

Hamming Weight

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Hamming distance

| | | | | | | | | |
|----------|---|---|---|---|---|---|---|---|
| a | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| b | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| \oplus | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |

- The Hamming distance between two words of equal length is the number of places in which they differ.
- The Hamming distance between a and b is 4.

Hamming weight

| | | | | | | | | |
|-----------|---|---|---|---|---|---|---|---|
| a | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| $\bar{0}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| \oplus | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |

- The Hamming of a word is the number of non-zero symbols in it.
- The Hamming weight of a is five.
- This is equal to the Hamming distance between a and the zero word.

Loop-up tables

Exercise

Write an algorithm that counts the number of bits set in an integer.

Loop-up tables

Exercise

Write an algorithm that counts the number of bits set in an integer.

You might try the following methods:

- Bit shifting
- Look-up table
- Kernighan's method
- popcount