

```
var x int
```

```
x = 1
```

```
for {
```

```
    fut. Println(x)
```

```
    x *= 3
```

```
}
```

overflow

INTERI SENZA  
SEGNO

(NATURALI)

1004

NOTA: ONE  
POSIZIONE  
IN BASE 10

MIV

↑

numerici

$$\text{BASE} = 5$$

0	∞
1	★
2	v
3	^
4	∩

★ v ∩

←  $5^2 5^1 5^0$

$$\begin{aligned} & 1 \times 5^2 + 2 \times 5^1 + 4 \times 5^0 = \\ & = 25 + 10 + 4 = \\ & = 39 \end{aligned}$$

BASE = 2

$$10100_2 = 20_{10}$$

0	0
1	1

$$\begin{array}{r} 10100 \\ \hline 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0 \end{array}$$

$$2^4 + 2^2 = 16 + 4 = 20$$

167	1
83	1
41	1
20	0
10	0
5	1
2	0
1	1
0	



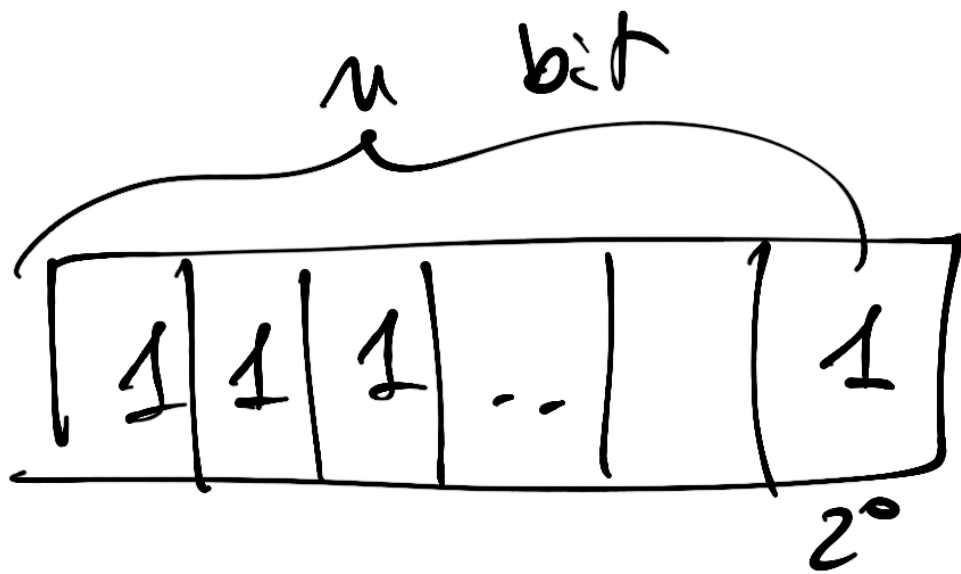
$$10100111$$

$$2^7 \quad 2^5 \quad 2^2 \quad 2^1 \quad 2^0$$

$$2^7 + 2^5 + 2^2 + 2^1 + 2^0 =$$

$$= 128 + 32 + 4 + 2 + 1 =$$

$$= 167$$



$$2^0 + 2^1 + 2^2 + \dots + 2^{n-1} =$$

$$= 2^n - 1$$

5

$$2^5 - 1 = 31$$

uint 8

$$0 \rightarrow 255$$

uint 16

$$0 \rightarrow 65535$$

uint 32

$$0 \rightarrow 4 \cdot 294 \cdot 967 \cdot 295$$

uint 64

$$0 \rightarrow \approx 1.84 \cdot 10^{89}$$

uint

?

