

Ordenamientos

1) Burbuja

[100, 22, 95, 1, 23, 45, 150, 18, 35]

```
def ordenamientoBurbuja(lista):
    for i in range(len(lista), len(lista):
```

~~if lista[i] >~~

for j in range(len(lista)-i):

if (lista[j] > lista[j+1]):

K = lista[j+1]

lista[j+1] = lista[j]

lista[j] = K

print(lista)

Bucle for i

N veces	i	lista	len(lista)
1	1	[100, 22, 95, 1, 23, 45, 150, 18, 35]	9
2	2	[22, 95, 1, 23, 45, 100, 18, 35, 150]	9
3	3	[22, 95, 1, 23, 45, 18, 35, 100, 150]	9
4	4	[1, 22, 23, 45, 18, 35, 95, 100, 150]	9
5	5	[1, 22, 23, 18, 35, 45, 95, 100, 150]	9
6	6	[1, 22, 18, 23, 35, 45, 95, 100, 150]	9
7	7	[1, 18, 22, 23, 35, 45, 95, 100, 150]	9
8	8	[1, 18, 22, 23, 35, 45, 95, 100, 150]	9

Buck for j

Primera pasada : rango de 0 a 7

j=0

$100 > 22$ # si

$K = 22$

$Lista[j+1] = lista[j]$ # 100

$Lista[j] = K$ # 22

[22, 100, 95, 1, 23, 45, 450, 18, 35]

j=1

$100 > 95$ # si

$K = 95$

$Lista[j+1] = 100$

$Lista[j] = K$ # 95

[22, 95, 100, 1, 23, 45, 450, 18, 35]

j=2

$100 > 1$ # si

$K = 1$

$Lista[j+1] = 100$

$Lista[j] = K$ # 1

[22, 95, 1, 100, 23, 45, 450, 18, 35]

$$j=3$$

$$100 > 23 \quad \# \text{ si}$$

$$K=23$$

$$\text{Lista}[j] = \cancel{K} \# 23$$

$$\text{Lista}[j+1] = 100$$

$$[22, 95, 1, 23, 100, 45, 450, 18, 35]$$

$$j=4$$

$$100 > 45 \quad \# \text{ si}$$

$$\text{Lista}[j] = 45$$

$$\text{Lista}[j+1] = 100$$

$$[22, 95, 1, 23, 45, 100, 450, 18, 35]$$

$$j=5$$

$$100 > 450 \quad \# \text{ NO}$$

$$j=6$$

$$450 > 18 \quad \# \text{ si}$$

$$\text{Lista}[j] = 18$$

$$\text{Lista}[j+1] = 450$$

$$[22, 95, 1, 23, 45, 100, 18, 450, 35]$$

$$j=7$$

$$450 > 35 \quad \# \text{ si}$$

$$\text{Lista}[j] = 35$$

$$\text{Lista}[j+1] = 450$$

$$[22, 95, 1, 23, 45, 100, 18, 35, 450]$$

Cuarta pasada : rango 0 a 4

$j=0$ $1 > 22$ # NO

$j=1$ $22 > 23$ # NO

$j=2$ $23 > 45$ # NO

$j=3$ $45 > 18$ # Si

$Lista[j] = 18$

$Lista[j+1] = 45$

$[1, 22, 23, 18, 45, 35, 95, 100, 450]$

$j=4$ $45 > 35$ # Si

$Lista[j] = 35$

$Lista[j+1] = 45$

$[1, 22, 23, 18, 35, 45, 95, 100, 450]$

Quinta pasada : rango 0 a 3

$j=0$ $1 > 22$ # NO

$j=1$ $22 > 23$ # NO

$j=2$ $23 > 18$ # Si

$Lista[j] = 18$

$Lista[j+1] = 23$

$[1, 22, 18, 23, 35, 45, 95, 100, 450]$

$j=3$ $23 > 35$ $\#$ NO

Sexta pasada rango 0 a 2

$j=0$ $1 > 22$ $\#$ NO

$j=1$ $22 > 18$ $\#$ Si

$Lista[j] = 18$

$Lista[j+1] = 22$

$[1, 18, 22, 23, 35, 45, 95, 100, 950]$

$j=2$ $22 > 23$ $\#$ NO

Septima pasada rango 0 a 1

$j=0$ $1 > 18$ $\#$ NO

$j=1$ $18 > 22$ $\#$ NO

$Lista = [1, 18, 22, 23, 35, 45, 95, 100, 950]$

Fin.

