EXPERIMENT 8
Seven segment display and 2x2 matrix keyboard

Code:

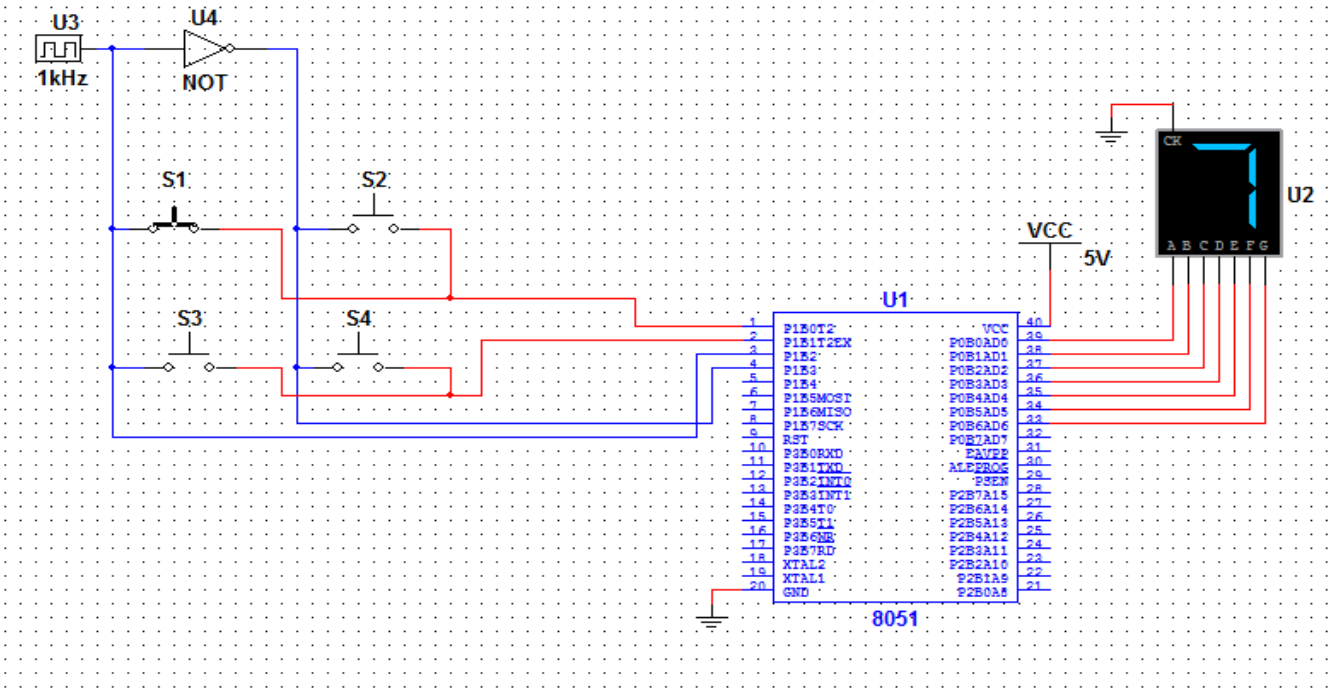
```
$MOD51
        MOV P1,#00H
        MOV P0,#00H

loop:   MOV A , #00H
; CHECK THE VALUE OF INPUT
        JNB P1.0, L1
        ADD A , #01H

    L1: JNB P1.1, L2
        ADD A , #02H

    L2: JNB P1.2, L3
        ADD A , #04H

    L3: JNB P1.3, L4
        ADD A , #08H

; MAP THE INPUT TO OUTPUT
    L4: MOV B, A
        CJNE A,#05H ,L5
        MOV P0,#07H
    LA: JNB P1.0, LX
        JB P1.2, LA
    LX: LJMP L16

    L5: MOV A,B
        CJNE A,#06H ,L6
        MOV P0,#4FH
    LB: JNB P1.0, LY
        JB P1.3, LB
    LY: LJMP L16

    L6: MOV A,B
        CJNE A,#09H ,L7
        MOV P0,#07H
    LC: JNB P1.1, LZ
        JB P1.2, LC
    LZ: LJMP L16

    L7: MOV A,B
        CJNE A,#0AH ,L16
        MOV P0,#06H
    LD: JNB P1.1, L16
        JB P1.3, LD

   L16: LJMP loop


END
```

