/Volumes/DongyunLee/ESE280 Lab/Lab9/task1/task1/main.asm

```
1   start:
2       ldi r17, 0x00
3       out VPORTC_DIR, r17
4       sbi VPORTD_DIR, 0
5
6
7   main_loop:
8       in r16, VPORTC_IN   // get input from switch
9
10      andi r16, 0x0F  // mask 0000 1111 4 least significant bits
11
12      rcall lookup
13
14      cpi r16, 0x00
15      breq always_off
16      cpi r16, 0x01
17      breq r16_is_1
18      cpi r16, 0x02
19      breq r16_is_2
20      cpi r16, 0x03
21      breq r16_is_3
22      cpi r16, 0x04
23      breq r16_is_4
24      cpi r16, 0x05
25      breq r16_is_5
26      cpi r16, 0x06
27      breq r16_is_6
28      cpi r16, 0x07
29      breq r16_is_7
30      cpi r16, 0x08
31      breq r16_is_8
32      cpi r16, 0x09
33      breq r16_is_9
34      cpi r16, 0x0A
35      breq r16_is_A
36      cpi r16, 0x0B
37      breq r16_is_B
38      cpi r16, 0x0C
39      breq r16_is_C
40      cpi r16, 0x0D
41      breq r16_is_D
42      cpi r16, 0x0E
43      breq r16_is_E
44      cpi r16, 0x0F
45      breq always_on
46
47      rjmp main_loop
48
49
50  r16_is_1:
51      ldi r16, 238
52      rjmp timing_loop
53
54  r16_is_2:
55      ldi r16, 221
56      rjmp timing_loop
57
```

```
 58   r16_is_3:
 59       ldi r16, 204
 60       rjmp timing_loop
 61
 62   r16_is_4:
 63       ldi r16, 187
 64       rjmp timing_loop
 65
 66   r16_is_5:
 67       ldi r16, 170
 68       rjmp timing_loop
 69
 70   r16_is_6:
 71       ldi r16, 153
 72       rjmp timing_loop
 73
 74   r16_is_7:
 75       ldi r16, 136
 76       rjmp timing_loop
 77
 78   r16_is_8:
 79       ldi r16, 119
 80       rjmp timing_loop
 81
 82   r16_is_9:
 83       ldi r16, 102
 84       rjmp timing_loop
 85
 86   r16_is_A:
 87       ldi r16, 85
 88       rjmp timing_loop
 89
 90   r16_is_B:
 91       ldi r16, 68
 92       rjmp timing_loop
 93
 94   r16_is_C:
 95       ldi r16, 51
 96       rjmp timing_loop
 97
 98   r16_is_D:
 99       ldi r16, 34
100       rjmp timing_loop
101
102   r16_is_E:
103       ldi r16, 17
104       rjmp timing_loop
105
106   r16_is_F:
107       ldi r16, 0
108       rjmp always_on
109
110   always_off:
111       cbi VPORTD_OUT, 0
112
113       rjmp main_loop
114
115   always_on:
116       sbi VPORTD_OUT, 0
117
```

```
118        rjmp main_loop
119
120  timing_loop:
121
122        ldi r20, 255
123        sub r20, r16
124
125
126        loop:
127            sbi VPORTD_OUT, 0
128
129        dec_loop:
130            dec r20
131            brne loop
132
133            cbi VPORTD_OUT, 0
134
135        loop2:
136            cbi VPORTD_OUT, 0
137
138        dec_loop2:
139            dec r16
140            brne loop2
141
142            sbi VPORTD_OUT, 0
143            rjmp main_loop
144
145
146  table: .db $00, $01, $02, $03, $04, $05, $06, $07, $08, $09, $0A, $0B, $0C, $0D,
       $0E, $0F
147
148  lookup:
149        ldi ZH, high (table*2)
150        ldi ZL, low (table*2)
151        ldi r18, $00
152        add ZL, r16
153        adc ZH, r18
154        lpm r16, Z
155
156        ret
157
```