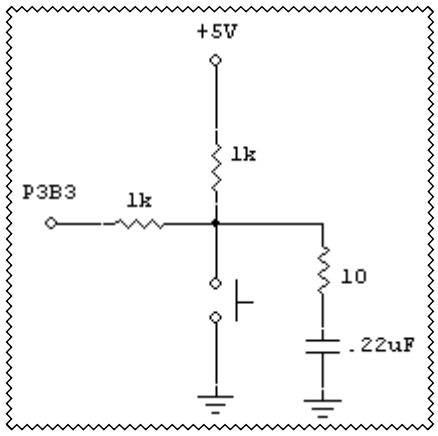
Lab H
External Hardware Interrupts

1. Assemble the following circuit:



2. Create the following program and add appropriate comments:

```
                ORG     00H
                AJMP    Main

;Interrupt Vector
                ORG     013H
                ACALL   Spin
                CLR     TF0
                SETB    TR0
                RETI

                ORG     100H
Main:           NOP
                SETB    TCON.2 ;Int1, falling edge
                MOV     IE,#84H ;enable interrupt 1
Loop:           MOV     P1,A
                ACALL   Delay
                CPL     A
                SJMP    Loop

;Interrupt Subroutine
                ORG     200H
Spin:           MOV     R0,#10H
                MOV     A,#80H
                MOV     P1,A
                ACALL   Delay
Blue:           RR      A
                MOV     P1,A
                ACALL   Delay
                DJNZ    R0,Blue
                MOV     A,#00H
                MOV     P1,A
                RET
```

```
;Delay Subroutine
                ORG     250H
Delay:          NOP
                MOV     TMOD,#01H
                MOV     TL0,#00H
                MOV     TH0,#00H
                SETB    TR0
Red:            NOP
                JNB     TF0,Red
                CLR     TR0
                CLR     TF0
                RET
                END
```

3. Refer to the various tables in Ch. 11 and add another interrupt at Int0. This interrupt must work in reverse of Int1. This new interrupt will require another push button circuit.

4. Draw the new circuit.

5. New commands or registers:

RETI - return from interrupt

TCON - timer/counter register

IE - interrupt enable registers