

CUE

HW #3

1. a) Assemble following code:

addi \$s0, \$zero, 77
OP rs \leftrightarrow rt imme
8_{hex} 0 16 77
0010,00 00,000 1,0000, 0000,0000,0100,1101

0x2010004D

addi \$s1, \$zero, 31234
OP rs rt imme
8_{hex} 0 17 31234
0010,00 00,000 1,0001, 0111,1010,0000,0010

0x20117A02

lw \$t0, 12(\$s1) ~~12~~
OP rs \leftrightarrow rt imme
23_{hex} 17 8 12
1000,11 10001 02,0000 0000,0000,0000,0100

0x8E20000C

domore: addi \$t0, \$t0, 100

OP rs rt imme
8_{hex} 8 8 100
0010,00 01,000 0100, 0000,0000,0110,0100

0x21D80064

sw \$t0, 8(\$s1)
OP rs \leftrightarrow rt imme
24_{hex} 17 8 ~~12~~ 8
1010,11 10001 01,000 0000,0000,0000,0100

0xAE280008

Summary

addi \$s0, \$s0, 1
OP rs rt imme
8_{hex} 16 16 1
0010,00 10,000 00,000 0000,0000,0000,0001
0x22100001

CUE

slti \$t7 \$s0, 15
op rs \rightarrow rt imm
a hex 16 15 150
001010 10000 01111 0000,0000,0001,0110

0x2A0F0096

addi \$s1, \$s1, 1
op rs rt imm
8 hex 17 17 1
001000 10001 10001 0000,0000,0000,0001

0x22310001

bne \$t7, \$zero, domore
op rs rt imm
5 hex 15 0 -6 (0110 \rightarrow 1001 \rightarrow 1010)
000101 01111 0,0000, 1111,1111,1010

0x15E0FFFA

sub \$s0, \$s0, 100
op rs \rightarrow rd shamt funct
0 hex 16 1 16 0 22 hex
various 10,000 00001 1000,0 0000 6,0010

0x02018022

$\therefore \cancel{\text{addi } \$s0,}$

0x2010004d

0x20117a02

0x8e28000c

0x2080064

0xa0280008

0x2200001

0x2a0f0096

0x22310001

0x15e0ffa

0x02018022

Summary

CUE

sub \$s0, \$s0, \$s0

cannot just use &sub. need to
store lw in \$at (pseudo)

{ addi \$at, \$zero, 100
 sub \$s0, \$s0, \$at

addi \$at, \$zero, 100
 op rs rt imm

8hex 0 0 | 100
00000000 0000 0,001, 0000,0000, 0100, 0100

~~0x40100064~~ 0x20010064

sub \$s0, \$s0, \$at
 op rs < rt > rd shamt funct
 0hex 16 1 16 0 2hex
 00 0000 10000 00001, 10000 0000 10000

0x02018022

∴ 0x2010004d

0x20117a02

0x8e28000c

0x~~2~~1080064

0xae280008

0x22100001

0x2a0f0096

0x22310001

0x15e0ffa

0x20010064

0x02018022

Summary

CUE

b) Get MIPS:

0x20117a02

0010 00,00 000,1 000 |, 0111 1010 0000 00/0

op = 08_{hex} ≠ 0 ⇒ addi

~~11~~ op rs rt imme

8_{hex} 0 17 7a02_{hex}

addi \$s1, \$zero, 31234

0x8e28000c

1000 1110 0010 1000, 0000 0000 0000 1100

op = 23_{hex} ≠ 0 ⇒ lw

op rs rt imme

23_{hex} 17 8 0000_{hex}

lw \$t0, 12(\$s1)

0x21180064

0010 00,01 000,1 1000 0000 0000 0110 0100

op = 08_{hex} ≠ 0 ⇒ addi

op rs rt imme

8_{hex} 8 24 0064_{hex}

addi \$t8, \$t0, 100

0xae8f0008

1010 1110 1000 1111, 0000 0000 0000 1000

op = 2b ≠ 0 ⇒ sw

op rs rt imme

2b_{hex} 20 15 0008_{hex}

~~sw \$t7, 8(\$s4)~~

sw \$t7, 8(\$s4)

Summary

CUE

0x22100003

0010 0010 0001 0000, 0000 0000 0000 0011

op = 8hex ≠ 0 => addi

op rs rt imme

8hex 010 010 0003hex

addi \$t0, \$t0, 3

0x2a0f0042

0010 1010 0000 1111, 0000 ~~0000~~ 0010 0010

op 0hex ≠ 0 => slti

op rs rt imme

0hex 10 15 0042hex

slt \$t7, \$t0, 66

. addi \$t1, \$zero, 31234

lw \$t0, 12(\$t1)

addi \$t8, \$t0, 100

sw \$t1, 8(\$t4)

addi ~~\$t0, \$t0, 3~~ \$t0, \$t0, 3

slt \$t7, \$t0, 66

Summary