

Problem 7: [16 points]
Filename: hw9prob7.asm
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1 ; read 10000 samples from ADC, calculated the most recent
2 ; 8 samples and write the average value to DAC
3
4 .ORG $500
5 Init MV r1, r0 ; r1 counts the samples number
6 ADDI r7, r0, $4 ; r7 = 4 for shifting
7 LI r2, $1 ; r2 enable bit
8 SW r0, r2, $0010 ; set ADC enable bit
9
10 Wait LW r2, r0, $0022 ; check data ready bit
11 MV r5, r0 ; r5 = 0 Init for sum
12 ADDI r4, r0, $C ; r4 = 12 Indexing and loop counter
13 BRN Shift ; if set, start Shifting
14 BRA Wait ; otherwise, keep busy-waiting
15
16 ; 7 loops in total. Shift Recent[6/5/4...0] to Recent[7/6/5...1]
17 Shift SLT r0, r4, r0
18 BRN RdADC ; RdADC if r4 < 0
19 LW r3, r4, Recent ; r3 = Recent[6/5/4...]
20 ADD r5, r5, r3 ; accumulating valid values
21 ADDI r4, r4, $2 ; r4 += 2 Get positions 7/6/5...
22 SW r4, r3, Recent ; Recent[7/6/5...] = Recent[6/5/4...]
23 SUB r4, r4, r7 ; r4 -= 4 Set r4 to the next value
24
25 RdADC LW r3, r0, $0020 ; r3 = ADC
26 ADD r5, r5, r3 ; accumulating valid values in r5
27 SW r0, r3, Recent ; Recent[0] = r3
28
29 WtDAC SRAI r5, r5, $3 ; r5 = r5 // 8
30 LI r6, $8000 ; DAC enable bit
31 SW r0, r6, $0012 ; set the DAC enable bit
32 SW r0, r5, $0014 ; store the calculated value
33
34
35 Branch ADDI r1, r1, $1 ; increment counter
36 SLTI r0, r1, $2710 ; check if r1 < 10000
37 BRN Wait ; if so, wait for next value
38
39 Done SW r0, r0, $0010 ; turn off ADC: clear enable bit
40
41 .ORG $1000
42 Recent .DW $0
43 .DW $0
44 .DW $0
45 .DW $0
46 .DW $0
47 .DW $0
48 .DW $0
49 .DW $0

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