LED Interfacing Using 8051

Aim:

To interface an LED with the 8051 microcontroller and control its operation.

Apparatus Required:

1.Laptop with Keil uVision software
2.Proteus Design Suite

Circuit Diagram Setup in Proteus:

1. Open Proteus and create a new project.
2. Add the following components from the library:
   8051 Microcontroller (AT89C51)
   LED
   Resistor (330Ω)
   Ground (GND) connection
3. Connect the LED's anode to P1.0 of the microcontroller through a 330Ω resistor.
4. Connect the cathode of the LED to GND.
5. Save the design and proceed to programming in Keil.

Algorithm:

1. Configure P1.0 as an output port.
2. Set P1.0 HIGH to turn ON the LED.
3. Introduce a delay.
4. Set P1.0 LOW to turn OFF the LED.
5. Introduce a delay.
6. Repeat the process continuously.

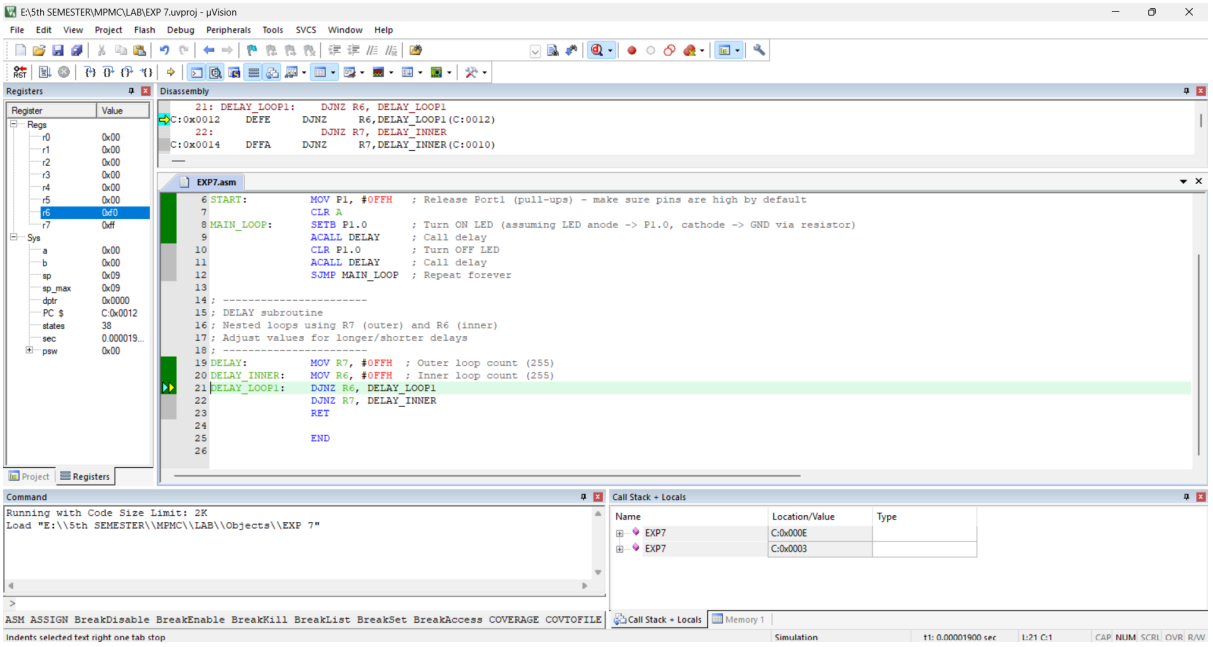
Program:

Program (Keil - 8051 Assembly)

