

EECE416: Microcomputer Fundamentals and Design

PIC Coding Practice -B

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Practice3: 7-Segment LED

FAIRCHILD
SEMICONDUCTOR™

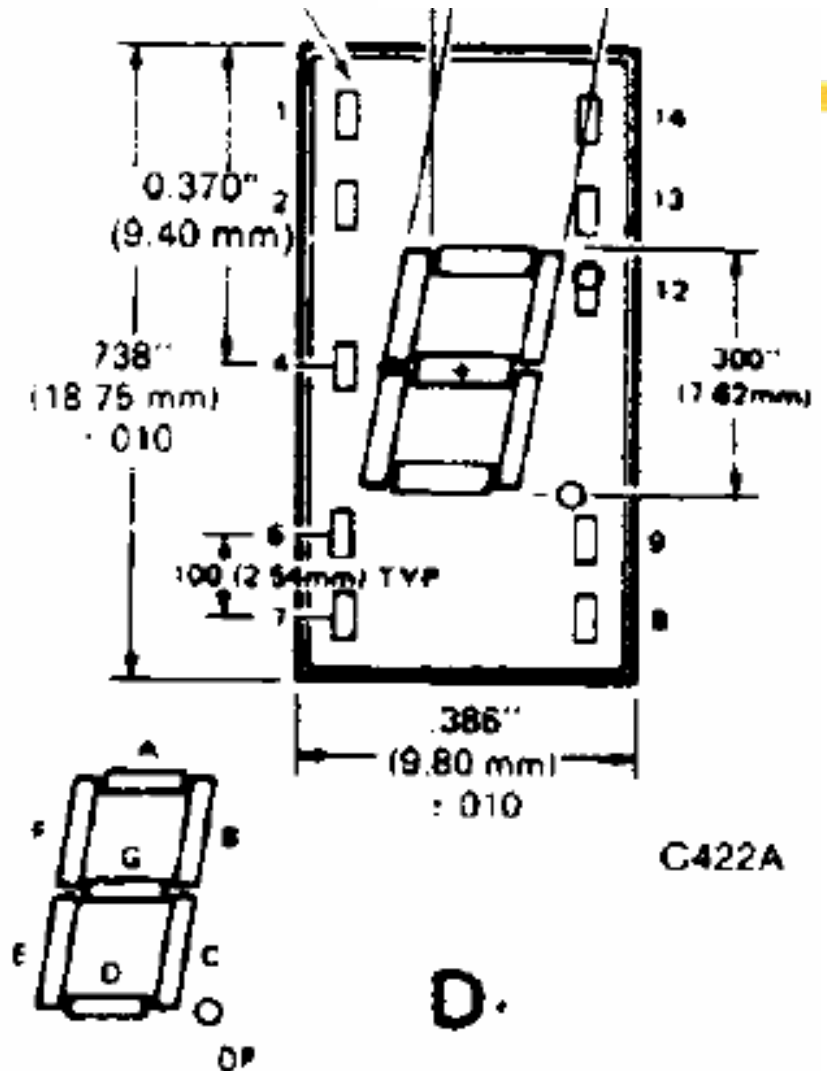
HIGH EFFICIENCY GREEN **MAN3400**
ORANGE **MAN3600**

