⇒ data modifiers

- Sign
  - unsigned
  - Sign
- Size
  - short
  - long
- Storage
  - auto
  - register
  - extern
  - static
- Constant
  - Const
- Volatile
  - Volatile

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1 Sign

- Signed
  - (+ve , -ve)
  - $[-2^{n-1} , 2^{n-1}-1]$
- unsigned
  - (+ve) $\Rightarrow [0 ; 2^n - 1]$

($n \Rightarrow$ # bits)

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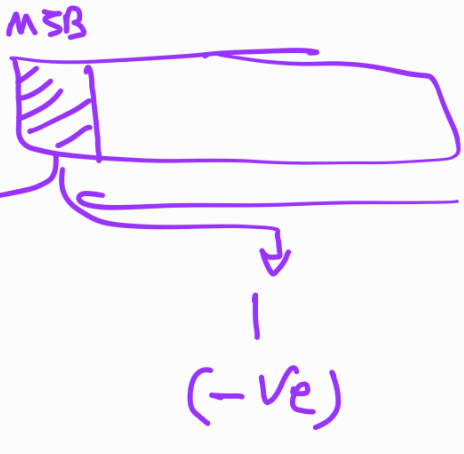
① Signed magnitude



Prob

① two Value of Zero ⟨ 0 0000000 (+0)
1 0000000 (-0)

② math oper (X)

+1 ⟶ 0000 0001
+
-1 ⟶ 1000 0001 +

0 | 1 0000 0010

= -2 X

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[2] 1's Compl — (0 ⇌ 1)

$10)_{10} = 0000\ 1010)_2$

(~)

$-10)_{10} \Rightarrow 1111\ 0101)_2$

0000 0000

↓~ > two Values of Zero

1111 1111

+1 0000 0001
+
-1 1111 1110 ⇒ 11111111

3 2's Compl

10 → 0000 1010

-10 → 1111 0110

0000 0000

1111 1111 → -0 (2's)

1+

+ → 0000 0000

+1 → 0000 0001

+

-1 → 1111 1111

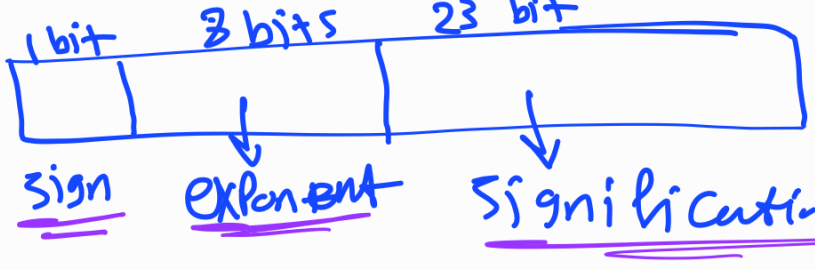
X → 0000 0000

2's → Integral

Floating Point repn in mem.

↳ (float & double)

① float → 4 bytes = 32 bits



$2^2\ 2^1\ 2^0\ \ 2^{-1}\ 2^{-2}$
$4\ 2\ 1$

$4,25)_{10} = 100,01)_2 \Rightarrow$ denormalized

$1,\_\_\_\_ \times 2^{\square}$

$1,0001 \times 2^{2} \Rightarrow$ norm

sign (+ve) → 0

mantissa

$2^{n-1} - 1 = 127$

$2 + 127 = 129)_{10} = 1000\ 0001)_2$

1 bit	8 bits	23 bits
0	1000 0001	0001 000 ...

double → 8 bytes = 64 bit → 1 → sign

→ 11 → expo

→ 52 → mante

$2^{11-1} - 1 = 1023$

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size

short

long

int ⟹ (2 (4)

