CMSI 2210 Fall 2021 HOMEWORK 03 SOLUTIONS

#	Problem	Solution
1	Hex FAC3 in binary is:	1111 1010 1100 0011
2	Hex FAC3 as an unsigned decimal is:	64195
3	Hex FAC3 as a signed decimal is: -1341	-1341 [1111101011000011 2's comp=> 0000010100111101]
4	Hex 0064 in binary is:	0000 0000 0110 0100
5	Hex 0064 as an unsigned decimal is:	100
6	Hex 0064 as a signed decimal is:	100
7	Hex 8000 in binary is:	1000 0000 0000 0000
8	Hex 8000 as an unsigned decimal is:	32768
9	Hex 8000 as a signed decimal is:	-32768
10	Decimal 8000 encoded in 16-bits (unsigned) is in hex:	0001 1111 0100 0000 => 0x1F40
11	Decimal 8000 encoded in 16-bits (signed) is in hex:	0001 1111 0100 0000 => 0x1F40
12	Decimal -11 encoded in 16-bits (signed) is in hex:	0xFFF5
13	Decimal -32717 encoded in 16-bits (signed) is in hex:	0x8033
14	Binary 10111101 in hex is:	0xBD
15	Binary 1011110100000001 as an unsigned decimal is:	48385
16	Binary 1011110100000001 as a signed decimal is:	- 17151
17	If we had 20-bit registers, the smallest signed decimal value would be:	-524288
18	If we had 20-bit registers, the largest signed decimal value would be:	524287
19	The modular sum of 16-bit hex values 3511 + 4FFC is:	0x850D
20	The saturated sum of 16-bit hex values 3511 + 4FFC is:	0x850D
21	The 16-bit operation 3511 + 4FFC has a carry (Y or N):	N [850D fits within 16 bits]
22	The 16-bit operation 3511 + 4FFC has an overflow (Y or N):	Y [850D is negative, but it's addition of 2 pos.]
23	The modular sum of 16-bit hex values 6159 + F702 is:	0x585B
24	The saturated sum of 16-bit hex values 6159 + F702 is: 0x585B	0xFFFF

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25	The 16-bit operation 6159 + F702 has a carry (Y or N):	N [the values in dec. are 24921 – 2302 = 22619 and the outcome, 585B fits in 16 bits]
26	The 16-bit operation 6159 + F702 has an overflow (Y or N):	N [the values in dec. are 24921 – 2302 = 22619 and the outcome, 585B is pos.]
27	The modular sum of 16-bit hex values EEEE + C00C is:	0xAEFA
28	The saturated sum of 16-bit hex values EEEE + C00C is:	0xFFFF
29	The 16-bit operation 9EEE + AB0C has a carry (Y or N):	Y
30	The 16-bit operation 9EEE + AB0C has an overflow (Y or N):	Y
31	The negation of 16-bit word B00F is:	1011 0000 0000 1111 => 0100 1111 1111 0001 0x4FF1
32	The negation of 16-bit word 2232 is:	0010 0010 0011 0010 => 1101 1101 1100 1110 0xDDCE
33	The negation of 16-bit word 8000 is:	1000 0000 0000 0000 => 1000 0000 0000 0000 0x8000
34	The negation of 32-bit word FFF329BA is:	1111 1111 1111 0011 0010 1001 1011 1010 => 0000 0000 0000 1100 1101 0110 0100 0110 => 000C D646
35	The largest finite IEEE-754 single precision float, in hex is:	0x7F7F FFFF [0 11111110 11111111111111111111111]
36	The smallest finite IEEE-754 single precision float, in hex is:	0xFF7F FFFF [1 11111110 11111111111111111111111]
37	The largest non-zero negative IEEE-754 single precision float, in hex is:	0x80800000 [1000 0000 1000 0000 0000 0000 0000 0000] which makes -0.00000000000000000000000000000000011754943508… or -1.1754943508222875e-38
38	The smallest non-zero positive IEEE-754 single precision float, in hex is:	0x0080 0000 [0 00000100 000 1000 0001 1100 1110 1010] which makes 0.00000000000000000000000000000000011754943508… or 1.1754943508222875e-38
39	-5.125 X 2^{90} as a 32-bit float, in hex is:	0xEDA4 0000 [1 11011011 010 0100 0000 0000 0000 0000]
40	96.03125 as a 32-bit float, in hex is:	0x42C0 1000 [0100 0010 1100 0000 0001 0000 0000 0000]
41	2^{-138} as a 32-bit float, in hex is:	0x00000800 [denormalized] [0 00000000 000 0000 0000 1000 0000 0000]
42	1.5 X 2^{-143} as a 32-bit float, in hex is:	0x00000060 [denormalized] [0 00000000 000 0000 0000 0000 0110 0000]
43	-16777216 as a 32-bit float, in hex is:	0xCB80 0000 [1 11111110 00000000000000000000000]
44	Hex 43700000, when interpreted as an IEEE-754 pattern, is in decimal:	240 [0 10000110 111 0000 0000 0000 0000 0000]
45	Hex C0FF0000, when interpreted as an IEEE-754 pattern, is in decimal:	–7.96875 [1.1111111 x $2^{(129-127)}$ or 111.11111] [1 10000001 111 1111 0000 0000 0000 0000]
46	Hex C059 0000 0000 0000, when interpreted as an IEEE-754 pattern, is in decimal:	-1.1125369292536007e-308