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1      j      start
2      add $zero, $zero, $zero
3      add $zero, $zero, $zero
4      add $zero, $zero, $zero
5      add $zero, $zero, $zero
6      add $zero, $zero, $zero
7      add $zero, $zero, $zero
8      add $zero, $zero, $zero
9  start: nor $1,$0,$0      #r1=0xFFFFFFFF
10     add $3,$1,$1      #r3=0xFFFFFFFFE
11     add $3,$3,$3      #r3=0xFFFFFFFFC
12     add $3,$3,$3      #r3=0xFFFFFFFF8
13     add $3,$3,$3      #r3=0xFFFFFFFF0
14     add $3,$3,$3      #r3=0xFFFFFFF0
15     add $3,$3,$3      #r3=0xFFFFFFF0
16     nor $20,$3,$0      #r20=0x0000003F
17     add $3,$3,$3      #r3=0xFFFFFFF80
18     add $3,$3,$3      #r3=0xFFFFFFF00
19     add $3,$3,$3      #r3=0xFFFFFFE00
20     add $3,$3,$3      #r3=0xFFFFF000
21     add $3,$3,$3      #r3=0xFFFFF800
22     add $3,$3,$3      #r3=0xFFFFF000
23     add $3,$3,$3      #r3=0xFFFFE000
24     add $3,$3,$3      #r3=0xFFFFC000
25     add $3,$3,$3      #r3=0xFFFF8000
26     add $3,$3,$3      #r3=0xFFFF0000
27     add $3,$3,$3      #r3=0xFFFE0000
28     add $3,$3,$3      #r3=0xFFFC0000
29     add $3,$3,$3      #r3=0xFFF80000
30     add $3,$3,$3      #r3=0xFFF00000
31     add $3,$3,$3      #r3=0xFFE00000
32     add $3,$3,$3      #r3=0xFFC00000
33     add $3,$3,$3      #r3=0xFF800000
34     add $3,$3,$3      #r3=0xFF000000
35     add $3,$3,$3      #r3=0xFE000000
36     add $3,$3,$3      #r3=0xFC000000
37     add $6,$3,$3      #r6=0xF8000000
38     add $3,$6,$6      #r3=0xF0000000
39     add $4,$3,$3      #r4=0xE0000000
40     add $13,$4,$4      #r13=0xC0000000
41     add $8,$13,$13      #r8=0x80000000
42     slt $2,$0,$1      #r2=0x00000001 unsigned slt
43     add $14,$2,$2      #r14=0x2
44     add $14,$14,$14      #r14=0x4
45     nor $10,$0,$0      #r10=0xFFFFFFFF
46     add $10,$10,$10      #r10=0xFFFFFFF0
47     sw $6,4($3)          #counter port:f0000004,r6=0xF8000000,设置计数器初值
48     lw $5,0($3)          #{counter0_out,counter1_out,counter2_out,led_out[12:0], SW};
49     add $5,$5,$5
50     add $5,$5,$5
51     sw $5,0($3)          #{GPIOf0[13:0],LED,counter_set}, port:f0000000
52     add $9,$9,$2          #r9 uninitilized, r9 = 1
53     sw $9,0($4)          #r9送r4=0xE0000000 七段数码管端口
54     lw $13,0x14($0)       #r13=0xFFF70000, 20号内存单元对应5号字
55 loop: lw $5,0($3)          #{counter0_out,counter1_out,counter2_out,led_out[12:0], SW}
56     add $5,$5,$5
57     add $5,$5,$5
58     sw $5,0($3)          #{GPIOf0[13:0],LED,counter_set}, port:f0000000
59     lw $5,0($3)          #{counter0_out,counter1_out,counter2_out,led_out[12:0], SW}
60     and $11,$5,$8          #取r5最高位, counter0_out虽然取出, 并没有使用
61     add $13,$13,$2          #r13= r13 + 1 ( r13 的初始值为 0xFFF70000 ), 依靠程序中的计数器, 当
62     beq $13,$0,next        r13 到了 0, 换一组显示, 重新开始计数
63 Disp: lw $5,0($3)          #{counter0_out,counter1_out,counter2_out,led_out[12:0], SW},
64     port:f0000000
65     add $18,$14,$14      #r18 = 8
66     add $22,$18,$18      #r22=0x10
67     add $18,$18,$22      #r18=0x18

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67      and $11,$5,$18  #取出SW[4:3]的值，其他位为0
68      beq $11,$0,L00  #SW[4:3]=0x00，跑马灯
69      beq $11,$18,L11  #SW[4:3]=0x11，显示七段图形
70      add $18,$14,$14  #r18=0x8
71      beq $11,$18,L01  #SW[4:3]=0x01，显示预置数字
72      sw $9,0($4)      #SW[4:3]=0x10，显示r9，L10
73      j    loop
74 L00:   beq $10,$1,L4   #r1 =0xFFFFFFFF，跑马灯，如果 r10 的值已经到了 0xFFFFFFFF ，转入 L4
      设置 r10 为 0xFFFFFFFFE
75      j    L3
76 L4:   nor $10,$0,$0   #r10=0xFFFFFFFF
77      add $10,$10,$10  #r10=0xFFFFFFFFE
78 L3:   sw $10,0($4)    #7段图形显示r10
79      j    loop
80 L11:  lw $9,0x60($17)
81      sw $9,0($4)      #7段图形显示$9，矩阵变化
82      j    loop
83 L01:  lw $9,0x20($17)
84      sw $9,0($4)      #7段文本显示$9，00000000，11111111，22222222，33333333，.....
85      j    loop
86 next: lw $13,0x14($0)  #r13=0xFFF70000
87      add $10,$10,$10
88      or  $10,$10,$2    #r10 是用于跑马灯的显示，每次显示后左移1位，再加1
89      add $17,$17,$14   #访存地址加4
90      and $17,$17,$20   #r20=0x0000003F（取$17的低6位，$17是地址的偏移，在0、4、8、
      12，.....，60（0x3C）之间循环）
91      add $9,$9,$2      #r9=r9+1，当 SW[4:3]=0x10，显示 r9 的值在递增
92      beq $9,$1,L2      #r1 = 0xFFFFFFFF，如果 r9 的值到了 0xFFFFFFFF，就重新设置r9从5
      开始
93      j    L5
94 L2:   add $9,$0,$14   #r9=0x4
95      add $9,$9,$2     #r9=0x5，如果 r9 达到了 0xFFFFFFFF，就重新设置r9从5开始
96 L5:   lw $5,0($3)     #{counter0_out,counter1_out,counter2_out,led_out[12:0],SW},
      port:f0000000
97      add $11,$5,$5
98      add $11,$11,$11
99      sw $11,0($3)     #{GPIOf0[13:0],LED,counter_set}, port:f0000000
100     sw $6,4($3)      #counter port:f0000004,r6=0xF8000000，设置计数器的初值
101     lw $5,0($3)      #{counter0_out,counter1_out,counter2_out,led_out[12:0],SW},
      port:f0000000
102     and $11,$5,$8    #取r5最高位，r8 为0x80000000，counter0_out虽然取出，并没有使用
103     j    Disp

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