⌘ MAN74A

☑ Common Cathode

☑ +5V

☑ 25mA

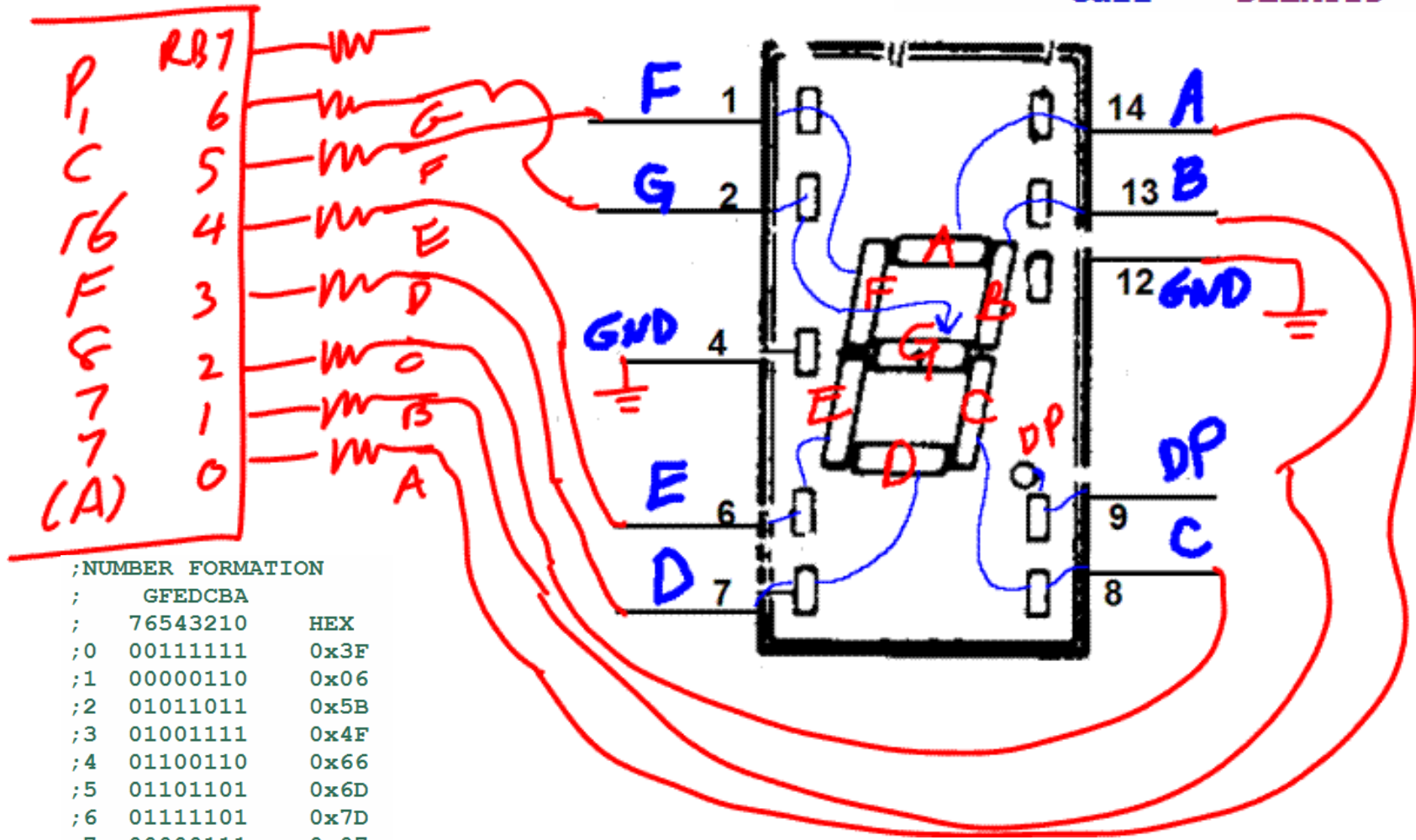


7 Segment Connection

```

movlw 0x3F
movwf PORTB
call BZZZ
call DELAY1s
    
```

R = 200Ω



```

;NUMBER FORMATION
; GFEDCBA
; 76543210 HEX
;0 00111111 0x3F
;1 00000110 0x06
;2 01011011 0x5B
;3 01001111 0x4F
;4 01100110 0x66
;5 01101101 0x6D
;6 01111101 0x7D
;7 00000111 0x07
;8 01111111 0x7F
;9 01100111 0x67
    
```

First 7-Segment LED code

- ⌘ Start from 0
- ⌘ Increase the number by 1 every 1 second
- ⌘ Cyclic: 0 → 1 → 2 → → 9 → 0 → 1
- ⌘ Beep (or Buzz) when the number is changed.
- ⌘ Save file as "7LED_1.ASM"

