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Comp org

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Chapter 3 exercises

**Note: answers are red**

Problem: 3.1

You subtract like regular base 10 numbers. Since we don’t have to borrow any numbers from the next base’s place during subtraction, we just subtract like regular.

Problem: 3.4

Since this is in octal base, when we subtract and borrow from the next place’s number, we add an 8 to the digit since this is in base 8.

Problem: 3.20

Hexadecimal: 0x0C000000

Binary: 0000 1100 0000 0000 0000 0000 0000 0000

Two’s Complement: + (Since no 1’s are at the first value of this hexadecimal number representation, we assume it is a positive integer and just add up all the bits)

Unsigned Integer: + (Same answer as above)

Problem: 3.21

000011 (opcode) 000 0000 0000 0000 0000 0000 0000

A jal (Jump and Link) instruction will be ran in MIPPS

Problem: 3.22

0000 1100 0000 0000 0000 0000 0000 0000 0000

0 0001 1000 000 0000 0000 0000 0000 0000

1.0 \* 2^ 24 – 127

=

Problem: 3.23

63.25 🡪 11 1111.01 🡪 1.1111101 x

IEEE Single Precision 754: 0 1000 0100 111 1101 0000 0000 0000 0000

Problem: 3.24

63.25 🡪 11 1111.01 🡪 1.1111101 x

IEEE Double Precision 754: 0 100 0000 0100 1111 1010 + (44 0’s)

Problem: 3.27

-1.5625 x 🡪 -0.15625 🡪 -0.00101 🡪 -1.01 x

.5, .25, .125, .0625, .03125, .015625 (base 2, negative exponents)

Half Precision Bias = 15

IEEE Half Precision 754: 1 0 1100 01 0000 0000

By using Half Precision, we were able to fully and accurately represent this number. The only problem is that using Half Precision is that it can only accurately store in 10 decimal places, and using Single Precision can store up to and represent 23 decimal places.