Traffic Light Using Intel 8051 Silicon Labs Kit

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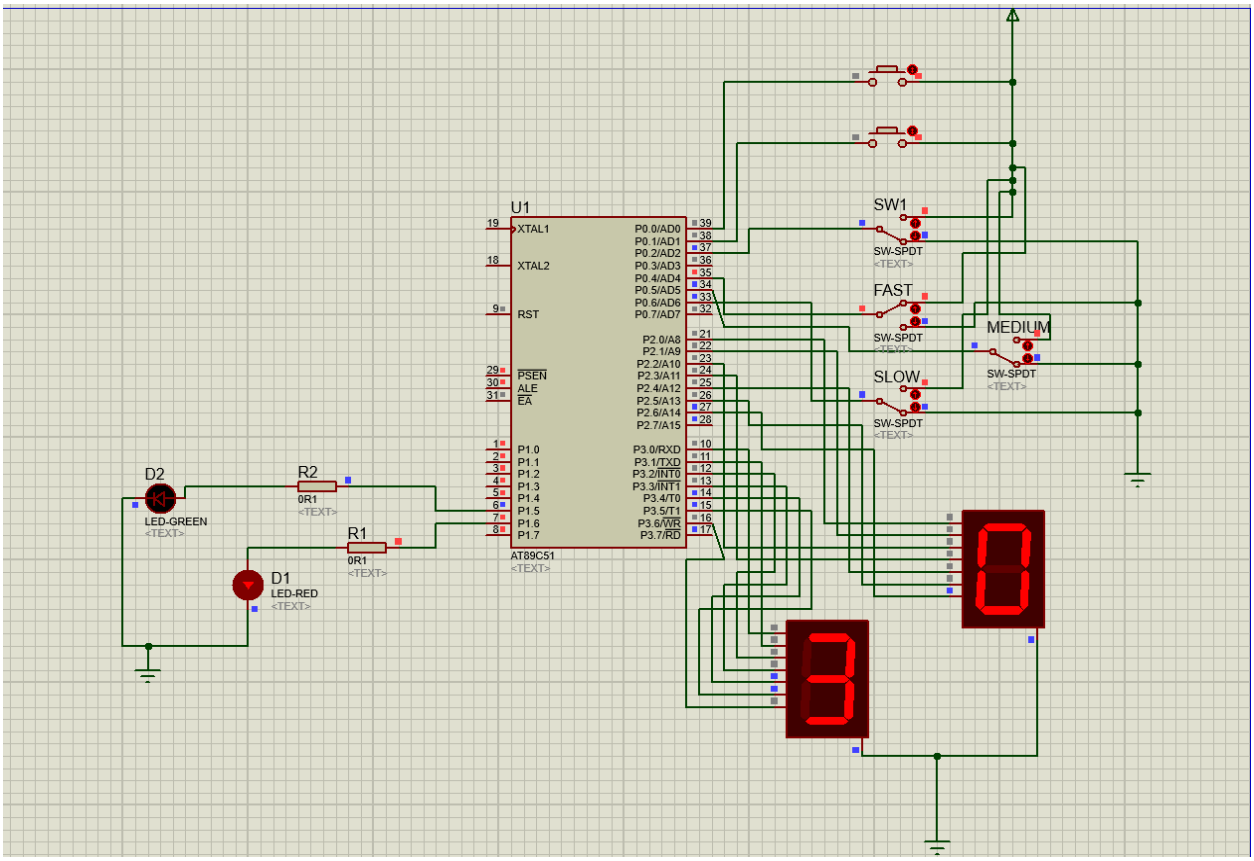
This is an implementation of a traffic light that has the following features:

- that gives the user access to control the frequency of counting of the two 7-segments according to how crowded or empty the streets are.
- The user has the ability to choose between 3 different frequencies [Fast- Medium (Default)- Slow]
- The Default max number shown on the 7-segments is 30 but the user has the ability to change that number to whatever suitable depending on the different traffic conditions.
- After setting the desired frequency and max number then the lights will alternate between red and green light.

