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def cambio_menor(lista, indice_valor_menor, j):
    menor = lista[indice_valor_menor]
    lista[indice_valor_menor] = lista[j]
    lista[j] = menor
def selectionSort(lista, i, len):
    indice_valor_menor = i
    for j in range(i+1, len):
        if lista[j] < lista[indice_valor_menor]:
            indice_valor_menor = j
    if i+1 < len:
        cambio_menor(lista, indice_valor_menor, i)
        selectionSort(lista, i+1, len)
    return lista
print(selectionSort(numeros, 0, len(numeros)))

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lista1 = [168, 200, 70, 460, 368, 468, 390, 822, 498, 128, 30, 448, 502, 986, 726, 466, 4
8, 424, 614, 824, 204, 330, 410, 292, 150, 28, 48, 964, 558, 252]

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lista2 = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 2
2, 23, 24, 25, 26, 27, 28, 29]

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lista3 = [30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11,
10, 9, 8, 7, 6, 5, 4, 3, 2, 1]

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def bubbleSort(lista, cont1, cont2, cont3):

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

        for i in range(len(lista)-1):
            cont3+=1
            if lista[i]>lista[i+1]:
                cont2+=1
                temp = lista[i]

                lista[i] = lista[i+1]

                lista[i+1] = temp

            cont1+=1

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    return lista, cont1, cont2, cont3

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print(bubbleSort(lista1, 0, 0, 0))

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def selectionSort(lista, cont1, cont2):

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    for i in range(len(lista)):

        pos_Min=i

        for j in range(i+1, len(lista)):
            cont1+=1
            if lista[j]<lista[pos_Min]:

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        pos_Min = j

    if pos_Min!=i:

        temp = lista[i]

        lista[i] = lista[pos_Min]

        lista[pos_Min] = temp
        cont2+=1
    return lista,cont1,cont2
#print(selectionSort(lista1,0,0))

def insertionSort(lista,cont1,cont2):

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

        key = lista[i]

        j = i-1

        while j >=0 and key < lista[j] :

            lista[j+1] = lista[j]
            cont2+=1
            j -= 1
        cont1+=1
        lista[j+1] = key

    return lista,cont1,cont2
print(insertionSort(lista1,0,0))

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import random
numeros = [7,3,2,6,10,5,9,4,11,8,1]
def pivote(lista):
    print(numeros)
    x = input("¿Qué desea hacer?:\n(a) El último número de la lista\n(b) Un valor aleatorio dentro de la lista\n(c) El elemento más cercano a la media de tres elementos de la lista elegidos al azar\n" )
    ultimo = "a"
    listad = "b"
    media = "c"
    if x == ultimo:
        return (len(lista)-1)
        #quickSort(numeros,len(numeros)-1,0)
    elif x == listad:
        return random.randint(1,len(numeros))
    elif x == media:
        media_num = int((random.randint(1,10)+random.randint(1,10)+random.randint(1,10))/3)
        return media_num

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def partition(lista,i,d):

    ini = i

    fin = d

    pivote = lista[pivotee]

    while (ini<fin):

        while(ini <=d and lista[ini]<=pivote ):

            ini +=1

        while(fin >=i and lista[fin]>pivote ):

            fin -=1

        if (ini<fin):

            temp = lista[ini]

            lista[ini] = lista[fin]

            lista[fin]=temp

    temp = lista[fin]

    lista[fin] = lista[i]

    lista[i]=temp

    return fin

def quickSort(lista,i,d):

    if i < d:

        pi = partition(lista,i,d)

        quickSort(lista, i, pi-1)

        quickSort(lista, pi+1, d)

    return lista

pivotee = pivote(numeros)
print(pivotee)
resultado = quickSort(numeros,0,len(numeros)-1)
print(resultado)

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