Python Basic Camp

Exercises Day 5

1 - Bubble Sort	
Instructions	Implement a function to sort a list using “Bubble Sort” algorithm. Create the list my_list = [39, 12, 18, 85, 72, 10, 2, 18]. Sort my_list using the “Bubble sort” function. Then print the sorted list.
Expected output	My sorted list is: [2, 10, 12, 18, 18, 39, 72, 85]
Solution	

```
def bubble_sort(arr):

  # Outer loop to iterate through the list n times
  for n in range(len(arr) - 1, 0, -1):

    swapped = False

    # Inner loop to compare adjacent elements
    for i in range(n):
      if arr[i] > arr[i + 1]:

        # Swap elements if they are in the wrong order
        swapped = True
        arr[i], arr[i + 1] = arr[i + 1], arr[i]

      # If we didn't make any swaps in a pass,
      # the list is already sorted and we can
      # exit the outer loop
    if not swapped:
      return

# Sample list to be sorted
arr = [39, 12, 18, 85, 72, 10, 2, 18]
print("Unsorted list is:")
print(arr)

bubble_sort(arr)

print("Sorted list is:")
print(arr)
```

2 - Selection Sort	
Instructions	Implement a function to sort a list using “Selection Sort” algorithm. Create the list my_list = [-2, 45, 0, 11, -9,88,-97,-202,747] Sort my_list using the “Selection Sort” function. Then print the sorted list.
Expected output	My sorted list is: [-202, -97, -9, -2, 0, 11, 45, 88, 747]
Solution	

```
# Selection sort in Python
#sorting by finding min_index
def selectionSort(array, size):

    for ind in range(size):
        min_index = ind

        for j in range(ind + 1, size):
            # select the minimum element in every iteration
            if array[j] < array[min_index]:
                min_index = j
        # swapping the elements to sort the array
        (array[ind], array[min_index]) = (array[min_index],
array[ind])

arr = [-2, 45, 0, 11, -9,88,-97,-202,747]
size = len(arr)
selectionSort(arr, size)
print('The array after sorting in Ascending Order by
selection sort is:')
print(arr)
```

2 - Insertion Sort	
Instructions	Implement a function to sort a list using “Insertion Sort” algorithm. Create the list my_list = [12, 11, 13, 5, 6, -9, 3] Sort my_list using the “Insertion Sort” function. Then print the sorted list.
Expected output	My sorted list is: [-9, 3, 5, 6, 11, 12, 13]

Solution	<pre>def insertionSort(arr):
	    n = len(arr) # Get the length of the array
	
	    if n <= 1:
	        return # If the array has 0 or 1 element, it is already sorted, so return
	
	    for i in range(1, n): # Iterate over the array starting from the second element
	        key = arr[i] # Store the current element as the key to be inserted in the right position
	        j = i-1
	        while j >= 0 and key < arr[j]: # Move elements greater than key one position ahead
	            arr[j+1] = arr[j] # Shift elements to the right
	            j -= 1
	        arr[j+1] = key # Insert the key in the correct position
	
	# Sorting the array [12, 11, 13, 5, 6, -9, 3] using insertionSort
	arr = [12, 11, 13, 5, 6, -9, 3]
	insertionSort(arr)
	print(arr)</pre>