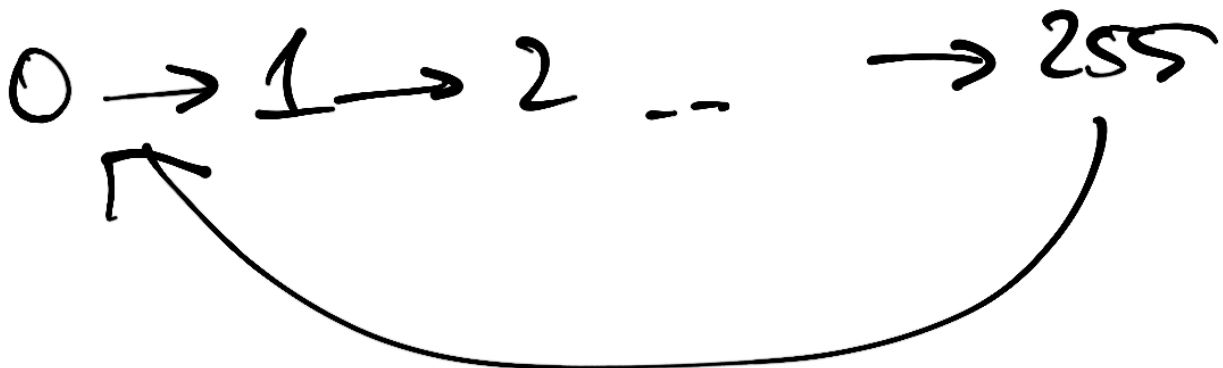


Var x uint8

x = 254

x++

x++ // overflow

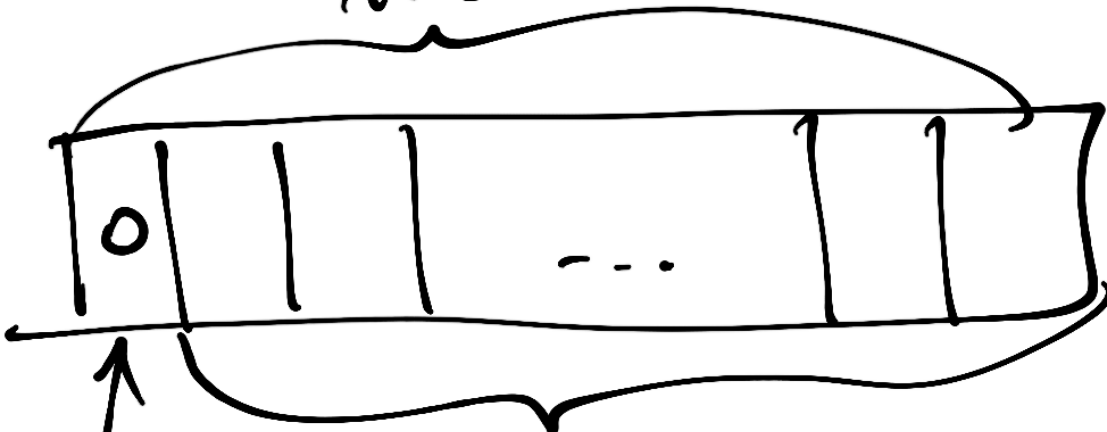


INTERI CON  
SEGNO

$n$  bit

$0 = +$

$1 = -$

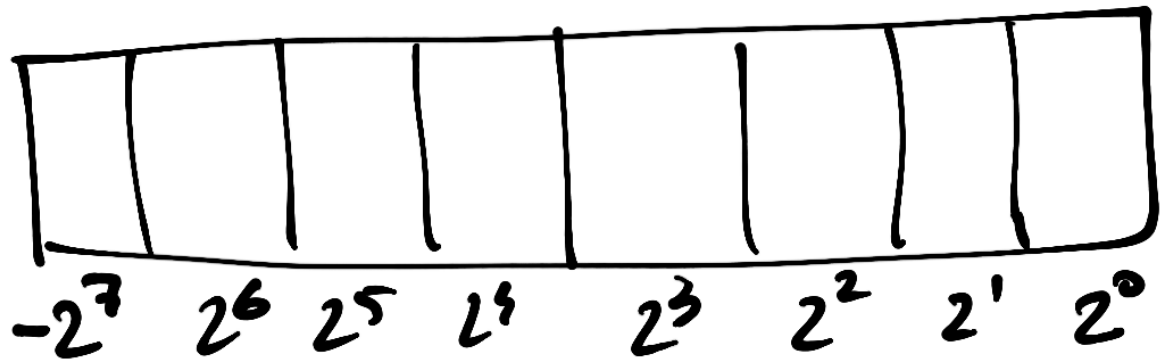


BIT DI  
SEGNO

$n-1$

$$2^n - 1$$

KAPPR. IN COMPL. A 2



0 1 1 1 1 1 1 1

$$2^7 - 1 = 127$$



0 0 0 0 0 0 0 0  
1 1 1 1 1 1 1 1

$$0 - 1$$



1 0 0 0 0 0 0 0

$$-2^7 = -128$$

$$2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0$$

$$10001010$$

$$00110110$$

---

$$11000000$$

BIT A1 SEGNO

$$-10$$

$$54$$

---

$$-64$$

uint8

$$2^1 + 2^3 + 2^7 = 2 + 8 + 128 = 138$$

$$2^1 + 2^2 + 2^4 + 2^5 = 2 + 4 + 16 + 32 = 54$$

$$2^7 + 2^6 = 128 + 64 = 192$$

int8

$$-2^7 + 2^3 + 2^1 = -128 + 8 + 2 = -118$$

$$2^1 + 2^2 + 2^4 + 2^5 = 54$$

$$-2^7 + 2^6 = -128 + 64 = -64$$

int 8

$$-128 \rightarrow 127$$

int 16

$$-32768 \rightarrow 32767$$

int 32

$$-2'147'483'648 \rightarrow 2'147'483'647$$

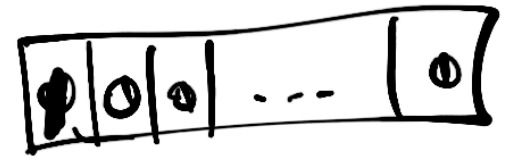
int 64

$$\approx -9 \cdot 10^{18} \rightarrow 9 \cdot 10^{18}$$

int

var x int

x=0  
x++ ...



-128 → -127 → ... → 0 → 1 → 2 → ... → 127



Wrap around

<u>var</u>	x	int 8
<u>var</u>	y	int 16
<u>var</u>	z	int 16

$$z = \underbrace{x + y}$$

NO

$$z = \text{int16}(x) + y$$

SI

var  
var

x int 8  
y int 16

x = y

No!

x = int8(y)

y = x

No!

y = int16(x)



var x, y    int 8  
var z        cat 16

z = x + y    NO!

---

z = int16 (x + y) ←

z = int16(x) + cat16(y) ←

x = 100

y = 100

var x int 8  
var y int 16

x = x + 5  
y = y + 5

untyped  
integer  
constants

~~z := x + 5~~

w := 5  
int

$$x + 315$$