1) Selectionsort (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)):  # 1T
            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		[1, 22, 95, 100,23,45,450,18,35]	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, 45, 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, 45, 95, 100, 450]	9

Bucle For j

Primera pasada : rango de 1 a 8

j=1   i=0
                100 > 22   # Si
                minima = 1
                aux = 122

j=2   minimo = 1
j=2   i =   22 > 95   # No
                aux = 22

                minimo = 1

j=3   minimo = 1
                22 > 1   # Si
                minimo = 3
                aux = 1

j=4   minimo = 3
                1 > 23   # No
                aux = 1

j=5   minimo = 1
                1 > 45   # No
                aux = 1

j = 6   minimo = 3
            1 > 450 # 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 = 1
            22 > 85 # Si
            aux = 22
            aux = 2

j = 3 minimo = 1
            22 > 100 # NO
            aux = 22

j = 4 minimo = 1
            22 > 23
            aux = 22

j=5   minimo=1

          22>45 # NO

          aux=22

j=6   minimo=1

          22>450 # NO

          aux=22

j=7   minimo

          22>18 # Si

          minimo=7

          aux=18

j=8   minimo=7

          18>35 # NO

          aux=18

Tercera pasada rango 1 a 6

j=3   minimo=2

          95>100 # No

          aux=95

j=4   minimo=2

          95>83 # Si

          minimo=4

          aux=83

j=5   minimo = 4
           23 > 45 # NO
           aux = 23

j=6   minimo = 4
           23 > 450 # NO
           aux = 23

j=7   minimo = 4
           23 > 22 # Si
           22 minimo = 7
           aux = 22

j=8   minimo = 7
           22 > 35
           aux = 22

Cuarta pasada   rango: 1 a 5

j=4   minimo = 3
           100 > 23 # Si
           minimo = 4
           aux = 23

j = 5   minimo = 4
             487 > 43 # NO
             aux = 23

j = 6   minimo = 4
             23 = 450 # NO
             aux = 23

j = 7   minimo = 4
             23 = 45
             aux = 23

j = 8   minimo = 4
             83 = 35
             aux = 23

Quinta pasada   rango   1 a 4

   j = 5   minimo = 4
             100 > 45 # si
                minimo = 5
                aux = 45
   j = 6   minimo = 5
             45 > 450 # No
             aux = 45

j = 7   minimo = 5
          45 > 95 # NO
          aux = 45

j = 8   minimo = 5
          45 > 35 # Si
          minimo = 8
          aux = 35

Quinta pasada   rango 6 a 3

j = 6   minimo = 5
          45 > 150 # NO
          aux = 45

j = 7   minimo = 5
          45 > 95 # NO
          aux = 45

j = 8   minimo = 5
          45 > 100 # NO
          aux = 45

Sexta pasada   rango 7 a 8
j = 7   minimo = 6
          150 > 95 # Si
          minimo = 7
          aux = 95

$j = 8$ minimo= 7

957100 # NO

aux = 95

Septima pasada , solo pasa una vez

$j = 8$ minimo = 7

100 > 450 # SI

minimo = 8

aux = 100

3) insercionDirecta(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

Bucle while

Primera pasada

$j=0$ $v=22$

   $j>=0$ and $100>22$ #si

   $lista[1]=100$

   $j=-1$

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

Segunda pasada

$j=1$ $v=95$

   $j>=0$ and $100>95$ #si

   $lista[2]=100$

   $j=0$

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

$j=0$ $v=95$

   $j>=0$ and $22>95$ #NO

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

Tercera pasada

$j=2$ $v=1$ $j>=0$ and $100>1$ #si $\Rightarrow Lista=[22,95,100,100,23,95,450,18,35]$

   $lista[3]=100$

   $j=1$

$j=1$ $v=1$ $j>=0$ and $95>1$ #si $\Rightarrow Lista=[22,95,95,100,23,45,450,18,35]$

   $lista[2]=95$

   $j=0$

$j=0$ $v=1$ $j>=0$ and $22>1$ #si

   $lista[1]=22$ $\Rightarrow Lista=[22,22,95,100,23,45,450,18,35]$

   $j=-1$

$J=3$

...ita posada

J=3   V=23

    j>=0 and 100>23 #si

      lista[4] = 100   => Lista=[1,22,95,100,100,95,150,18,35]
      j=2

J=2   V=23

    j>=2 and 95>23 #si
                   => Lista=[1,22,95,95,100,95,950,18,35]
      lista[3] = 95

      j=1

J=1   V=23
    j>=1 and 22>23 # No
              => Lista=[1,22,95,95,100,95,150,18,35]

Quinta pasada

J=4   V=95
    j>=0 and 100>95 #si
      lista[5]=100 => Lista=[1,22,23,95,100,100,950,18,35]
      j=3

J=3   V=95
    j>=0 and 95>95 #si
      lista[4]=95
      j=2   => Lista=[1,22,23,95,95,100,450,18,35]

J=2   V=4
    j>=0 and 23>95 # No
      => Lista=[1,22,23,95,95,100,450,18,35]

Sexta posada

$j = 5$ $v = 150$

$j >= 0$ and $100 > 450$ # NO

$\Rightarrow$ Lista = [1, 22, 23, 15, 95, 100, 150, 18, 35]

Septima pasada

$j = 6$ $v = 18$

$j >= 0$ and $450 > 18$ # si

lista[7] = 450 $\Rightarrow$ Lista = [1, 22, 23, 15, 95, 100, 150, 450, 35]

$j = 5$

$j = 5$ $v = 18$

$j >= 0$ and $100 > 18$ # si

lista[6] = 100 $\Rightarrow$ Lista = [1, 22, 23, 45, 100, 100, 450, 35]

$j = 4$

$j = 4$ $v = 18$

$j >= 0$ and $45 > 18$

lista[5] = 45 $\Rightarrow$ Lista = [1, 22, 23, 45, 45, 100, 450, 35]

$j = 3$

$j = 3$ $v = 18$

$j >= 0$ and $23 > 18$ # si

lista[4] = 23

$j = 2$ $\Rightarrow$ Lista [1, 22, 23, 23, 45, 100, 450, 35]

$j = 2$ $v = 18$

$j >= 0$ and $22 > 18$ # si

lista[3] = 22

$j = 1$ $\Rightarrow$ Lista = [1, 22, 22, 23, 45, 100, 450, 35]

$j = 1$ $v = 18$

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

$\Rightarrow$ Lista = [1, 22, 22, 23, 45, 100, 450, 35]

tara pasada

j=7   V=35

        j >=0 and   450 > 35 #si

          Lista[8] = 450

          j = 6 => Lista = [1,18,22,23,45,95,100,450,450]

j=6   v=35

        j >=0 and   100 > 35 #si

          Lista[7] = 100

          j = 5 => Lista = [1,18,22,23,45,95,100,100,450]

j=5   v=35

        j >=0 and   95 > 35 #si

          Lista[6] = 95

          j = 4 => Lista = [1,18,22,23,45,95,95,100,450]

j=4   v=35

        j >=0 and   45 > 35 #si

          Lista[5] = 45

          j = 3 => Lista = [1,18,22,23,45,45,95,100,450]

j=3   v=35

        j >=0 and   23 > 35 #NO

        => Lista = [1,18,22,23,45,45,95,100,450]