Schematics using Proteus:



The code uploaded on the kit

```
$NOMOD51   ;to suppress the pre-defined addresses by keil
$include (C8051F020.H)    ; to declare the device peripherals with it's addresses
ORG 00H            ; to start writing the code from the base 0


;disable the watch dog
MOV WDTCN,#11011110B ;0DEH
MOV WDTCN,#10101101B ;0ADH

; config of clock
MOV OSCICN , #14H ; 2MH clock

; config cross bar
MOV XBR0 , #00H
MOV XBR1 , #00H
MOV XBR2 , #040H  ; Cross bar enabled , weak Pull-up enabled

;config,setup
MOV P1MDOUT, #0FFh
MOV P2MDOUT, #0FFh
MOV P0MDOUT, #00001100B ;leds on p0.2 p0.3
MOV P74OUT,#00000000B ;5.4:5.7 out

;initially 30 on  7segments
BEGINING: ACALL OFF
          MOV R1, #00H
          MOV R2, #03H
          MOV DPTR, #400h

;load chosen max time on 7segs
INIT:
  CLR A
  MOV A, R1
  MOVC A, @A+DPTR
  MOV P1, A
  MOV A, R2
  MOVC A, @A+DPTR
  MOV P2,A
```

```
CHECK:
       CLR A
       MOV A,P5
       RRC A     ; Rotate A to the right to check P5.0 (submit)
       JNC START   ;If carry high jump to start
       RRC A     ; Rotate A to check P5.1 (inc1)
       JNC INC1
       RRC A     ; Rotate A to check P5.2(inc2)
       JNC INC2
       SJMP INIT   // Read switch status again.JB P0.6,START ;start if submit


INC1: CJNE R1, #09H, IN1 ; check if 9 reached return to zero
      MOV R1,#00H
      ACALL DELAY
      SJMP INIT

      IN1:INC R1
          ACALL DELAY
          SJMP INIT


INC2: CJNE R2,#09H,IN2 ; check if 9 reached return to 1 (minimum is 10)
      MOV R2,#01H
      ACALL DELAY
      SJMP INIT

      IN2:INC R2
          ACALL DELAY
          SJMP INIT

START:
  MOV 60H,R1
  MOV 70H,R2
  JMP MAIN
```

```
MAIN: ACALL DELAY
      CLR A
      MOV A, R1
      MOVC A, @A+DPTR
      MOV P1, A
      MOV A, R2
      MOVC A, @A+DPTR
      MOV P2, A

DEC1: CJNE R1,#00H,DC1
      MOV R1,#09H
      SJMP DEC2
      DC1:DEC R1
      JMP MAIN

DEC2: CJNE R2,#00H,DC2
      SJMP REST
      DC2:DEC R2
      JMP MAIN

REST: CALL TOG
      MOV R1,60H
      MOV R2,70H
      ;JNB P0.6, CHECK
      JMP START

ON: SETB P0.3
    CLR P0.2
    RET

OFF:  CLR P0.3 ;Green led turned off
      SETB P0.2
      RET

TOG:  CPL P0.3
      CPL P0.2
      RET
```

```
  ;setting the register values for high frequency delay
  fastfreq:
          MOV R4,#03H
          MOV R5 ,#0FFH
          MOV R6, #0FFH
      ACALL LOOP
      AJMP CONT


  ;setting the register values for medium frequency delay
  medfreq:
          MOV R4,#07H
          MOV R5 ,#0FFH
          MOV R6, #0FFH
      ACALL LOOP
      AJMP CONT

  ;setting the register values for slow frequency delay
  slowfreq:
          MOV R4,#011H
          MOV R5 ,#0FFH
          MOV R6, #0FFH
      ACALL LOOP
      AJMP CONT

  ;the delay loop
  LOOP: DJNZ R6, LOOP
          DJNZ R5, LOOP
          DJNZ R4, LOOP
      RET

  DELAY:
      CLR A
      MOV A, P4
      RRC A
      JNC fastfreq
      RRC A
      JNC medfreq
```

```
DELAY:
    CLR A
    MOV A, P4
    RRC A
    JNC fastfreq
    RRC A
    JNC medfreq
    RRC A
    JNC slowfreq

    ACALL medfreq ;if no switch is closed, choose the medium frequency

    CONT:
        RET


ORG 400H
DB 3FH,06H,5BH,4FH,66H,6DH,7DH,07H,7FH,6FH

END
```