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Computer Architecture

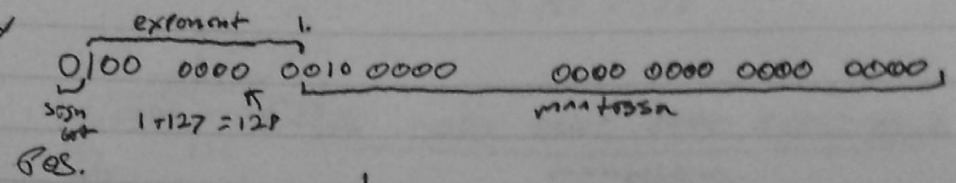
20-Jan-15
HW 2

Problem Set:
Ch. 1 : 6(a,b,c,d), 7(a,b,c,d), 8

6)

a) 0x40200000

binary



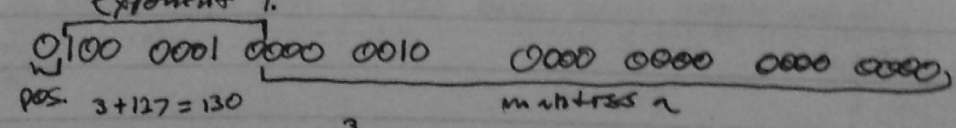
1.01×2^1

mt

2.5

b) 0x4102 0000

binary



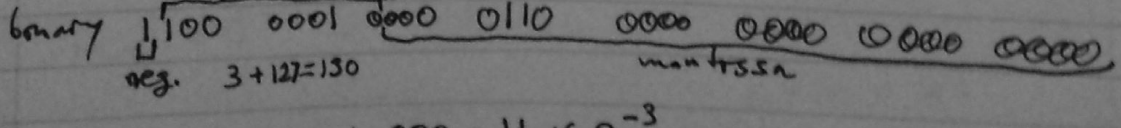
1.0×2^3

mt

8.125

c) 0xC106 0000

binary



$+1.000011 \times 2^{-3}$

-8.375

mt

d) 0x BD80 0000

binary 1011 1101 1000 0000 0000 0000 0000 0000

sign bit = 1 | exponent | mantissa

-1.0×2^{-4}

mt -0.0625

7) a) mt 2.0

1×2^{1} ← real exp

1 + 127 = 128

IEEE exponent 1. mantissa

0 1000 0000 0000 0000 0000 0000 0000 0000

sign bit 128

b) mt 45.0

$2^5 = 32$

exp

127 + 5 = 132

IEEE exponent 1. mant

0 1000 0100 0110 0100 0000 0000 0000 0000

sign bit 132

Mant. $\frac{45}{32} = 1.40625$

0.40625 x2 = 0.8125

0.8125 x2 = 1.625

0.625 x2 = 1.25

0.25 x2 = 0.5

0.5 x2 = 1.0

0.0 x2 = 0

⋮

c) mt 61.01

$2^5 = 32$

exp

127 + 5 > 132

IEEE exponent 1. mant

0 1000 0100 1110 0100 0000 0000 0000 0000

sign bit

$\frac{61.01}{32}$

Mant

1.90656250 x2 = 1.8131250

.8131250 x2 = 1.625

.625 x2 = 1.25

.25 x2 = 0.5

.5 x2 = 1.0

.0 x2 = 0.0

.084 x2 = 0.168
.168 x2 = 0.0336
.0336 x2 = 0.0672
.0672 x2 = 0.1344

d) int -18.375

x $1^{-4} = -16$

exponent 1.

IEEE 1 011 1101 1 100 1000 0000 0000 0000 0000

sign bit

123

exp
$-4 + 127 = 123$

mant: $\frac{-18}{-16}$ 1.125

.125 x2 = 0.25
.25 x2 = 0.5
.5 x2 = 1.0

8) No. If the number can be represented as a 32-bit integer it can be written as an IEEE float point. This is because you can represent them in the ~~Scientific format. 1,000,000,000,000 to~~