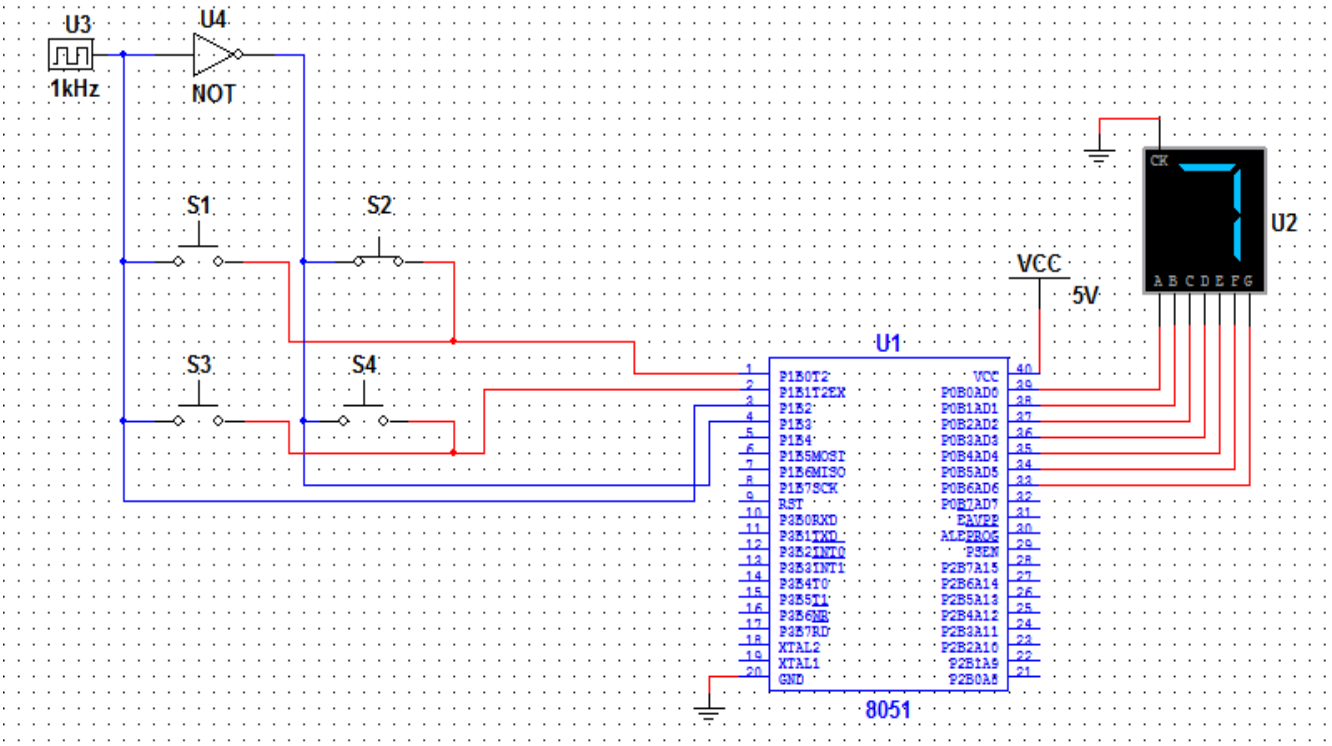
Theory:

