1.
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; JOSEPH OKONOBOH
; 0137755064
; SWITCH BASED-COMBO LOCK

      MASK     EQU      0x0F
      LED      EQU      P0       ;LED port
      switch   EQU      P1       ;switches port
      num1     EQU      0x04     ;1st input
      num2     EQU      0x05     ;2nd input
      num3     EQU      0x07     ;3rd input
      num4     EQU      0x0F     ;final input
      s0       EQU      0x00     ;state 0
      s1       EQU      0x01     ;state 1
      s2       EQU      0x02     ;state 2
      s3       EQU      0x03     ;state 3
      state    EQU      0x07

;----------   Initialization   ----------;
      MOV      LED,  #0x00    ;set Port as output
      MOV      R7,   #s0      ;R7 contains present state
      MOV      LED,  #s0

; read data from switch into accumulator
READ_DATA:
      MOV      A,    switch
      ANL      A,    #MASK


STATE0:
      CJNE     R7,   #s0,     STATE1      ;if not in state0 go to state 1
      CJNE     A,    #num1,   READ_DATA   ;if first input is wrong re-read data from switch
      MOV      R7,   #s1                 ;go to state 1
      MOV      LED,  #s1                 ;signal user that state was successfully changed
      SJMP     READ_DATA                 ;read next input
STATE1:
      CJNE     R7,   #s1,     STATE2      ;if not in state1 go to state 2
      CJNE     A,    #num2,   READ_DATA   ;if second input is wrong re-read data from switch
      MOV      R7,   #s2                 ;go to state 2
      MOV      LED,  #s2                 ;signal user that input two was correct
      SJMP     READ_DATA                 ;read next input
STATE2:
      CJNE     R7,   #s2,     STATE3      ;if not in state2 go to state 3
      CJNE     A,    #num3,   READ_DATA   ;if third input is wrong re-read data from switch
      MOV      R7,   #s3                 ;go to state 2
      MOV      LED,  #s3                 ;signal user that input three was correct
      SJMP     READ_DATA                 ;read next input
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STATE3:
      CJNE     R7,   #s3,     READ_DATA   ;if not in state3 or if input is wrong read data fr
      CJNE     A,    #num4,   READ_DATA

;;;;; Repeatedly display LED for 1s and turn off led for 1s
BLINK:
      MOV      LED,  #0xFF
      ACALL    DELAY
      MOV      LED,  #0x00
      ACALL    DELAY
      SJMP     BLINK

;;;;; 0.5Hz timing delay (1s ON, 1s OFF)
DELAY:
      MOV      R0,   #175

LOOP0:
      MOV      R1,   #250
LOOP1:
      MOV      R2,   #250
LOOP2:
      DJNZ     R2,   LOOP2
      DJNZ     R1,   LOOP1

      DJNZ     R0,   LOOP0
      RET


END
```