CS org Homework #3

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C Level

1) 1111 1010 1100 0011

2) 1+2+64+128+512+2048+4096+8192+16384+32768
= 64195

3) -32768+1+2+64+128+512+2048+4096+8192+16384
= -13411

4) 0000 0000 0110 0100

5) 4+32+64 = 100

6) 100

7) 1000 0000 0000 0000

8) 32768

9) -32768

10) 8000

4000	2000	1000	500	250	125	62	31	15	7	3	1	0
0	0	0	0	0	0	1	0	1	1	1	1	1

= 0001 1111 0100 0000 = 1F40

11) 0001 1111 0100 0000 = 1F40

12) 1111 1111 1111 1111 = -1,
-(1010 = 10)
= 1111 1111 1111 0101 = FFF5

13) 1000 0000 0000 0000 = -32768
-11 0011 = 51
= 1000 000 0011 0011 = 8033

25	12	6	5	1	0
1	1	0	0	1	1

14) BD

15) 1+256+1024+2048+4096+8192+32768 = 48385

16) -32768+1+256+1025+2048+4096+8192 = -17151

17) 1000 0000 0000 0000 0000, = -2^{19} = -524288

18) 0111 1111 1111 1111 1111 = $2^{19}-1$ = 524287

19) $\overset{1\ 1}{3511} + 4FFC$ = 850D

20) 850D

21) No

22) 1000... Yes

Cs Org homework #3 cont.

B level

2) $\begin{smallmatrix} 6159 \\ +F702 \end{smallmatrix} = 585B$

3) FFFF

4) Yes

5) 0101... NO

6) $\begin{smallmatrix} EEEE \\ +C00C \end{smallmatrix} = AEFA$

7) FFFF

8) $\begin{smallmatrix} 9EEE \\ +ABOC \end{smallmatrix} = 49FA$ Yes

9) 0100... NO

10) 1010 0000 0000 1111 → 0101 1111 1111 0000 = 5FF0

11) 0010 0010 0011 0010 → 1101 1101 1100 1101 = DDCD

12) 1000 0000 0000 0000 → 0111 1111 1111 1111 = 7FFF

13) 1111 1111 1111 0011 0010 1001 1011 1010 → 0000 0000 0000 1100 1101 0110 0100 0101 = 000CD645

14) 96.03125

48	24	12	6	3	1	0
0	0	0	0	0	1	1

0.0625	0.125	0.25	0.5	1
0	0	0	0	1

1100000.00001 = 1.10000000001×2^6

S=0 $6+127 = 133 = 10000101$

$128+4+1$

0 100 0010 1100 0000 0001 0000 0000 0000 = 42C01000

15) -16777216

8388608	4194304	2097152	1048576	524288	262144	131072	65536
0	0	0	0	0	0	0	0

32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

S=1

75	37	18	9	4	2	1	0
1	1	1	0	1	0	0	1

$10000000000000000000000 = 2^{24} \times 1.0 \ldots$ $127+24 = 151$

1 100 1011 1000... = CB800000

16) 43700000 = 0100 0011 0 111 0000... S=0 $10000110 = 2+4+128 = \frac{134}{-127} = 7$ $2^7 \times 1.1110\ldots$

(c) 1111 0000 = 16+32+64+128 = 240

17) C0FF0000 = 1100 0000 1 111 1111 0000... S=1 $10000001 = 1+128 = \frac{129}{-127} = 2$ $2^2 \times 1.111\ 1111 0\ldots$

(1) 111.11111 $= -(7 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}) = -7\frac{31}{32} = -7.96875$

CS org HW#3 cont.

A Level

2) 0 111 1111 0 111 1111 1111 1111 1111111 = 7F7FFFFF

255 = NaN s=0 e=254 f=111...

so 254 is max s=1 e=254 f=111...

3) 1111 1110 111 1111 1111 1111 1111 1111 = FF7FFFFF

4) 1000 0000 0 000 0000 00000000000000001 = 80000001 s=1 e=0 f=0...01

5) 0000 0000 0000 0000 00000000000000001 = 00000001 s=0 e=0 f=0...1

6) $-5.125 \cdot 2^{90} = -5.125 \rightarrow$ float + e = 90+127 = 217

217: 128 64 32 16 8 4 2 1 = 1 0 0 1 1 0 0 1

s=1 5: 4 2 1 = 1 0 1 0.125: 0.25 0.5 1 = 0 0 1

$101.001 = 1.01001 \times 2^2$

$= 11011001 + 00000010 \leftarrow = 11011011 = e$

1110 1101 10100100... = EDA40000

7) 2^{-138} 138 − 127 = 11 $1.0 \cdot 2^{-11} \rightarrow 0.\overbrace{0\ldots0}^{11}1 = f$ s=0 e=0

0000 0000 0000 0000 0000 1000... = 00000800

8) $1.5 \cdot 2^{-143}$ 143 − 127 = 16 $1.1 \cdot 2^{-16} \rightarrow 0.\overbrace{0\ldots0}^{14}11 = f$ s=0 e=0

0000 0000 0 000 0000 0000 0000 0110 0000 = 00000060