Iterazioni - esemp.: - Calcolo ricorsivo

Fattoriale: $n! = n \times n-1 \times n-2 \times \dots \times 1$

```
unsigned long long int p = 1;
int i; // iteratore
for(i=1; i<=n; i++){
    p *= i;
}
printf("%d! = %llu \n", n, p);
```

inizializzazione di p

64 bit senza segno.

i	p	n
-	-	7
-	1	7
1	1	7
2	2	7
3	6	7
4	24	7
5	120	7
6	720	7
7	5040	7
8		

```
gcc -o app.exe proj.c -lm
./app.exe
```

7! = 5040

Successione: $a_n = n$

✓ $a_n = n^2$

✓ $a_n = n \times (n-1)$

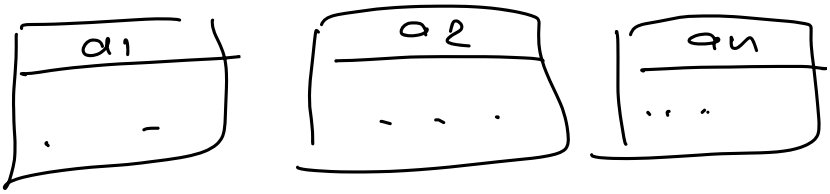
$a_n = n \times a_{n-1}$

$= n \times (a_{n-2} \times n-1)$

Fibonacci: ✓ $a_n = a_{n-1} + a_{n-2}$

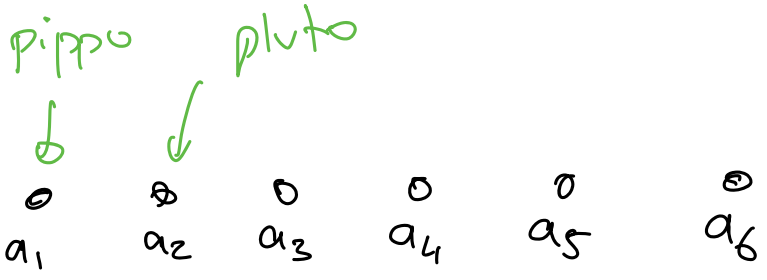
Calcolo ricorsivo

```
int a1, a2, an;
a1 = 1;
a2 = 1;
int i;
for (i = 3; i <= n; i++) {
    an = a1 + a2;
    a1 = a2;
    a2 = an;
}
```



i	an
3	2
4	2
5	2
6	2

i	a1	a2	an
3	1	1	2
4	1	2	3
5	2	3	5




```
pippo = pluto = 1;
for (i = 3; i <= n; i++) {
    an = pippo + pluto;
    pippo = pluto;
    pluto = an;
}
printf("a_n = %d\n", an);
```

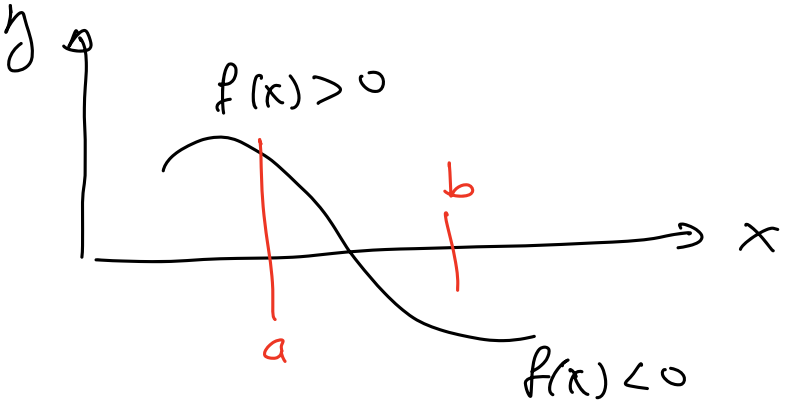
Trovare Zero di una funzione

$f(x) = 0$ $\quad x_i : f(x_i) = 0$

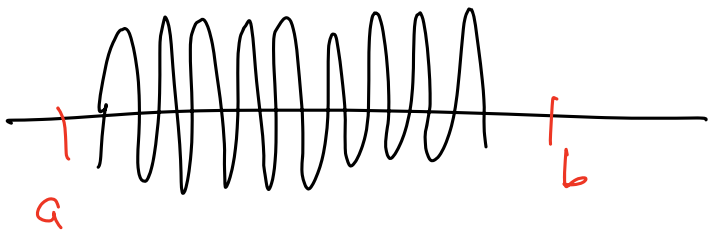
$3x - 4 + 7x^2 = 0$ $\quad x_1, x_2$

$-x^3 + 3x^2 - 7x + 78 = 0$

$\sin(x) + x^2 = 0$



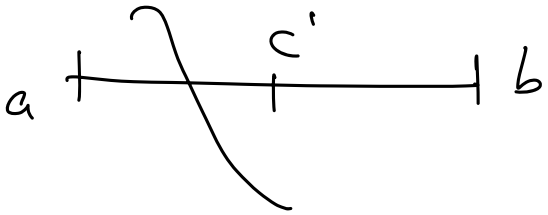
$f(a) * f(b) < 0$



NON funzione.

x_i: $f(x_i) = 0$.

scelgo $[a, b]$ che contiene x_i

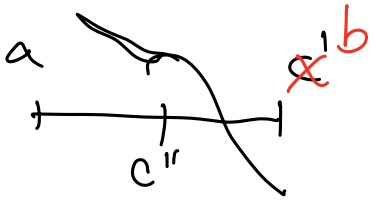


$f(a) * f(b) < 0$.

$c = \frac{a+b}{2}$

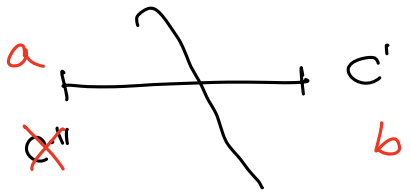
$f(a) * f(c) < 0$

$f(b) * f(c) > 0$ $\quad x_i \notin [c, b]$



$c \to b$ $\qquad c'' = \frac{a + c'}{2}$

$f(a) * f(c'') > 0$



$c'' \rightarrow a$

$\varepsilon = 10^{-3} = 0.001$

Mi fermo se $|a-b| < \varepsilon$

1) Nom ciclo for