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1 /*
2  * led1.c
3  *
4  * Created on: Dec 8, 2021
5  * Author: bailey-waltzo
6  *
7  * ****
8  * EE 1910 LAB 2
9  * Owen Bailey
10 * Program to run a set of three external LEDs through a
11 * traffic light sequence emulation
12 *
13 * The external LEDS is connected to:
14 * RED: Port 4, bit 0 [P4.0]
15 * YELLOW: Port 4, bit 1 [P4.1]
16 * GREEN: Port 4, bit 2 [P4.2]
17 * Inputs: none
18 * Outputs: LED flashing and console message
19 * ****/
20
21 #include <stdio.h>
22 #include "msp.h"
23
24 // clock rate
25 #define CLKRATE 3000000
26
27 void main(void)
28 {
29     // set direction for pins 0-2 of port 4 to output
30     // if P4 DIR is abcdefgh -> abcde111
31     // to do this, we'll OR it with 0x07 [0000 0111]
32     P4->DIR = P4->DIR | 0x07;
33
34     // splash
35     printf("LAB 2: MSP432 TRAFFIC LIGHTS\n");
36
37     // infinite loop
38     while(1)
39     {
40         // turn everything off
41         P4->OUT = P4->OUT & 0x01;
42         // set output value to 1 for Port 4 bit 0 and print
43         // P4->OUT => abcd efg1
44         P4->OUT = P4->OUT | 0x01;
45         printf("STOP\n");
46
47         // delay for five seconds
48         _delay_cycles(5 * CLKRATE);
49
50         // set output value to 0 for Port 4 bit 0
51         // set output value to 1 for Port 4 bit 2
52         // print
53         // abcd efg1 AND NOT 0000 0001 = abcd efg0
54         // abcd efg0 OR 0000 0100 = abcd e1g0
55         P4->OUT = P4->OUT & ~(0x01);
56         P4->OUT = P4->OUT | 0x04;
57         printf("GO\n");

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58
59 // delay for five seconds
60 delay_cycles(5 * CLKRATE);
61
62 // set output value to 0 for Port 4 bit 2
63 // set output value to 1 for Port 4 bit 1
64 // print
65 // abcd e1g0 AND NOT 0000 0100 = abcd e1g0 AND 1111 1011 = abcd e0g0
66 // abcd e0g0 OR 0000 0010 = abcd e010
67 P4->OUT = P4->OUT & ~(0x04);
68 P4->OUT = P4->OUT | 0x02;
69 printf("CAUTION\n");
70
71 // delay for one second
72 delay_cycles(1 * CLKRATE);
73
74 // set output value to 0 for port 4 bit 1
75 P4->OUT = P4->OUT & ~(0x02);
76 }
77
78 return;
79 }
80
```