

Solution 6

1.

Fractional value	Binary representation	Decimal representation
1/8	0.001	0.125
3/4	0.11	0.75
43/16	10.1011	2.6875
25/16	1.1001	1.5625
51/16	11.0011	3.1875

2.

A. $E = 2$, $M = 1.01_2 = 5/4$, $f = 0.01_2 = 1/4$, $V = 5$.

The exponent bits: 100...01; The fraction bits: 0100...0.

B. $E = n$, $M = 1.11...1_2 = 2 - 2^{-n}$, $f = 0.11...1_2 = 1 - 2^{-n}$, $V = 2^{n+1} - 1$.

The exponent bits: $n + 2^{k-1} - 1$; The fraction bits: 11...11.

C. $E = 2^{k-1} - 2$, $M = 1$, $f = 0$, $V = 2^{k-1} - 2$.

The exponent bits: 11...101; The fraction bits: 00...00.

3.

Format A		Format B	
Bits	Value	Bits	Value
1 01110 001	$-\frac{9}{16}$	1 0110 0010	$-\frac{9}{16}$
0 10110 101	208	0 1110 1010	208
1 00111 110	$-\frac{7}{1024}$	1 0000 0111	$-\frac{7}{1024}$
0 00000 101	$\frac{5}{131072}$	0 0000 0001	$\frac{1}{1024}$
1 11011 000	-4096	1 1110 1111	-248
0 11000 100	768	0 1111 0000	$+\infty$

4.

	Offset of each field				Total size	alignment
A	i:0	c:4	j:8	d:16	24	8
B	i:0	c:8	d:9	j:12	16	8
C	w:0	c:8			32	8
D	a:0	p:48			56	8
E	w:0	c:6			10	2