

Digital Data

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① Intro

Communicating with a computer requires an understanding of

a) Our own conventions

b) The rationale or rules of the computer.

A computer only knows "On / Off" which we will refer to as "1 / 0"

How can we represent information under this rule?

Types of information:

a) Numbers

b) Text

c) Sound

d) Images

II) Numbers

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Types: Natural numbers (+ 0)
Integers
Rational numbers
Real numbers.

II) 1) Natural numbers (+ 0)

Writing this year's number:

Two thousand twenty four

2 0 2 4

Convention # 1: Numbers are written from left to right.

Convention # 1 is used by in English and in computer representation of numbers.



2×1000 0×100 2×10 4

Each digit can be occupied by $0 \rightarrow 9$

Different digits represent the separator
over, 0 , 10 , 100 , 1000 , ...

(from left to right, with left being the largest.)

1000	100	10	0
10^3	10^2	10^1	10^0
4	1	6	3

On a computer, a "digit" can only take the values 0 or 1

A computer number is represented by "digits" representing powers of 2 .

A computer "number"

(4)

2^4	2^3	2^2	2^1	2^0
(16)	(8)	(4)	(2)	(1)
1	0	0	1	1

Example:

$$(11)_2 = (3)_{10}$$

$$(10011)_2 = (19)_{10}$$