2) Selection sort (lista) # [100, 22, 95, 1, 23, 45, 450, 18, 35]

```
def selectionsort (lista):
```

```
    for i in range (len(lista)-1):
```

```
        minimo = i
```

```
        for j in range (i+1, len(lista)):
```

```
            if lista[minimo] > lista[j]:
```

```
                minimo = j
```

```
            aux = lista[minimo]
```

```
            lista[minimo] = lista[i]
```

```
            lista[i] = aux
```

```
    print (lista)
```

Bucle for i

N veces	i	minimo	aux	Lista	len(lista)
1	0	0		[100, 22, 95, 1, 23, 45, 450, 18, 35]	9
2	1	7		[1, 18, 95, 100, 23, 45, 450, 22, 35]	9
3	2	7		[1, 18, 22, 100, 23, 45, 450, 95, 35]	9
4	3	4		[1, 18, 22, 23, 100, 45, 450, 95, 35]	9
5	4	8		[1, 18, 22, 23, 35, 45, 450, 95, 100]	9
6	5	5		[1, 18, 22, 23, 35, 15, 450, 95, 100]	9
7	6	7		[1, 18, 22, 23, 35, 95, 95, 450, 100]	9
8	7	8		[1, 18, 22, 23, 35, 95, 95, 100, 450]	9

Bubble Sort

Primera pasada: rango de 1 a 8 largo

$$j=1 \quad i=0$$

$$100 > 22 \quad \# \text{ Si}$$

$$\text{minimo} = 1$$

$$\text{aux} = 22$$

$$[22, 100, 5, 15, 10, 7]$$

$$j=2 \quad \text{minimo} = 1$$

$$j=2 \quad i=1 \quad 22 > 95 \quad \# \text{ No}$$

$$\text{aux} = 22$$

$$\text{minimo} = 1$$

$$j=3 \quad \text{minimo} = 1$$

$$22 > 1 \quad \# \text{ Si}$$

$$\text{minimo} = 3$$

$$\text{aux} = 1$$

$$j=4 \quad \text{minimo} = 3$$

$$1 > 23 \quad \# \text{ No}$$

$$\text{aux} = 1$$

$$j=5 \quad \text{minimo} = 1$$

$$1 > 45 \quad \# \text{ No}$$

$$\text{aux} = 1$$

j=6 minimo=3
1 > 150 # No
aux = 1

j=7 minimo=3
1 > 18 # No
aux = 1

j=8 minimo=3
1 > 35 # No
aux = 1

Segunda pasada : rango 2 a 7

j=2 minimo=2
22 > 95 # Si
aux = 22
aux = 22

j=3 minimo=2
22 > 100 # No
aux = 22

j=4 minimo=2
22 > 23
aux = 22

$$j=5 \quad \text{minimo}=1$$

$$22 > 45 \neq \text{No}$$

$$\text{aux}=22$$

$$j=6 \quad \text{minimo}=1$$

$$22 > 450 \neq \text{No}$$

$$\text{aux}=22$$

$$j=7 \quad \text{minimo}$$

$$22 > 18 \neq \text{Si}$$

$$\text{minimo}=7$$

$$\text{aux}=18$$

$$j=8 \quad \text{minimo}=7$$

$$18 > 35 \neq \text{No}$$

$$\text{aux}=18$$

Tercera pasada: rango 1 a 6

$$j=3 \quad \text{minimo}=2$$

$$95 > 100 \neq \text{No}$$

$$\text{aux}=95$$

$$j=4 \quad \text{minimo}=2$$

$$95 > 23 \neq \text{Si}$$

$$\text{minimo}=4$$

$$\text{aux}=23$$

$j=5$ $\text{minimo} = 4$
 $23 > 45 \# \text{NO}$
 $\text{aux} = 23$

$j=6$ $\text{minimo} = 4$
 $23 > 450 \# \text{NO}$
 $\text{aux} = 23$

$j=7$ $\text{minimo} = 4$
 $23 > 22 \# \text{SI}$
 $22 \text{ minimo} = 7$
 $\text{aux} = 22$

$j=8$ $\text{minimo} = 7$
 $22 > 35$
 $\text{aux} = 22$

Quarta pasada rango: 11 a 58

$j=4$ $\text{minimo} = 3$
 $100 > 23 \# \text{SI}$
 $\text{minimo} = 4$
 $\text{aux} = 23$

$$j = 5 \quad \text{minimo} = 4$$

$$43 > 45 \neq \text{NO}$$

$$\text{aux} = 23$$

$$j = 6 \quad \text{minimo} = 4$$

$$23 = 450 \neq \text{NO}$$

$$\text{aux} = 23$$

$$j = 7 \quad \text{minimo} = 4$$

$$23 = 95$$

$$\text{aux} = 23$$

$$j = 8 \quad \text{minimo} = 4$$

$$23 = 35$$

$$\text{aux} = 23$$

Quinta pasada rango 1 a 4

$$j = 5 \quad \text{minimo} = 4$$

$$100 > 45 \neq \text{si}$$

$$\text{minimo} = 5$$

$$\text{aux} = 95$$

$$j = 6 \quad \text{minimo} = 5$$

$$95 > 450 \neq \text{No}$$

$$\text{aux} = 95$$

$j=7$ $\text{minimo}=5$
 $45 > 95 \neq \text{No}$
 $\text{aux}=45$

$j=8$ $\text{minimo}=5$
 $45 > 35 \neq \text{Si}$
 $\text{minimo}=8$
 $\text{aux}=35$

