

**1.13** Suppose a new standard, the IDDD-643 standard, is developed for storing numbers in a string of 16 bits. The first bit is used for the sign of the number (0 if positive and 1 if negative). The next five bits store the exponent plus the bias, and the remaining 10 bits store the mantissa. The bias is 15 and no bits are reserved for any special purposes. What is the smallest exponent that can be stored?

**Solution**

The smallest exponent that can be stored in binary form is 00000, so the exponent plus the bias would be 0, meaning that the exponent is  $0 - 15 = -15$ . So, the smallest exponent that can be stored is -15.

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