Faculty of Engineering

Cairo University

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A report on:

TRAFFIC LIGHT SYSTEM

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☒Task Description

Our project aims to control the traffic light system flexibly to meet several conditions of traffic.

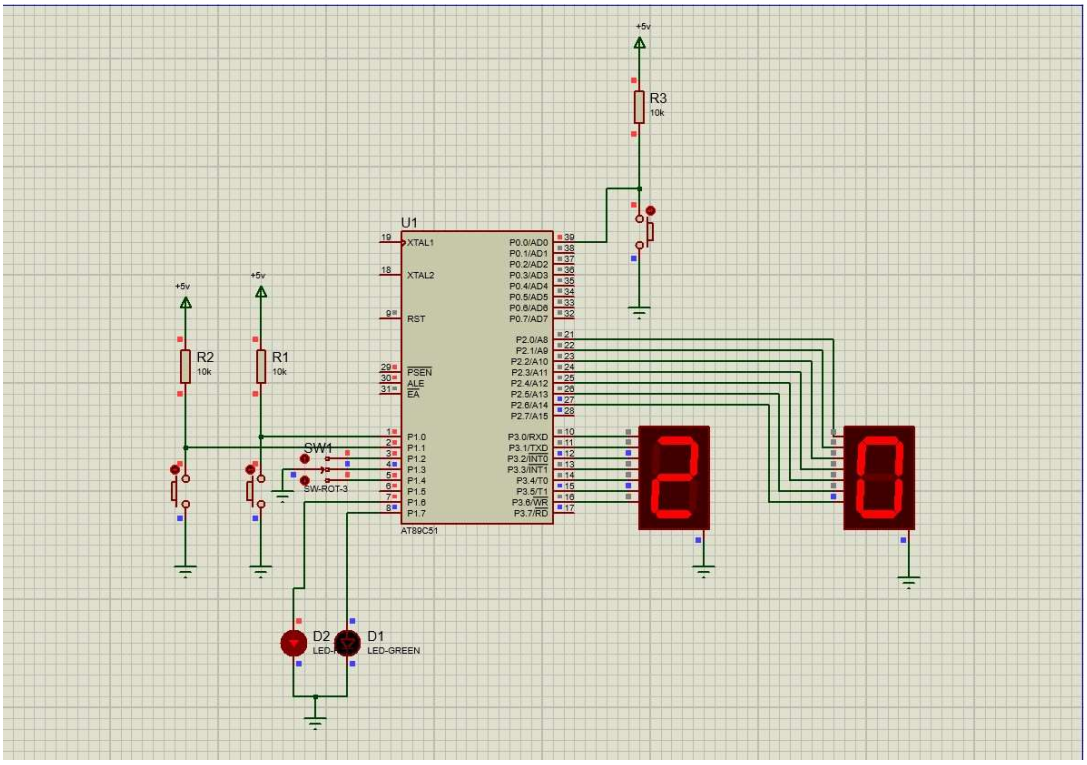
Components:

- 8051 Microcontroller
- Two light LEDs (Red & Green)
- Two Seven-Segments
- Push Buttons

We designed a traffic light system with some features like:

- Turning ON the green light LED for a specific time period. This period can be changed based on a predetermined number “Max” shown on two 7-segments.
- “Max” starts to count down on the 7-segments until it reaches 00, when the green light is turned Off and the red light turned ON.
- After 00, the 7-segments will be reloaded to “Max” and starts to count down until 00, when the Red light is Off, green ON, and so on.
- Users have the capability to change “Max” on the 7-segments to meet several conditions of traffic.
- Users have the capability to change the frequency of counting using switches. (3 switches to control the frequency of counting).
- Users have the capability to Reset the counting to start from the beginning.

