**Course**: ENCM 369

**Lab Section:** B03

**Lab 6**

**Student Name**: Mitchell Sawatzky

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Exercise A

Part I

addiu $sp, $sp, -96

OPCODE: 9

$sp: 29

-96: 0b10100000

|  |  |  |  |
| --- | --- | --- | --- |
| 001001 | 11101 | 11101 | 1111111110100000 |
| 9 | 29 | 29 | -96 |

So the machine code is 0b00100111101111011111111110100000

0x7fffed80 is already 32 bits long, so it just needs to be represented in base two as 0b01111111111111111110110110000000

The imm field from the machine code above needs to be sign-extended 16 bits into 0b11111111111111111111111110100000

1111111111111111111111111 0

0b01111111111111111110110110000000

+0b11111111111111111111111110100000

0b01111111111111111110110100100000

Part II

The value of *some offset* needs to be 0xc000 in this case, but 0xc000 is 0b1100000000000000, which cannot fit into a **signed** 16-bit constant. Another way to reach 0x1002c000 is to compute 0x10030000 – 0x4000. Since -0x4000 can fit into a signed 16-bit constant, it will be ok.

-0x4000 is equal to -16384.

lui $at, 0x1003

lw $t0, -16384($at)