COSC 2325 Computer Organization

Assignment 11

Due: 23:59:00, 11/21/2022 (Monday)

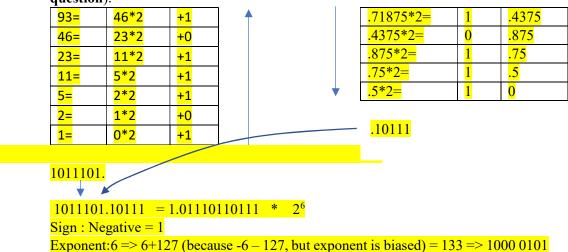Andrew Kalathra

1. (30 points) Please convert 8-bit fixed point expression 11010011 to decimal (Chapter 29, **this is NOT a programming question**)

Values	1	1	0	1	.	0	0	1	1
Pos	3	2	1	0		-1	-2	-3	-4
Convert	$(1*2^3)$	$+ (1*2^2)$	$+(0*2^1)$	$+(1*2^0)$	+	$(0*2^{-1})+$	$(0*2^{-2})+$	$(1*2^{-3})+$	$(1*2^{-4})=$
Convert Again	8	+ 4	+0	+1	+	0+	0+	.125+	.0625=

Answer: 13.1875

2. (70 points) Please convert decimal expression -93.71875 to hexadecimal in 32-bit IEEE 754 single precision format (Chapter 30, **this is NOT a programming question**).

93=	46*2	+1
46=	23*2	+0
23=	11*2	+1
11=	5*2	+1
5=	2*2	+1
2=	1*2	+0
1=	0*2	+1

.71875*2=	1	.4375
.4375*2=	0	.875
.875*2=	1	.75
.75*2=	1	.5
.5*2=	1	0

.10111

1011101.

1011101.10111 = 1.01110110111 * 2^6

Sign : Negative = 1

Exponent:6 => 6+127 (because -6 – 127, but exponent is biased) = 133 => 1000 0101

Mantissa = 01110110111 => 0 extended => 01110110111000000000000

Sign	Exponent								Mantissa																						
1	1	0	0	0	0	1	0	1	0	1	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0

To Hex:
1100   0010   1011   1011   0111   0000   0000   0000

Binary	1100	0010	1011	1011	0111	0000	0000	0000
Decimal	12	2	11	11	7	0	0	0
Hex	C	2	B	B	7	0	0	0

= 0x C2BB7000