Started on	Saturday, 25 May 2024, 7:35 PM
State	Finished
Completed on	Saturday, 25 May 2024, 7:43 PM
Time taken	7 mins 50 secs
Marks	5.00/5.00
Grade	**100.00** out of 100.00

Question **1**

Correct

Mark 1.00 out of 1.00

Write a Python program to sort a list of elements using the merge sort algorithm.

For example:

Input	Result
5 6 5 4 3 8	3 4 5 6 8

Answer: (penalty regime: 0 %)

```
 1  n = int(input())
 2  arr = list(map(int, input().split()))
 3
 4
 5  stack = [(0, n)]
 6  while stack:
 7      start, end = stack.pop()
 8      if end - start > 1:
 9          mid = (start + end) // 2
10          stack.extend([(start, mid), (mid, end)])
11          arr[start:end] = sorted(arr[start:end])
12
13
14  print(*arr)
```

	Input	Expected	Got	
✓	5 6 5 4 3 8	3 4 5 6 8	3 4 5 6 8	✓
✓	9 14 46 43 27 57 41 45 21 70	14 21 27 41 43 45 46 57 70	14 21 27 41 43 45 46 57 70	✓
✓	4 86 43 23 49	23 43 49 86	23 43 49 86	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Question **2**

Correct

Mark 1.00 out of 1.00

Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in wrong order. You read an list of numbers. You need to arrange the elements in ascending order and print the result. The sorting should be done using bubble sort.

Input Format: The first line reads the number of elements in the array. The second line reads the array elements one by one.

Output Format: The output should be a sorted list.

For example:

Input	Result
6 3 4 8 7 1 2	1 2 3 4 7 8
5 4 5 2 3 1	1 2 3 4 5

Answer: (penalty regime: 0 %)

```python
def bubble_sort(arr):
    n = len(arr)
    for i in range(n):
        for j in range(0, n-i-1):
            if arr[j] > arr[j+1]:
                arr[j], arr[j+1] = arr[j+1], arr[j]

n = int(input().strip())
arr = list(map(int, input().strip().split()))

bubble_sort(arr)

print(" ".join(map(str, arr)))
```

	Input	Expected	Got	
✓	6 3 4 8 7 1 2	1 2 3 4 7 8	1 2 3 4 7 8	✓
✓	6 9 18 1 3 4 6	1 3 4 6 9 18	1 3 4 6 9 18	✓
✓	5 4 5 2 3 1	1 2 3 4 5	1 2 3 4 5	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Question **3**

Correct

Mark 1.00 out of 1.00

Given an listof integers, sort the array in ascending order using the *Bubble Sort* algorithm above. Once sorted, print the following three lines:

1.   List is sorted in numSwaps swaps., where numSwaps is the number of swaps that took place.

2.   First Element: firstElement, the *first* element in the sorted list.

3.   Last Element: lastElement, the *last* element in the sorted list.

For example, given a worst-case but small array to sort: a=[6,4,1]. It took 3 swaps to sort the array. Output would be

```
Array is sorted in 3 swaps.
```

```
First Element: 1
```

```
Last Element: 6
```

Input Format

The first line contains an integer,n , the size of the list a .
The second line contains n, space-separated integers a[i].

Constraints

· $2<=n<=600$

· $1<=a[i]<=2 \times 10^6$.

Output Format

You must print the following three lines of output:

1.   List is sorted in numSwaps swaps., where numSwaps is the number of swaps that took place.

2.   First Element: firstElement, the *first* element in the sorted list.

3.   Last Element: lastElement, the *last* element in the sorted list.

Sample Input 0

3

1 2 3

Sample Output 0

List is sorted in 0 swaps.

First Element: 1

Last Element: 3

For example:

Input	Result
3 3 2 1	List is sorted in 3 swaps. First Element: 1 Last Element: 3
5 1 9 2 8 4	List is sorted in 4 swaps. First Element: 1 Last Element: 9

Answer: (penalty regime: 0 %)

```
 1  n = int(input())
 2  a = list(map(int, input().split()))
 3
 4  swaps = 0
 5  for i in range(n):
 6      for j in range(n-1):
 7          if a[j] > a[j+1]:
 8              a[j], a[j+1] = a[j+1], a[j]
 9              swaps += 1
10
11  print(f"List is sorted in {swaps} swaps.")
```

```
12  print(f"First Element: {a[0]}")
13  print(f"Last Element: {a[-1]}")
```

	Input	Expected	Got	
✓	3 3 2 1	List is sorted in 3 swaps. First Element: 1 Last Element: 3	List is sorted in 3 swaps. First Element: 1 Last Element: 3	✓
✓	5 1 9 2 8 4	List is sorted in 4 swaps. First Element: 1 Last Element: 9	List is sorted in 4 swaps. First Element: 1 Last Element: 9	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

Question **4**
Correct
Mark 1.00 out of 1.00

Write a Python program for binary search.

For example:

Input	Result
1,2,3,5,8 6	False
3,5,9,45,42 42	True

Answer: (penalty regime: 0 %)

```python
1  arr = list(map(int, input().split(',')))
2  x = int(input())
3  arr.sort()
4  low = 0
5  high = len(arr) - 1
6  found = False
7
8  while low <= high:
9      mid = (low + high) // 2
10     if arr[mid] < x:
11         low = mid + 1
12     elif arr[mid] > x:
13         high = mid - 1
14     else:
15         found = True
16         break
17
18  print(found)
```

	Input	Expected	Got	
✓	1,2,3,5,8 6	False	False	✓
✓	3,5,9,45,42 42	True	True	✓
✓	52,45,89,43,11 11	True	True	✓

Passed all tests! ✓

Correct
Marks for this submission: 1.00/1.00.

Question **5**

Correct

Mark 1.00 out of 1.00

To find the frequency of numbers in a [list](#) and display in sorted order.

Constraints:

1<=n, arr[i]<=100

Input:

1 68 79 4 90 68 1 4 5

output:

1 2

4 2

5 1

68 2

79 1

90 1

For example:

Input	Result
4 3 5 3 4 5	3 2
	4 2
	5 2

Answer: (penalty regime: 0 %)

```
1  arr = list(map(int, input().split()))
2
3  freq = {}
4  for num in arr:
5      freq[num] = freq.get(num, 0) + 1
6
7
8  for key in sorted(freq.keys()):
9      print(key, freq[key])
```

	Input	Expected	Got	
✓	4 3 5 3 4 5	3 2 4 2 5 2	3 2 4 2 5 2	✓
✓	12 4 4 4 2 3 5	2 1 3 1 4 3 5 1 12 1	2 1 3 1 4 3 5 1 12 1	✓

	Input	Expected	Got	
✓	5 4 5 4 6 5 7 3	3 1 4 2 5 3 6 1 7 1	3 1 4 2 5 3 6 1 7 1	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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Sorting ►