Digital Data (2)

I) 1) Natural numbers (+ ∅)

N = thirty five

Our world

$N = a10^3 + b10^2 + c10 + d$

$\emptyset \times 10^3 + \emptyset \times 10^2 + 3 \times 10 + 5$

$(35)_{10}$

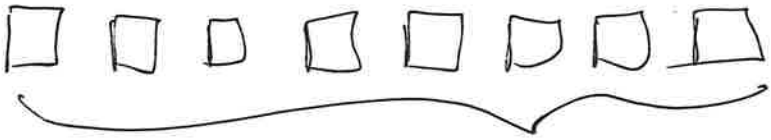
Computer world

$N = a2^5 + b2^4 + c2^3 + d2^2 + e2 + f$

		R
35	17	1
17	8	1
8	4	0
4	2	0
2	1	0
1	0	1

$(1\emptyset\emptyset\emptyset11)_2$

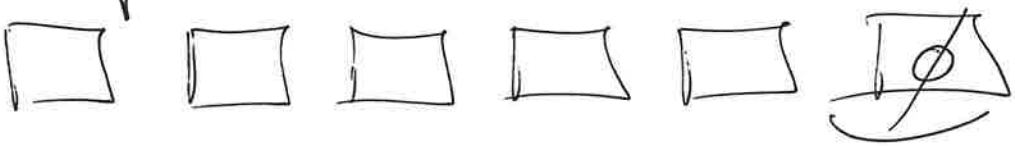
1 bit : " basic unit of information on a computer "

8 bits : 

byte

1 K byte : 1024 bytes

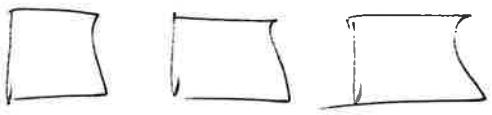
Anecdotic information



divisible by 2
" even "

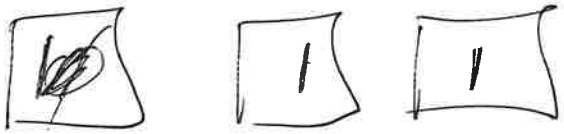
divisible by 4

If you have a number represented on 3 bits



smallest:

largest:



$2^2 \quad 2 \quad 2^\emptyset = (7)_{10}$

N bits: smallest number: $\emptyset$

largest number:

$2^{N-1} + 2^{N-2} + \dots 2 + 1 = 2^N - 1$

Number of numbers: 2^N

I) 2) Integers

Integers regroup { "positive integers" ≡ Natural numbers ; ∅ ; "negative integers" }

We have the concept of sign

Convention: $-N$ means negative integer

$+N$ means positive integer

Option 1

You add in front of the number what is refered to as a bit sign.

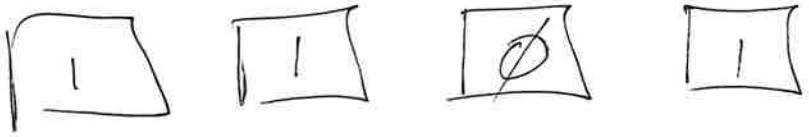
0	positive
1	negative

Example: $(7)_{10}$ = | 1 | 0 | 1 |

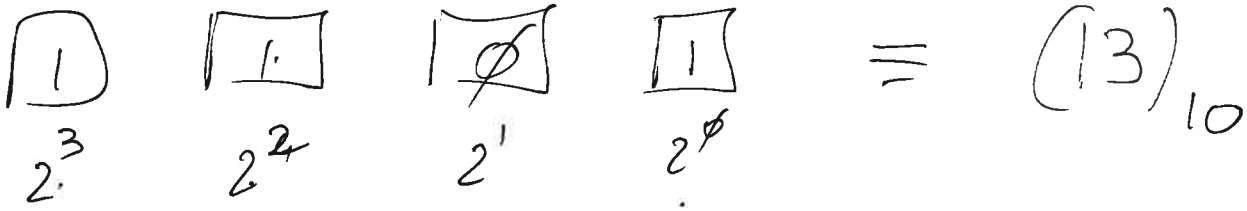
as a natual number

As an integer, 7

If I show to you the number



this is ambiguous!



or

natural number: largest number $2^5 - 1 = 31$

integer: largest number: $2^4 - 1 = 15$

Integers: