Lab1 Report

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;* Name: Lab 1 program.s
;* Purpose: This code flashes one LED at approximately 1 Hz frequency
;* Author:
             Rasoul Keshavarzi
:*-----*/
      THUMB ; Declare THUMB instruction set
       AREA
                   My_code, CODE, READONLY ;
       EXPORT
                     __MAIN
                                ; Label __MAIN is used externally q
       ENTRY
__MAIN
; The following operations can be done in simpler methods. They are done in this
; way to practice different memory addressing methods.
; MOV moves into the lower word (16 bits) and clears the upper word
; MOVT moves into the upper word
; show several ways to create an address using a fixed offset and register as offset
; and several examples are used below
; NOTE MOV can move ANY 16-bit, and only SOME >16-bit, constants into a register
; BNE and BEQ can be used to branch on the last operation being Not Equal or EQual to zero
       MOV
                     R2, #0xC000 ; move 0xC000 into R2
                     R4, #0x0
       MOV
                                         ; init R4 register to 0 to build address
       MOVT
                     R4, #0x2009
                                        ; assign 0x20090000 into R4
       ADD
                     R4, R4, R2
                                         ; add 0xC000 to R4 to get 0x2009C000
                     R3, #0x0000007C
                                         ; move initial value for port P2 into R3
       MOV
       STR
                     R3, [R4, #0x40]; Turn off five LEDs on port 2
```

MOV R3, #0xB0000000 ; move initial value for port P1 into R3

STR R3, [R4, #0x20]; Turn off three LEDs on Port 1 using an offset

MOV R2, #0x20 ; put Port 1 offset into R2 for user later

MOV R0, #0x0000 ; Initialize R0 lower word for countdown

MOVT R0, #0x0010 ; Initialize R0 higher word for countdown

loop

SUBS R0, #1; Decrement r0 and set the N,Z,C status bits

BNE loop ; when R0 is not equal to 0, the loop will contunie; when R0 is equal to 0, the program will go out of the loop to the next step

MOV R0, #0X0000 ; reset R0 lower word for countdown

MOVT R0, #0x0010 ; reset R0 higher word for countdown

STR R3, [R4, R2]; write R3 port 1, YOU NEED to toggle bit 28 first

EOR R3, R3, #0x10000000; using xor to turn "off" and "on" the light on port 1.28. toggling between 0xA0000000 and 0xB0000000

B loop ; it makes the light toggling forever!

END

;Hand assembly: ADD R4, R4, R2 1110 00 0 0100 0 0100 0100 00000000 0010

;Slice into 4 bit pieces and convert to hex gives: 0xE0844002

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