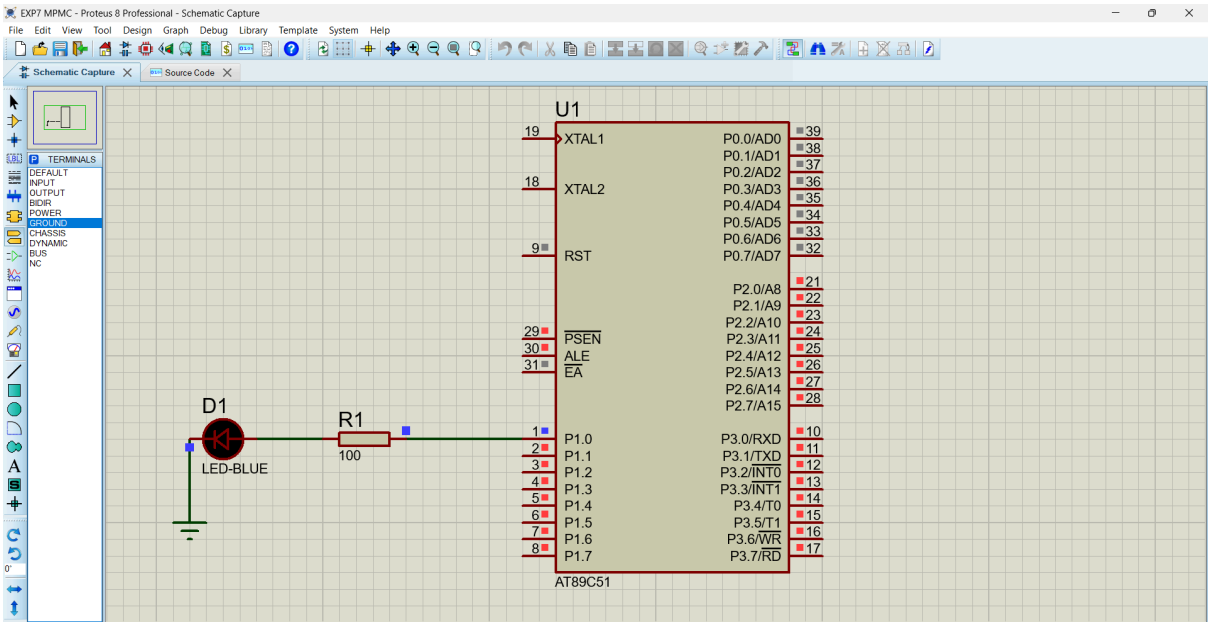
```
; led_blink.asm  - Blink LED on AT89C51 P1.0
; Assemble with Keil for AT89C51, produce HEX for Proteus simulation.

        ORG 0000H       ; Reset vector

START:      MOV P1, #0FFH   ; Release Port1 (pull-ups) - make sure pins are high by default
        CLR A
MAIN_LOOP:      SETB P1.0       ; Turn ON LED (assuming LED anode -> P1.0, cathode -> GND via resistor)
        ACALL DELAY     ; Call delay
        CLR P1.0        ; Turn OFF LED
        ACALL DELAY     ; Call delay
        SJMP MAIN_LOOP  ; Repeat forever

; -----------------------
; DELAY subroutine
; Nested loops using R7 (outer) and R6 (inner)
; Adjust values for longer/shorter delays
; -----------------------
DELAY:      MOV R7, #0FFH  ; Outer loop count (255)
DELAY_INNER:    MOV R6, #0FFH  ; Inner loop count (255)
DELAY_LOOP1:    DJNZ R6, DELAY_LOOP1
        DJNZ R7, DELAY_INNER
        RET

        END
```

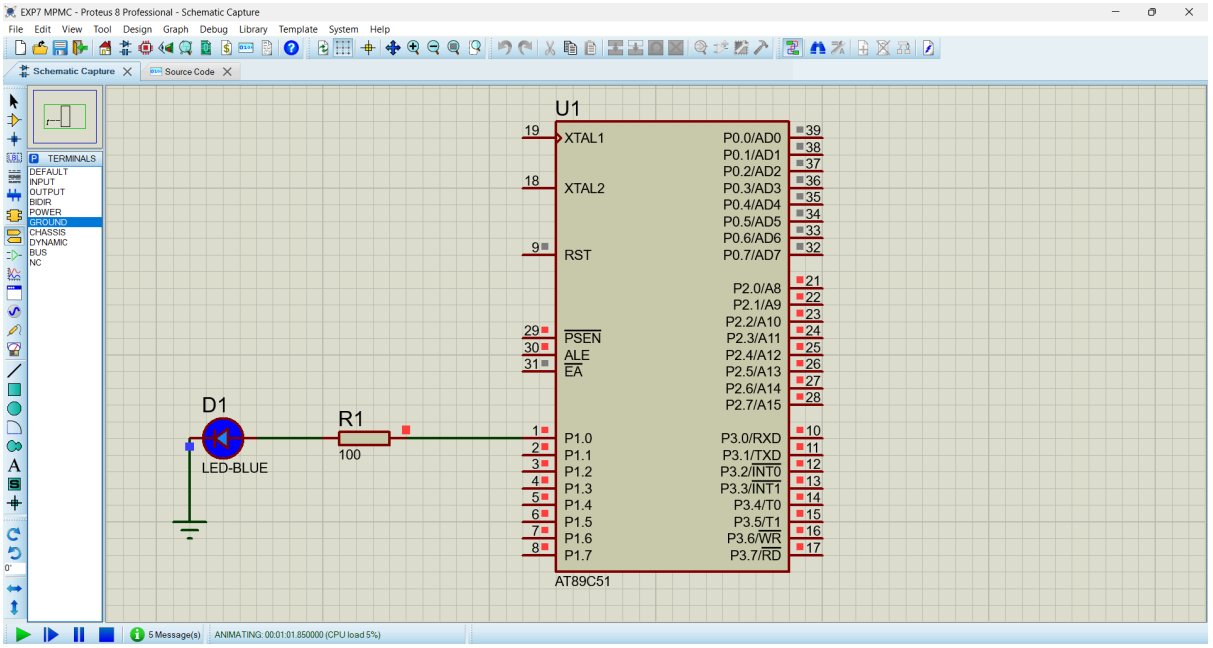
Output:

KEIL OUTPUT:



PROTEUS OUTPUT:





Result:

The LED interfacing with the 8051 microcontroller has been successfully implemented and simulated using Keil and Proteus.