Given 0 x 12341234 is the start: lw $t1, 200 ($t0)

PC value is 0 x 12341234

Fetch value: 0 x 8D090200 (HEX)

0 x 1000110100001000100000010000000000

LW instruction format

LW t0 t1 offset

|  |  |  |  |
| --- | --- | --- | --- |
| 100011 | 01000 | 01001 | 0000 0000 0010 0000 |

Decode: read register: 01000

Opcode: 100011

Max value: 0

Write register: 01001

Read register

Offset Instruction [15-0]: 0000 0000 0010 0000

Control lines

Jump = 0

Branch = 0

Mem read = 1

Mem reg = 1

Aloop = 010

Mem write = 0

Alusrc = 1

Reg write = 1

Output

Fetch phase: read data 1 = contents of $t0

ALU phase: $t0 + 200H

Memory phase: Address: ALU output

Read data; data in location $t0 = 200 H

Write back phase: data from memory written to $t1

Nori $s0, $s1, -2

Fetch phase

Read register: $1

Write register: $s0

Instant [15:0]: 1111 1111 1111 1110

Read data: contents of $s0

ALU i/p1; read data 1

i/p2: FFFEH

o/p = $s1 0 + (FFFF)H

memory

wb o/p is written to $s0

Control lines:

Reg DST = 0

Jump = 0

Branch = 0

Mem read = 0

Mem Write = 0

Aloop = 010

ALUsrc = 0

Reg write = 1

J start

Decode:

|  |  |
| --- | --- |
| 00010 | Start |

PC = [0001 start]

Control:

Reg dst

Jump 1

Branch

Mem read write 0

Aloop

ALUsrc x

Reg write 0

Bne $s0, $s1 start

Reg dst 1

ALU op 110

Jump 0

Alu src

Branch 1

reg write 0

Mem read & write 0

And $a3, $a1, $a2

Fetch = 0 x 00A63824

Decode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 000 000 | 00101 | 00111 | 00000 | 100100 |