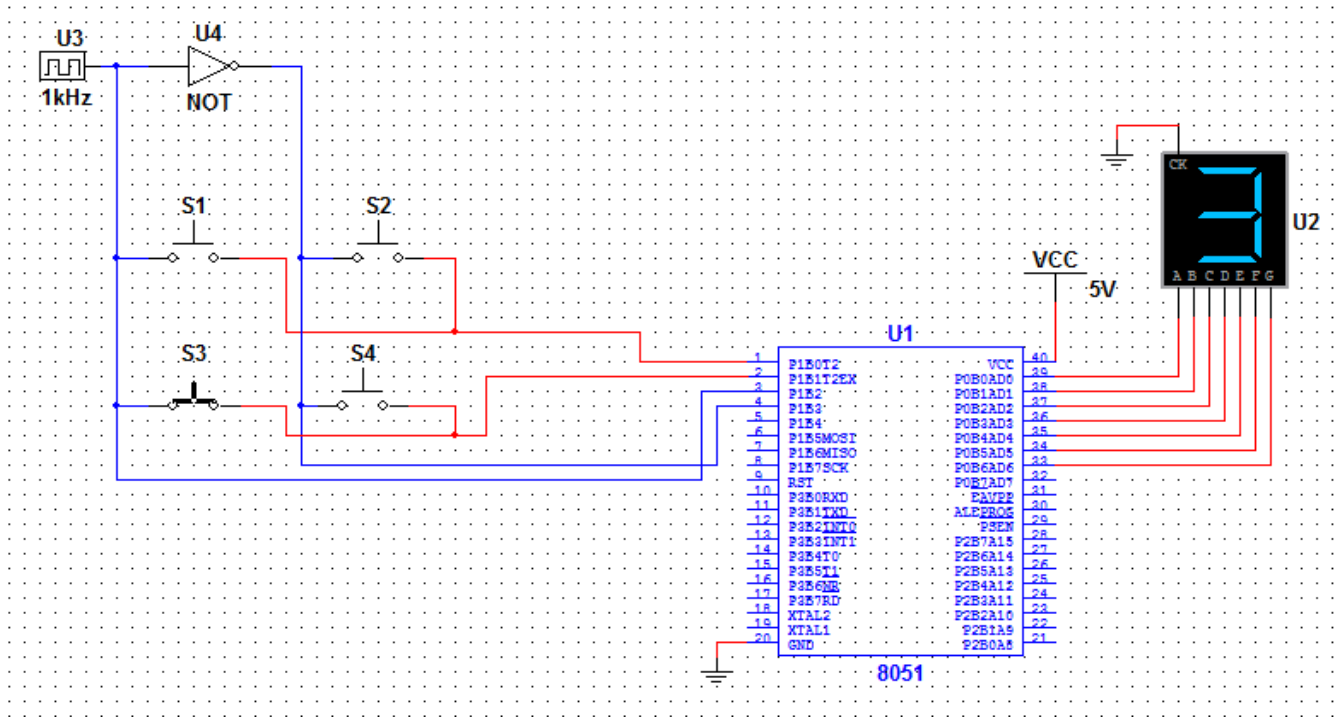
Above, the button at B1 is held. As the scan progresses, it does the following:

1. Nothing is selected. Outputs A and B are both high, and we don't worry about inputs 1 and 2.
2. Column A is selected with a logical low.
    - The system reads inputs 1 and 2. Both are open, so the pull-up resistors cause the inputs to be pulled high. Since this is an active low matrix, the high inputs indicate nothing is pressed.
3. The system deselects column A by driving it high and selects column B is by driving it low.
    - The system reads inputs 1 and 2. Since switch B1 is held, the low level from the column selection shows up at input 1.
    - By pairing the column output (B) with the detected switch (1), the system knows that switch B1 is pressed.
4. Finally, everything is deselected by driving both outputs high.

Circuit and Output:




U3
1kHz
U4
NOT
S1
S2
S3
S4
VCC
5V
U1
8051
U2
CK
A B C D E F G
P1.0/T2
P1.1/T2EX
P1.2
P1.3
P1.4
P1.5/MOSI
P1.6/MISO
P1.7/SCK
RST
P3.0/RXD
P3.1/TXD
P3.2/INT0
P3.3/INT1
P3.4/T0
P3.5/T1
P3.6/WR
P3.7/RD
XTAL2
XTAL1
GND
VCC
P0.0/AD0
P0.1/AD1
P0.2/AD2
P0.3/AD3
P0.4/AD4
P0.5/AD5
P0.6/AD6
P0.7/AD7
EA/VPP
ALE/PROG
PSEN
P2.7/A15
P2.6/A14
P2.5/A13
P2.4/A12
P2.3/A11
P2.2/A10
P2.1/A9
P2.0/A8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P2.6/A14
P2.5/A13
P2.4/A12
P2.3/A11
P2.2/A10
P2.1/A9
P2.0/A8