

DANIEL CHAPIN

CS21

QUIZ 6

1. 5.75

CONVERT 5 TO BINARY

$$5_{10} = 101_2$$

CONVERT .75 TO BINARY

$$.75 = .11$$

$2^{-1} 2^{-2}$

$$5.75_{10} = 101.11_2$$

63/64

$$.111111$$

$1/2 \ 1/4 \ 1/8 \ 1/16 \ 1/32 \ 1/64$

$$\frac{32}{64} + \frac{16}{64} + \frac{8}{64} + \frac{4}{64} + \frac{2}{64} + \frac{1}{64} = \frac{63}{64}$$

$$63/64_{10} = D.111111_2$$

9.8125

CONVERT 9 TO BINARY

$$9_{10} = 1001_2$$

CONVERT .8125 TO BINARY

$$.1101$$

$2^{-1} 2^{-2} 2^{-3} 2^{-4}$

9.8125

$$\begin{array}{r} .8125 \\ -.5 \\ \hline .3125 \\ -.25 \\ \hline .0625 \\ -.0625 \\ \hline 0 \end{array}$$

$$9.8125 = 1001.1101_2$$

2. 34.890625 SIGN = + = 0

CONVERT 34_{10} TO BINARY

1 0 0 0 1 0
32 16 8 4 2 1

CONVERT $.890625_{10}$ TO BINARY

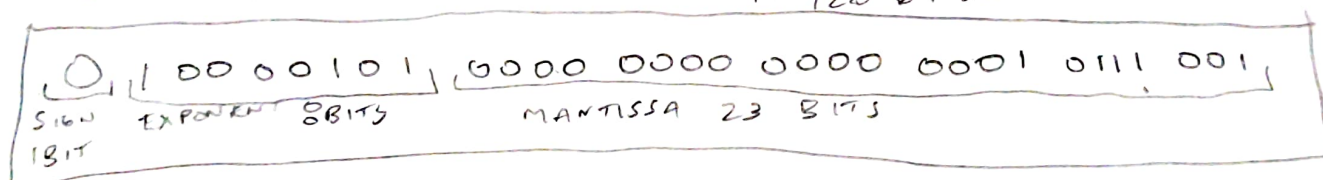
. 1 1 1 0 0 1
.5 .25 .125 .0625 .03125 .015625

$$\begin{array}{r} .890625 \\ -.5 \\ \hline .390625 \\ -.25 \\ \hline .140625 \\ -.125 \\ \hline .015625 \\ -.015625 \\ \hline 0 \end{array}$$

100010.111001 SHIFT TO LEFT MOST 1

1.00010111001 $\times 2^5$ UNBIASED EXP = 5

BIASED EXPONENT = $5 + 127 = 132_{10} = 10000100$
128 64 32 16 8 4 2 1



3. SIGN = 0 = +

BIASED EXPONENT = $01111011_2 = 64 + 32 + 16 + 8 + 2 + 1 = 123_{10}$
128 64 32 16 8 4 2 1

UNBIASED = $123_{10} - 127_{10} = -4$

$1.0 \times 2^{-4} = 0.0001 = 0.0625$
.5 .25 .125 .0625

4. A DENORMALIZED NUMBER HAS ZERO FOR THE EXPONENT, BUT A NONZERO MANTISSA. A DENORMALIZED STARTS WITH ZERO INSTEAD OF A ONE FOR NORMALIZED.
LARGEST DENORMALIZED NUMBER

0 00000 111111111 = $0.111111111_2 \times 2^{-14}$

SMALLEST NORMALIZED NUMBER

0 00001 0000000000 = $1.0_2 \times 2^{-14}$