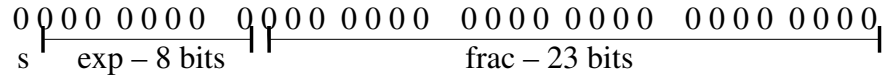


IEEE Floating Point Examples  
 CSci223 – Spring 2005

This page is only concerned with 32-bit floats, as they are the only type of IEEE floating point values that will be on the test. Also, you will not be asked to encode or decode denormalized numbers on the test.



Normalized Interpretation

(when exp is neither all 1s nor all 0s)

$$V = (-1)^s \times M \times 2^E \qquad M = 1 + \text{frac} \qquad E = \text{exp} - \text{Bias}$$

$$\text{Bias} = 2^{k-1} - 1 = 127 \qquad k = \text{length}(\text{exp}) = 8$$

Examples:

0x40490FDB = 3.141593

0x4400C99A = 515.15

0xC2F6A45A = -123.321

0x402DF854 = 2.718282

0x3FB504F3 = 1.414214

0x3FCF1BBD = 1.618034

Special Interpretation

(when exp is all 1s)

+Infinity:

0111 1111 1000 0000 0000 0000 0000 0000 = 0x7F800000

-Infinity:

1111 1111 1000 0000 0000 0000 0000 0000 = 0xFF800000

NaN (Not a Number):

?111 1111 1xxx xxxx xxxx xxxx xxxx xxxx

Sign bit can be set or unset. The *x* bits can be anything but all 0s.