☒Schematics



☒Assembly Code

```
$NOMOD51                    ; to suppress the pre-defined addresses by keil
$include (C8051F020.INC)    ; to declare the device peripherals with its addresses
ORG 0H                      ; 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
```

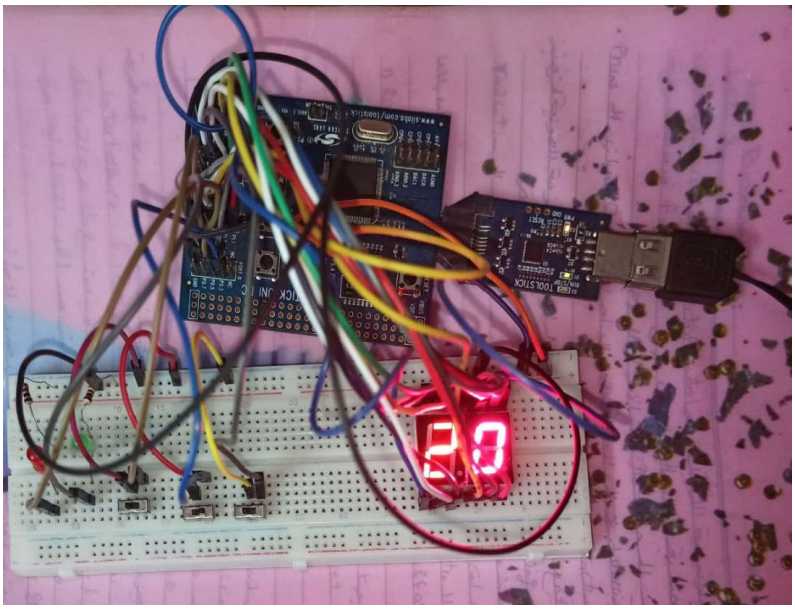
```
MOV XBR1, #00H
MOV XBR2, #040H          ; Cross bar enabled, weak Pull-up enabled

R_LED BIT P0.5
G_LED BIT P0.6

SETB R_LED
CLR G_LED
MOV P74OUT, #00h

MOV R1, #00H             ; Digit1 num
MOV R2, #02H             ; Digit2 num
MOV DPTR, #400H

INIT:
        MOV A, R1
        MOVC A, @A+DPTR
        MOV P1, A
        MOV A, R2
        MOVC A, @A+DPTR
        MOV P2, A

MOV A, P5
ANL A, #08H
CJNE A, #08H, START

MOV A, P5
ANL A, #04H
CJNE A, #04H, INCREMENT

MOV A, P5
ANL A, #02H
CJNE A, #02H, DECREAMENT
SJMP INIT
```

```
INCREMENT:
        CJNE R2, #09H, INC2
        SJMP INIT
        INC2:
            CJNE R1, #09H, INC1
            MOV R1, #00H
            INC R2
            ACALL DELAY
            SJMP INIT
        INC1:
            INC R1
            ACALL DELAY
            SJMP INIT

DECREAMENT:
         CJNE R1, #00H, DEC_1
         CJNE R2, #00H, DEC_2
        SJMP INIT
        DEC_1:
            DEC R1
            ACALL DELAY
            SJMP INIT
        DEC_2:
            MOV R1, #09H
            DEC R2
            ACALL DELAY
            SJMP INIT

START:
        MOV 60H, R1
        MOV 50H, R2
        JNB P0.2, A0
        JNB P0.3, A1
```

```
        JNB P0.4, A2
        L:
        MOV DPTR, #20FH
        MOVC A, @A+DPTR
        MOV 61H, A
        MOV DPTR, #200H
        SJMP MAIN

A0:MOV A, #00H
SJMP L
A1:MOV A, #01H
SJMP L
A2:MOV A, #02H
SJMP L

MAIN:
        ACALL DELAY1
        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
        SJMP MAIN

DEC2:
        CJNE R2, #00H, DC2
        SJMP FINISH
```

```
        DC2: DEC R2
        SJMP MAIN

FINISH:
        CPL R_LED
        CPL G_LED
        MOV R1,60H
        MOV R2,50H
        SJMP START

ORG 400H
DB   40H,79H,24H,30H,19H,12H,02H,78H,00H,10H
ORG 20FH
DB 05H, 0AH, 014H


DELAY:
        MOV R3, #02H
        UP2:MOV R4, #0FFH
        UP1: MOV R5, #0FFH
        HERE: DJNZ R5, HERE
                DJNZ R4, UP1
                DJNZ R3, UP2
        RET

DELAY1:
        MOV R3, 61H
        UP22:MOV R4, #00H
        UP11: MOV R5, #0C8H
        HERE1: DJNZ R5, HERE1
                DJNZ R4, UP11
                DJNZ R3, UP22
        RET
END
```

☒ Circuit



☒ Video of working circuit

https://drive.google.com/file/d/1B7KhW1nHGhrjd1o64-SjKU4w_8DJUK4a/view