CEC470 – Homework 2

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10.1:

Sign Magnitude, is a binary representation of the positive and negative decimal numbers, where the left most digit is the sign value and the n – 1 values to the right are the integer value, this has its own draw back of two ways to right zero as +0 and -0.

Twos Complement, is another binary representation of the positive and negative decimal numbers where the representations of positive are normal binary where as the negative representations are the positive values but where each bit is flipped and 1 is added, a benefit of this representation is the one way to display 0

Biased, is another way to represent decimal numbers in binary and is characterized by all values are biased by 2^3 which is 8

10.3:

The sign extension rule is where the most significant bit which for signed numbers determines the sign of the value is repeated out if the bit size for a value needs to be increased for example 1010 in 4 bits to an 8 bit would be 1111 1010.

9.6:

a. 11100.011 -> 16 + 8 + 4 + 0 + 0 + 0 + .25 + .125 = 28.375

b. 110011.10011 -> 32 + 16 + 0 + 0 + 2 + 1 + .25 + 0 + 0 + (1/8) + (1/16) = 51.4375

c. 1010101010.1 -> 512 + 0 + 128 + 32 + 0 + 8 + 0 + 2 + 0 + .5 = 682.5

9.14:

a. 204.125

204 -> 1100 1100

.125 \* 2 -> .25

.25 \* 2 -> .5

.5 \* 2 -> 1

.125 -> 001

204.125 -> 11001100.001 -> CC.2

b. 255.875

255 -> 1111 1111

.875 \* 2 -> 1.75

.75 \* 2 -> 1.5

.5 \* 2 -> 1.0

110

255.875 -> 11111111.110 -> FF.E

c.631.25

631 -> 0010 0111 0111

.25 \* 2 -> .5

.5 \* 2 -> 1

0001

631.25 -> 0010 0111 0111.0001 -> 277.4

d. 10000.00390625

10000 -> 0010 0111 0001 0000

.00390625 \* 2 -> .0078125

.0078125 \* 2 -> .015625

.015625 \* 2 -> .03125

.03125 \* 2 -> .0625

.0625 \* 2 -> .125

.125 \* 2 -> .25

.25 \* 2 -> .5

.5 \* 2 -> 1

0000 0001

10000.00390625 -> 0010 0111 0001 0000.0000 0001 -> 2710.01

10.1:

+512

0000 0010 0000 0000

0000 0010 0000 0000

-29

1111 1111 0001 1100

1111 1111 1110 0011

10.2:

1110 1011

0001 0100

-20

0010 1101

11 01 0010

210

10.15:

23 x 29

010111 x 011101

|  |  |  |  |
| --- | --- | --- | --- |
| A | Q | Q-1 | M |
| 000000 | 010111 | 0 | 011101 |
| 000000  + 100010  100011 | 010111 | 0 | 011101 |
| 110001 | 101011 | 1 | 011101 |
| 111000 | 110101 | 1 | 011101 |
| 111100 | 011010 | 1 | 011101 |
| 111100  + 011101  001001 | 011010 | 1 | 011101 |
| 000100 | 101101 | 0 | 011101 |
| 000100  + 100010  100110 | 101101 | 0 | 011101 |