* IEEE-754 floating point Representation L-3

Single Precision

S	E	M

32 bit

1 | 8 | 23

Sign | E | M

Bias = 127

Double Precision

S	E	M

64 bit

1 | 11 | 52

S | E | M

Bias → 1023

if E = all 0's or 1's ⟶ Special Number

S	E	M	Number
0	0---0	0---0	+0
1	0---0	0---0	−0
0	1---1	0---0	+∞
1	1---1	0---0	−∞
0/1	1---1	M≠0-0	N.AN (not a number)
0/1	0---0	M≠0---0	Denormalized (fraction)
0/1	E≠0---0 and E≠1---1	M=X---X	Normal number (Implicit normalized)

Value format

Value (implicit) $= (-1)^S * 1.M * 2^{E-bias}$

Value (denormalized) $= (-1)^S * 0.M * 2^{-126}$ or -1022

-126 → Sigl single precision

-1022 → double precision

Denormalized number

A small number that can not be normalized.

Min. possible value of $E = (0\ldots1)_2$ or $(1)_{10}$

hence $e = 1-127 = -126$

if number ⇒ 0.000 — 011 ⇒ Implicit Normalization

128 times 0

* We can't normalize number after -126.

S	E: 0...0	M: 0011

$0.0011 * 2^{-126}$

M_2 0011

$1.1 * 2^{-129}$

$M = 1$

$e = -129$

$E = -129 + 127 = -2$

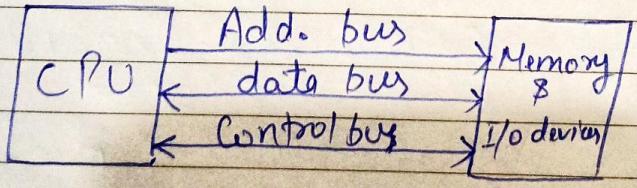
* Components of Computer L-4

- CPU → It is the brain of Computer which perform every single task.
  - → Control unit
  - → Arithmetic and logic unit

- Memory → Primary memory (Main) → RAM, ROM
  - → Secondary memory (Auxillary) → HDD.
- I/O devices → Input D.
  - → output D.

* Other components
  - System Bus → Connection of comm- -ication lines between components of computer

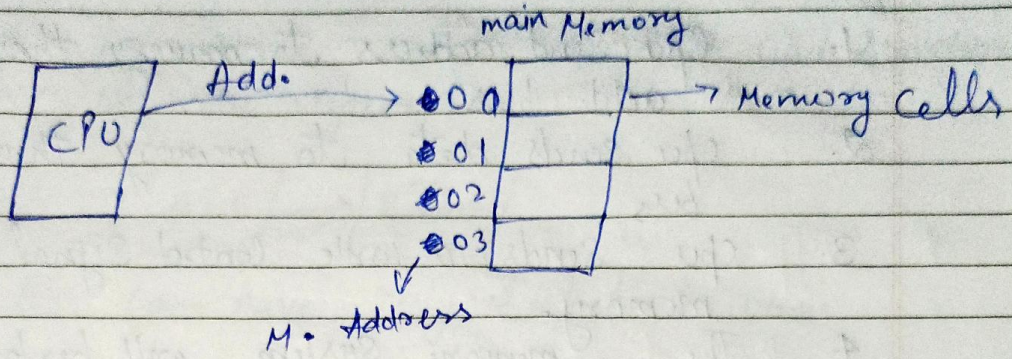
→ Address bus, data bus, Control bus



individually all signals are ~~Signals are~~ unidirectional

✓The Good Paper

Memory Address (RAM)



- Memory operation
  - read: data goes from memory to cpu
  - write: data goes from cpu to memory

if a memory has 2^n no. of address of address, Address length = n-bits

Memory can only perform one operation at a time, either read or write.

- Memory Access: Read
1. Cpu sends add. to memory through address bus.
2. CPU sends read control signal to memory
3. Memory perform read and send data through data bus.

Memory Access: write

1. Cpu Send address to memory through add. bus
2. cpu sends data to memory through data bus
3. cpu Sends a write Control Signal to memory.
4. The memory System will perform write operation.