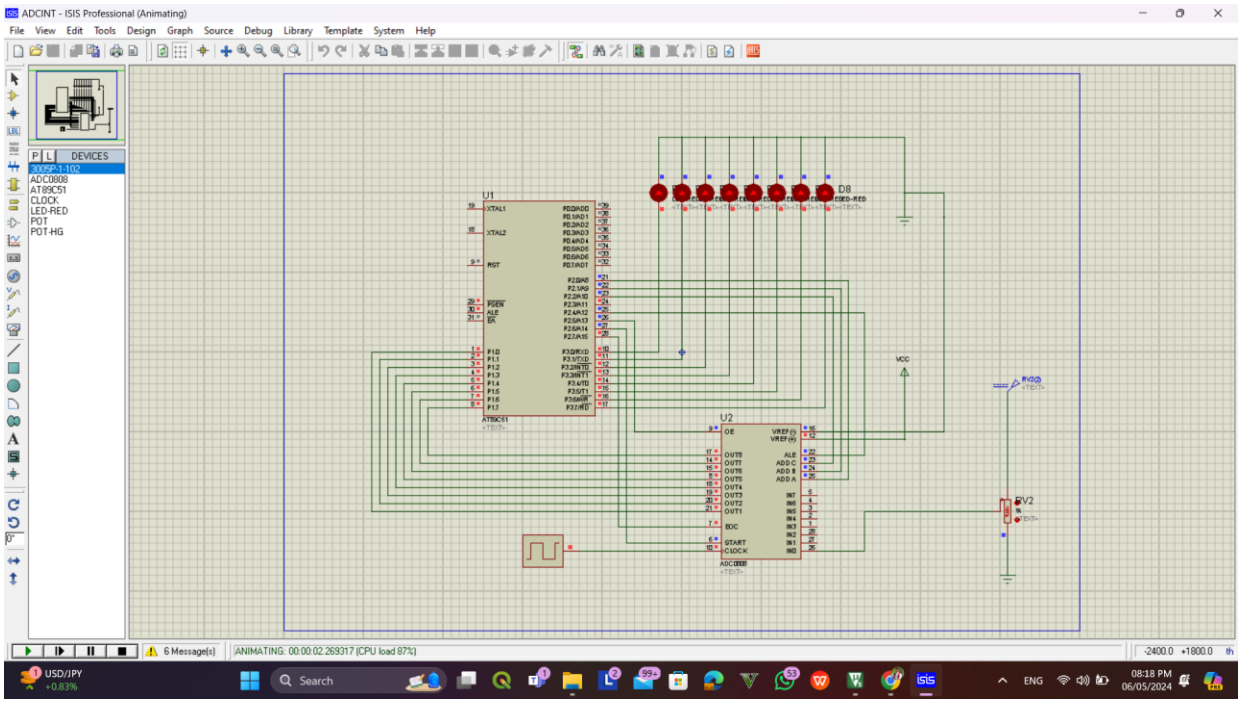
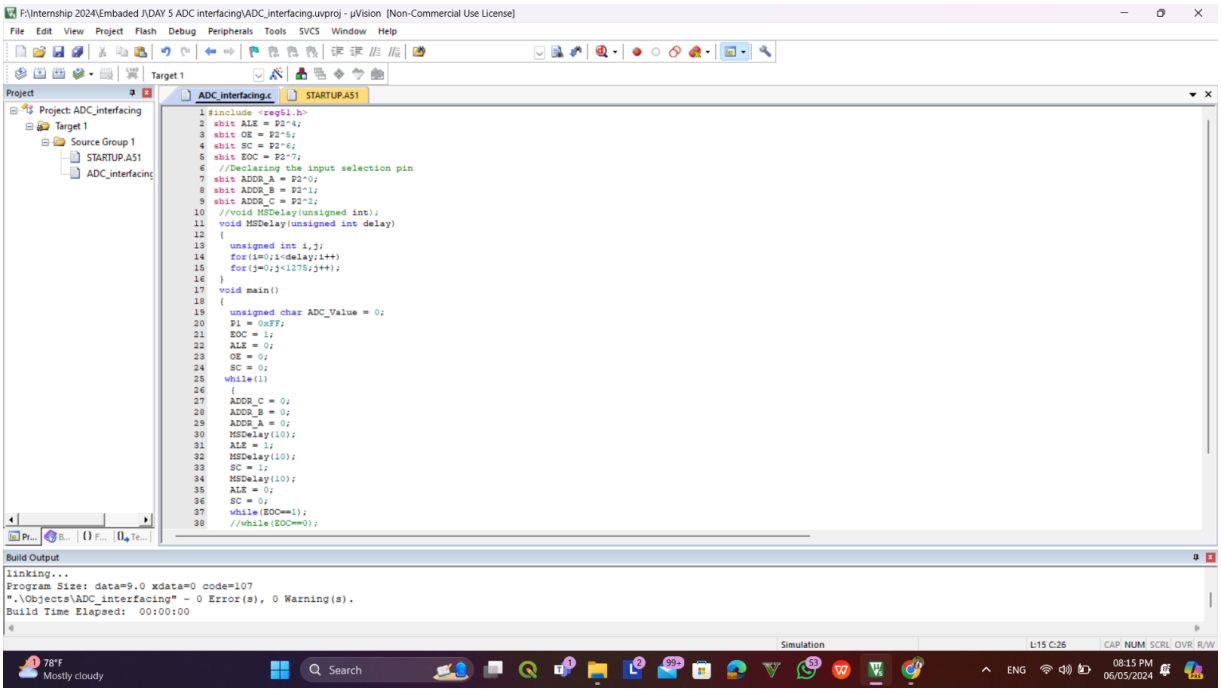
➢ Results:

❖The results of this project are observed through the LEDs connected to the microcontroller. As the potentiometer (RV2) is adjusted, the analog voltage input to the ADC changes. This change is converted to a digital value by the ADC and read by the microcontroller. The corresponding digital value is then displayed on the LEDs, providing a real-time visual representation of the analog input.

➢ Screenshots:



Proteus Simulation



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