Floating Point HW 2 other representations

27.

(-1.5625 x 10^-1)ten = -0.00101two but since we have a hidden one, we normalize the form as -0.00101two = (-1.01 x 2 ^-3)two

Now all we need to do is find the following representations, 1, exponent 12 and fraction 01, so the representation is 1 0100 0100000000

Since exponents are much shorter, the range is way shorter than a normal single-precision IEEE754 standard notation. Also, the fraction is shorter, so the half precision is no long accurate.

28.

(-1.5625 x 10^-1)ten = -0.00101two but we do not have a hidden one this time. So we must write -0.00101two = (-0.101 x 2^-2)two. The fraction is 0101 and since it's negative, we apply two's compliment. 0101 0000 0000 0000 0000 0000/1010 1111 1111 11111 1111 1111 + 0000 0000 0000 0000 0000 0001/1011 0000 0000 0000 0000 0000 which the exponent is -2 so 0000 0101. This is then represented as 1011 0000 0000 0000 0000 0000 0000 0101

It uses the 24 bits for the fraction and two's complement, so its accuracy is better than standard IEEE754. The ranged are of the IEEE754 is slightly smaller though.