Quinta pasada rango 6 a 3

$j=6$ $\text{minimo}=5$
 $45 > 150 \neq \text{No}$
 $\text{aux}=45$

$j=7$ $\text{minimo}=5$
 $45 > 95 \neq \text{No}$
 $\text{aux}=45$

$j=8$ $\text{minimo}=5$
 $45 > 100 \neq \text{No}$
 $\text{aux}=45$

Sexta pasada rango 7 a 2

$j=7$ $\text{minimo}=6$
 $150 > 95 \neq \text{Si}$
 $\text{minimo}=7$
 $\text{aux}=95$

$$j = 8 \quad \text{minimo} = 7$$

$$95 > 100 \quad \# \text{ No}$$

$$\text{aux} = 95$$

Septima pasada, solo pasa una vez

$$j = 8 \quad \text{minimo} = 7$$

$$100 > 450 \quad \# \text{ Si}$$

$$\text{minimo} = 8$$

$$\text{aux} = 100$$

3) insercion Directa (lista): # [100, 22, 95, 1, 23, 45, 450, 18, 35]

def insercionDirecta(lista):

for i in range(1, len(lista)):

v = lista[i]

j = i - 1

while j >= 0 and lista[j] > v:

lista[j+1] = lista[j]

j = j - 1

lista[j+1] = v

print(lista)

Bucle For i

N veces	i	v	j	Lista	len(lista)
1	1	22	0	[22, 100, 95, 1, 23, 45, 450, 18, 35]	9
2	2	95	1	[22, 95, 100, 1, 23, 45, 450, 18, 35]	9
3	3	1	2	[1, 22, 95, 100, 23, 45, 450, 18, 35]	9
4	4	23	3	[1, 22, 23, 95, 100, 45, 450, 18, 35]	9
5	5	45	4	[1, 22, 23, 45, 95, 100, 450, 18, 35]	9
6	6	450	5	[1, 22, 23, 45, 95, 100, 450, 18, 35]	9
7	7	18	6	[1, 18, 22, 23, 45, 95, 100, 450, 35]	9
8	8	35	7	[1, 18, 22, 23, 35, 45, 95, 100, 450]	9

Bubble while

Primera pasada

$$j=0 \quad v=22$$

$$j \geq 0 \text{ and } 100 > 22 \# \text{Si}$$

$$\text{lista}[1] = 100$$

$$j = -1$$

$$\Rightarrow \text{Lista} = [100, 100, 95, 1, 23, 45, 450, 18, 35]$$

Segunda pasada

$$j=1 \quad v=95$$

$$j \geq 0 \text{ and } 100 > 95 \# \text{Si}$$

$$\text{lista}[2] = 100$$

$$j = 0$$

$$\text{Lista} = [22, 100, 100, 1, 23, 45, 450, 18, 35]$$

$$j=0 \quad v=95$$

$$j \geq 0 \text{ and } 22 > 95 \# \text{No}$$

$$\Rightarrow \text{Lista} = [22, 100, 100, 1, 23, 95, 450, 18, 35]$$

Tercera pasada

$$j=2 \quad v=1$$

$$j \geq 0 \text{ and } 100 > 1 \# \text{Si}$$

$$\text{lista}[3] = 100$$

$$j = 1$$

$$j=1 \quad v=1$$

$$j \geq 0 \text{ and } 95 > 1 \# \text{Si}$$

$$\text{lista}[2] = 95$$

$$j = 0$$

$$j=0 \quad v=1$$

$$j \geq 0 \text{ and } 22 > 1 \# \text{Si}$$

$$\text{lista}[1] = 22$$

$$j = -1$$

$$\Rightarrow \text{Lista} = [22, 22, 95, 100, 23, 95, 450, 18, 35]$$

Quinta pasada

$$j=3 \quad v=23$$

$$j \geq 0 \text{ and } 100 > 23 \# \text{si}$$

$$\text{lista}[4] = 100 \Rightarrow \text{Lista} = [1, 22, 95, 100, 100, 45, 450, 18, 35]$$