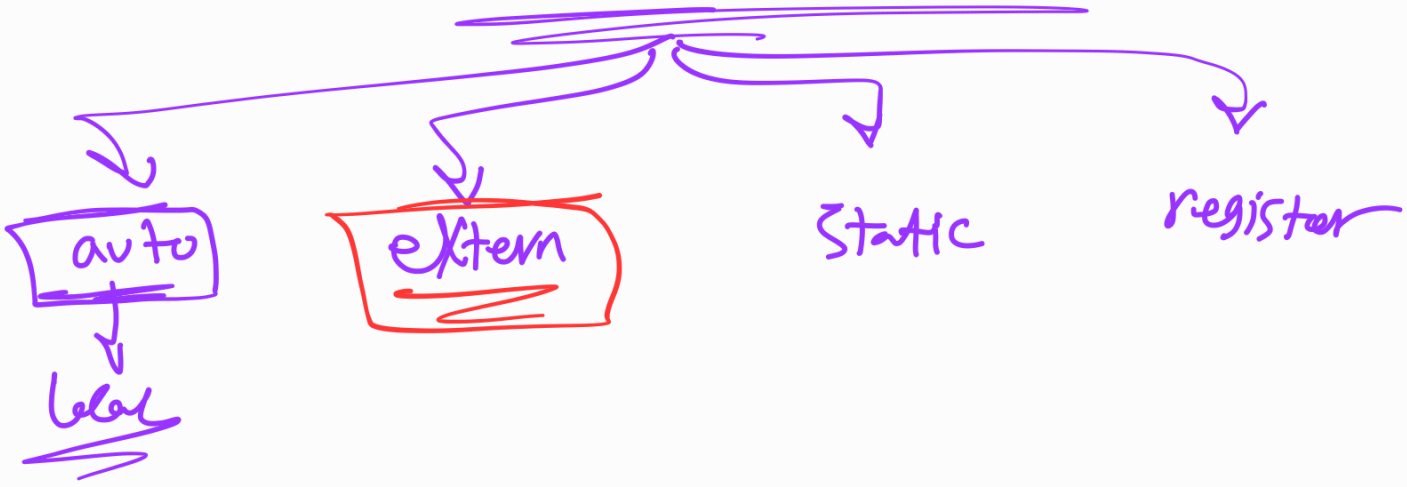
short int → 2

long ~ → 4

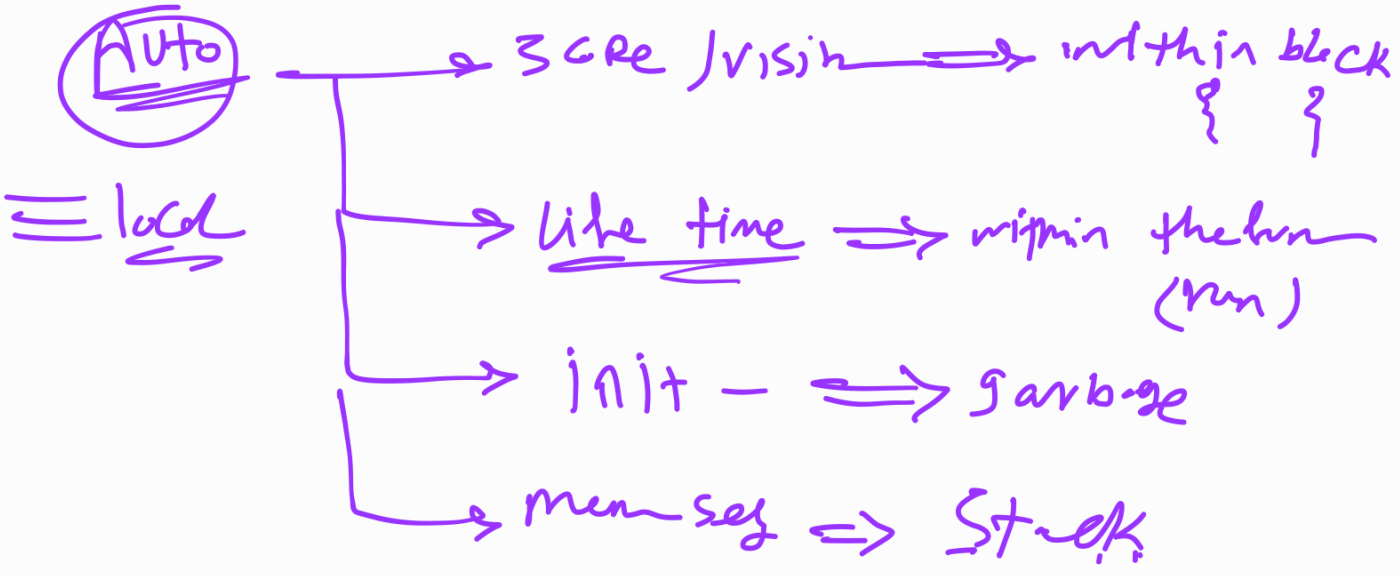
short ≡ short int

long ≡ long int

Storage classes




```
Void main()
{
   int x;  ==  auto int x;
}
```



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2 extern