7-Segment Coding

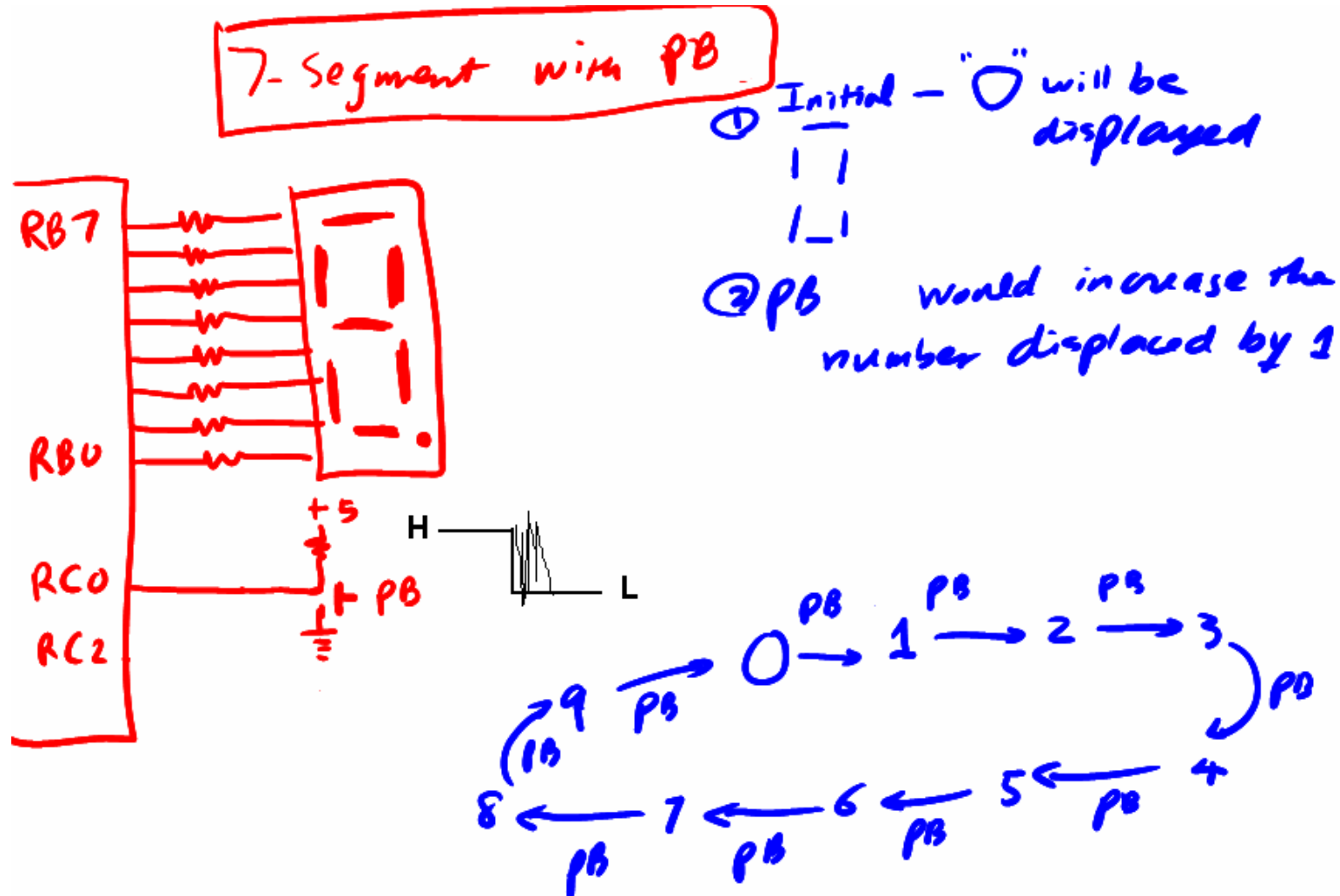
⌘ Regular Approach vs. Table Approach

```
movlw 0x00
movwf PORTB
call BZZZ
call DELAY1s
goto LOOP
movlw 0x5B
movwf PORTB
call BZZZ
call DELAY1s
movlw 0x4F
movwf PORTB
call BZZZ
call DELAY1s
movlw 0x66
movwf PORTB
call BZZZ
call DELAY1s
movlw 0x6D
movwf PORTB
call BZZZ
call DELAY1s
movlw 0x7D
movwf PORTB
call BZZZ
call DELAY1s
movlw 0x07
```

```
AGAIN    MOVLW    0x00
         CALL    TABLE
         MOVWF   PORTB
         CALL    DELAY1S
         MOVLW   0x01
         CALL    TABLE
         MOVWF   PORTB
         CALL    DELAY1S

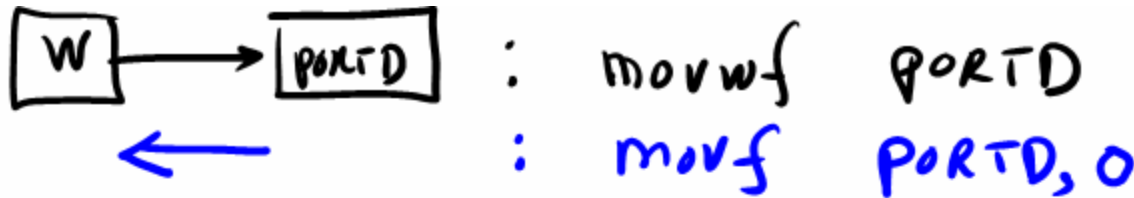
TABLE    ADDWF   PCL
; PC=PC+[W]=$(TABLE+[W])
         RETLW   0x0F    ;0
         RETLW   0x06    ;1
         RETLW   0x5B    ;2
         :
         :
         :
         RETLW   0x67    ;9
```

