

5) Quicksort

```
def quicksort(lista):
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```
    if len(lista) == 1 or len(lista) == 0:
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```
        return lista
```

```
    else:
```

```
        pivot = lista[0]
```

```
        i = 0
```

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

```
            if lista[i+1] < pivot:
```

```
                lista[i+1], lista[i] = lista[i], lista[i+1]
```

```
            i += 1
```

```
        lista[0], lista[i] = lista[i], lista[0]
```

```
        primera = quicksort(lista[:i])
```

```
        segunda = quicksort(lista[i+1:])
```

```
        primera.append(lista[i])
```

```
    return (primera + segunda)
```

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

pivot = 100

for j in range(len(lista)-1):

i	lista
0	[100, 22, 95, 1, 23, 45, 450, 18, 35]
1	[100, 22, 95, 1, 23, 45, 450, 18, 35]
2	[100, 22, 95, 1, 23, 45, 450, 18, 35]
3	[100, 22, 95, 1, 23, 45, 450, 18, 35]
4	[100, 22, 95, 1, 23, 45, 450, 18, 35]
5	[100, 22, 95, 1, 23, 45, 450, 18, 35]
6	[100, 22, 95, 1, 23, 45, 18, 450, 35]
7	[100, 22, 95, 1, 23, 45, 18, 35, 450]

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

Llamada recursiva # primera = quicksort(lista[:i])

lista = [35, 22, 95, 1, 23, 45, 18]

pivot = 35

for j in range(len(lista)-1):

i	lista
0	[35, 22, 95, 1, 23, 45, 18]
1	[35, 22, 95, 1, 23, 45, 18]
2	[35, 22, 1, 95, 23, 45, 18]
3	[35, 22, 1, 23, 95, 45, 18]
4	[35, 22, 1, 23, 95, 45, 18]
5	[35, 22, 1, 23, 18, 45, 95]

lista = [18, 22, 1, 23, 35, 45, 95]

- llamada recursiva # primera = quicksort($E:i$)

lista = [18, 22, 1, 23]

pivot = 18

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

j	lista
0	[18, 22, 1, 23]
1	[18, 1, 22, 23]
2	[18, 1, 22, 23]

lista = [1, 18, 22, 23]

- llamada recursiva # primera = quicksort($E:i$)

lista = [1]

return lista

- llamada recursiva # segunda = quicksort($E:i+1$)

lista = [22, 23]

pivot = 22

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

j	lista
0	[22, 23]

lista = [22, 23]

- llamada recursiva # segunda = quicksort($E:i+1$)

lista = [23]

return lista

- llamada recursiva # segunda = quicksort([i+1:])

lista = [45, 95]

pivot = 45

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

j	lista
0	[45, 95]

lista = [45, 95]

- llamada recursiva # segunda = quicksort([i+1:])

lista = [95]

return lista

- llamada recursiva # segunda = quicksort([i+1:])

lista = [45, 95]

return lista

Desarrollo de la lista

$$[22] + [23] = [22, 23]$$

$$[1, 18] + [22, 23] = [1, 18, 22, 23]$$

$$[45] + [95] = [45, 95]$$

$$[1, 18, 22, 23, 35] + [45, 95] = [1, 18, 22, 23, 35, 45, 95]$$

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

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