Assembly Code with Comments and Flowchart

**Description of code:**

**Lighting and turning off the 8 L.E. D’s in sequence with a short delay between each step.**

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; Configuration data

; PICmicro MCU type: 16F88

; Oscillator: RC mode, slow, VR1 fully anticlockwise (min.rate)

; LCD display: off

; 7-segment display: off

; Version 3 board settings: J14 links: Digital

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; The following lines embed configuration data into the PICmicro

LIST P=16F88

\_\_CONFIG H'2007', H'3F7A' ; RC mode

\_\_CONFIG H'2008', H'3FFC' ; Clock Fail-Safe disabled

;:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

; setting Port B to output mode and turn on each led

ORG 0 ; Reset vector

GOTO 5 ; Goto start of program

ORG 4 ; Interrupt vector

GOTO 5 ; Goto start of program

ORG 5 ; Start of program memory

STATUS EQU H'03' ;we will use EQU to make the program easier to read,

;by setting hex 03 equivalent to STATUS, so we can replace H'03' with STATUS

Z EQU 2

ANSEL EQU H'9B' ;set hex 9B equivalent to ANSEL register

PORTB EQU H'06'

DIRB EQU H'86'

PAGE EQU 5

LEDZERO EQU 0 ;make the word “LEDONE” equivalent to 0

LEDONE EQU 1

LEWTWO EQU 2

LEDTHEEE EQU 3

LEDFOUR EQU 4 ;make LEDFOUR equivalent to 4

LEDFIVE EQU 5

LEDSIX EQU 6

LEDSEVEN EQU 7

MINUSONE EQU H'FF' ;make MINUSONE equivalent to H'FF'

FIVE EQU 5

delayval EQU H'1' ;assign hex 1 to delayval

START CLRF PORTB ; set all Port B pins to logic 0

BSF STATUS,5 ; instruct program that Page 1 commands come next

CLRF ANSEL ; clear ANSEL register to make port pins digital

CLRF H'86' ; set all Port B pins as outputs from within Page 1

BCF H'03',5 ; instruct program that Page 0 commands come next

BSF PORTB,0 ; set Port B pin 0 to logic 1, light up led 1

CALL DELAY ;call subroutine (will return with RETURN or RETLW)

BSF PORTB,1 ; set Port B pin 1 to logic 1, light up led 2

CALL DELAY

BSF PORTB,2 ;set port B pin 2 to logic 1, light up led 3

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

BSF PORTB,3

CALL DELAY

BSF PORTB,4

CALL DELAY ;call subroutine (will return with RETURN or RETLW)

BSF PORTB,5 ;set port B pin 5 to logic 1, LIGHT UP led 6

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

BSF PORTB,6

CALL DELAY

BSF PORTB,7 ;set port B pin 7 to logic 1, LIGHT UP led 8

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

BCF PORTB,7 ;set port B pin 7 to logic 0, TURN OFF led 8

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

BCF PORTB,6

CALL DELAY

BCF PORTB,5

CALL DELAY

BCF PORTB,4 ;set port B pin 4 to logic 0, TURN OFF led 5

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

BCF PORTB,3

CALL DELAY

BCF PORTB,2

CALL DELAY

BCF PORTB,1

CALL DELAY

BSF PORTB,0 ;set port B pin 0 to logic 0, TURN OFF led 1

CALL DELAY ;go to the delay loop so that the LED stays on for a few milliseconds

GOTO START

DELAY MOVLW H'1' ;start of delay subroutine which loads the working register W with a

; number and counts it down to zero thus creating a delay, move literal

; value hex 1 to working register

LOOP ADDLW H'ff' ;subtracts 1 from working register W using two’s complement

;notation to represent -1

BTFSS STATUS,Z ;bit test file in status file check is count is equal to zero,

;if zero set z to satus register.

GOTO LOOP ;it has not passed the test, go to LOOP and start again

RETURN ;go back to the next line from where the delay was called

END ; final statement, required to end the program

flow chart

Increment

the

Pin value

No

Is portB pin 0 to logic = 0 ?

Decrement the

Pin value

Call Delay subroutine

Set portB pin 7 to logic 0,

Thus, turning OFF LED 8

No

Is portB pin 7 to logic = 1 ?

Call Delay subroutine,

To keep it on a few milliseconds

Set portB pin 0 to logic 1,

Thus, Lighting ON LED 1

Set up both ports as output ports