Information content/Entropy.

The information content, entropy, of a particular symbol, $x$, is calculated from the probability of its occurrence using the following formula. If $p(x) = 0$ then $H(x) = 0$ by definition.

$$H(x) = -\log p(x)\cdot p(x)$$

Remember that all probabilities must obey the following rule.

$$0 \leq p(x) \leq 1$$

When $p(x) = 1$, $-\log p(x) = 0$. Otherwise $\log p(x) < 0$ and $-\log p(x) > 0$.

If a code $X$ consists of $n$ symbols, $x_1, x_2, \ldots, x_n$, then

$$H(X) = -\sum_{i=1}^{n} p(x_i)\log p(x_i)$$