$$j=2$$

$$j=2 \quad v=23$$

$$j \geq 2 \text{ and } 95 > 23 \# \text{si}$$

$$\Rightarrow \text{Lista} = [1, 22, 95, 95, 100, 45, 450, 18, 35]$$

$$\text{lista}[3] = 95$$

$$j=1$$

$$j=1 \quad v=23$$

$$j \geq 1 \text{ and } 22 > 23 \# \text{No}$$

$$\Rightarrow \text{Lista} = [1, 22, 95, 95, 100, 45, 450, 18, 35]$$

$$j=4 \quad v=45$$

$$j \geq 0 \text{ and } 100 > 45 \# \text{si}$$

$$\text{lista}[5] = 100$$

$$j=3$$

$$\Rightarrow \text{Lista} = [1, 22, 23, 95, 100, 100, 450, 18, 35]$$

Quinta pasada

$$j=3 \quad v=95$$

$$j \geq 0 \text{ and } 95 > 45 \# \text{si}$$

$$\text{lista}[4] = 95$$

$$j=2$$

$$\Rightarrow \text{Lista} = [1, 22, 23, 95, 95, 100, 450, 18, 35]$$

$$j=2 \quad v=4$$

$$j \geq 0 \text{ and } 23 > 45 \# \text{No}$$

$$\Rightarrow \text{Lista} = [1, 22, 23, 95, 95, 100, 450, 18, 35]$$

Sexta pasada

$$j=5 \quad v=150$$

$$j \geq 0 \text{ and } 100 > 150 \# \text{No}$$

$$\Rightarrow \text{Lista} = [1, 22, 23, 45, 95, 100, 150, 18, 35]$$

Septima pasada

$$j=6 \quad v=18$$

$$j \geq 0 \text{ and } 150 > 18 \# \text{si}$$

$$\text{lista}[7] = 150 \Rightarrow \text{Lista} = [1, 22, 23, 45, 95, 100, 150, 150, 35]$$

$$j=5$$

$$j=5 \quad v=18$$

$$j \geq 0 \text{ and } 100 > 18 \# \text{si}$$

$$\text{lista}[6] = 100 \Rightarrow \text{Lista} = [1, 22, 23, 45, 100, 100, 150, 35]$$

$$j=4$$

$$j=4 \quad v=18$$

$$j \geq 0 \text{ and } 45 > 18$$

$$\text{lista}[5] = 45 \Rightarrow \text{Lista} = [1, 22, 23, 45, 45, 100, 150, 35]$$

$$j=3$$

$$j=3 \quad v=18$$

$$j \geq 0 \text{ and } 23 > 18 \# \text{si}$$

$$\text{lista}[4] = 23$$

$$j=2 \Rightarrow \text{Lista} = [1, 22, 23, 23, 45, 100, 150, 35]$$

$$j=2 \quad v=18$$

$$j \geq 0 \text{ and } 22 > 18 \# \text{si}$$

$$\text{lista}[3] = 22$$

$$j=1 \Rightarrow \text{Lista} = [1, 22, 22, 23, 45, 100, 150, 35]$$

$$j=1 \quad v=18$$

$$j \geq 0 \text{ and } 1 > 18 \# \text{No}$$

$$\Rightarrow \text{Lista} = [1, 22, 22, 23, 45, 100, 150, 35]$$

para pasada

$$j=7 \quad v=35$$

$$j \geq 0 \text{ and } 450 > 35 \neq \text{si}$$

$$\text{Lista}[8] = 450$$

$$j=6 \Rightarrow \text{Lista} = [1, 18, 22, 23, 45, 95, 100, 450, 450]$$

$$j=6 \quad v=35$$

$$j \geq 0 \text{ and } 100 > 35 \neq \text{si}$$

$$\text{Lista}[7] = 100$$

$$j=5 \Rightarrow \text{Lista} = [1, 18, 22, 23, 45, 95, 100, 100, 450]$$

$$j=5 \quad v=35$$

$$j \geq 0 \text{ and } 95 > 35 \neq \text{si}$$

$$\text{Lista}[6] = 95$$

$$j=4 \Rightarrow \text{Lista} = [1, 18, 22, 23, 45, 95, 95, 100, 450]$$

$$j=4 \quad v=35$$

$$j \geq 0 \text{ and } 45 > 35 \neq \text{si}$$

$$\text{Lista}[5] = 45$$

$$j=3 \Rightarrow \text{Lista} = [1, 18, 22, 23, 45, 45, 95, 100, 450]$$

$$j=3 \quad v=35$$

$$j \geq 0 \text{ and } 23 > 35 \neq \text{NO}$$

$$\Rightarrow \text{Lista} = [1, 18, 22, 23, 45, 45, 95, 100, 450]$$