

Example: encoding beq \$1, \$2, -3

From the MIPS reference sheet:

beq \$s, \$t, i 000100 sssss ttttt iiiiiiiiiiiiiiiiii

Decode the input:

op: 4 00000000000000000000000000000000 000100
s: 1 00000000000000000000000000000000 00001
t: 2 00000000000000000000000000000000 00010
i: -3 111111111111111111 11111111111111101

Shift into position:

op: 4 << 26 000100 00000 00000 00000000000000000000
s: 1 << 21 000000 00001 00000 00000000000000000000
t: 2 << 16 000000 00000 00010 00000000000000000000
i: -3 & 0xffff 000000 00000 00000 11111111111111101

Or them together:

word = (4<<26) | (1<<21) | (2<<16) | (-3 & 0xffff)
 000100 00001 00010 11111111111111101

8 bits at a time:

 00010000 00100010 11111111 11111101
System.out.write((word>>24) & 0xff) 00000000000000000000000000000000 00010000
System.out.write((word>>16) & 0xff) 00000000000000000000000000000000 00100010
System.out.write((word>>8) & 0xff) 00000000000000000000000000000000 11111111
System.out.write(word & 0xff) 00000000000000000000000000000000 11111101