Second 7-Segment LED Code



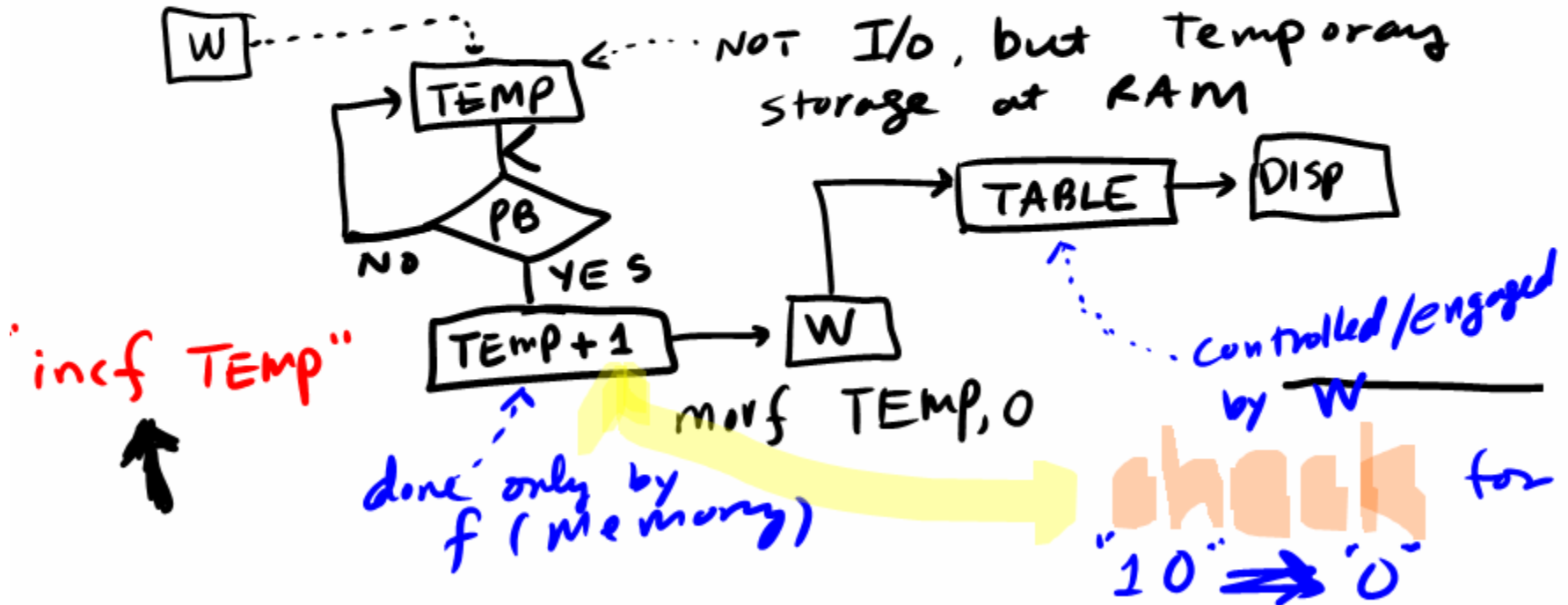
⌘ Save file as "7LED_PB.ASM"

Reading Data from a File Register: MOVF



MOVf

INCREMENT CASE:



Part of the Code

⌘ Usual Approach

```
START
    BANKSEL TRISB
    movlw 0x00 ;ALL OUTPUT
    movwf TRISB
    movwf TRISD
    movlw 0xFF ;ALL IN
    movwf TRISC
    BANKSEL PORTB
    clrf PORTB

;Start with 0
ZEROP    movlw 0x3F ;display 0
         movwf PORTB
         call BZZZ
         call DELAY1s
ONEP     btfsc PORTC, PBUP
         goto ONEP
         movlw 0x06 ;display 1
         movwf PORTB
         call BZZZ
         call DELAY1s
TWOP    btfsc PORTC, PBUP
         goto TWOP
         movlw 0x5B
         movwf PORTB
         call BZZZ
         call DELAY1s
TRIP    btfsc PORTC, PBUP
         goto TRIP
         movlw 0x4F
         movwf PORTB
         call BZZZ
         call DELAY1s
```