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```
1  from collections import Counter
2
3  def four_sum_count(A, B, C, D):
4      countAB = Counter(a + b for a in A for b in B)
5      return sum(countAB[-(c + d)] for c in C for d in D)
6
7  A = [1, 2]
8  B = [-2, -1]
9  C = [-1, 2]
10 D = [0, 2]
11 print(four_sum_count(A, B, C, D))
12
```

Output | Clear

```
2

=== Code Execution Successful ===
```


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```
1  import heapq
2
3  def k_closest(points, k):
4      return heapq.nsmallest(k, points, key=lambda p: p[0]**2 + p[1]**2)
5
6  points = [[1,3],[-2,2],[5,8],[0,1]]
7  print(k_closest(points, 2))
8
```

Output | Clear

```
[[0, 1], [-2, 2]]

=== Code Execution Successful ===
```


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```python
def binary_search_steps(arr, target):
    left, right = 0, len(arr) - 1

    while left <= right:
        mid = (left + right) // 2
        print(f"Checking midpoint index {mid}, value {arr[mid]}")

        if arr[mid] == target:
            return mid
        elif arr[mid] < target:
            left = mid + 1
        else:
            right = mid - 1

    return -1

arr = [3,9,14,19,25,31,42,47,53]
index = binary_search_steps(arr, 31)
print("Index:", index)
```

Output | Clear

```
Checking midpoint index 4, value 25
Checking midpoint index 6, value 42
Checking midpoint index 5, value 31
Index: 5

=== Code Execution Successful ===
```


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```python
def binary_search(arr, target):
    left, right = 0, len(arr) - 1
    comparisons = 0

    while left <= right:
        mid = (left + right) // 2
        comparisons += 1

        if arr[mid] == target:
            return mid, comparisons
        elif arr[mid] < target:
            left = mid + 1
        else:
            right = mid - 1

    return -1, comparisons

arr = [5,10,15,20,25,30,35,40,45]
index, comparisons = binary_search(arr, 20)
print("Index:", index, "Comparisons:", comparisons)
```

Output | Clear

```
Index: 3 Comparisons: 4

=== Code Execution Successful ===
```


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```python
def quick_sort(arr):
    if len(arr) <= 1:
        return arr

    pivot = arr[len(arr) // 2]
    left = [x for x in arr if x < pivot]
    middle = [x for x in arr if x == pivot]
    right = [x for x in arr if x > pivot]

    return quick_sort(left) + middle + quick_sort(right)

arr = [19,72,35,46,58,91,22,31]
print(quick_sort(arr))
```

Output | Clear

```
[19, 22, 31, 35, 46, 58, 72, 91]

=== Code Execution Successful ===
```


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main.py

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```
def quick_sort(arr):
    if len(arr) <= 1:
        return arr

    pivot = arr[0]
    left = [x for x in arr[1:] if x <= pivot]
    right = [x for x in arr[1:] if x > pivot]

    return quick_sort(left) + [pivot] + quick_sort(right)

arr = [10,16,8,12,15,6,3,9,5]
print(quick_sort(arr))
```

Output | Clear

```
[3, 5, 6, 8, 9, 10, 12, 15, 16]

=== Code Execution Successful ===
```

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```python
def merge_sort(arr):
    global comparison_count
    if len(arr) <= 1:
        return arr

    mid = len(arr) // 2
    left = merge_sort(arr[:mid])
    right = merge_sort(arr[mid:])

    return merge(left, right)

def merge(left, right):
    global comparison_count
    sorted_arr = []
    i = j = 0

    while i < len(left) and j < len(right):
        comparison_count += 1
        if left[i] < right[j]:
            sorted_arr.append(left[i])
            i += 1
        else:
            sorted_arr.append(right[j])
            j += 1

    sorted_arr.extend(left[i:])
    sorted_arr.extend(right[j:])

    return sorted_arr

arr = [12,4,78,23,45,67,89,1]
sorted_arr = merge_sort(arr)
print(sorted_arr, "Comparisons:", comparison_count)
```

Output | Clear

```
[1, 4, 12, 23, 45, 67, 78, 89] Comparisons: 16

=== Code Execution Successful ===
```


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```python
def merge_sort(arr):
    if len(arr) <= 1:
        return arr

    mid = len(arr) // 2
    left = merge_sort(arr[:mid])
    right = merge_sort(arr[mid:])

    return merge(left, right)

def merge(left, right):
    sorted_arr = []
    i = j = 0

    while i < len(left) and j < len(right):
        if left[i] < right[j]:
            sorted_arr.append(left[i])
            i += 1
        else:
            sorted_arr.append(right[j])
            j += 1

    sorted_arr.extend(left[i:])
    sorted_arr.extend(right[j:])

    return sorted_arr

arr = [31,23,35,27,11,21,15,28]
print(merge_sort(arr))
```

Output | Clear

```
[11, 15, 21, 23, 27, 28, 31, 35]

=== Code Execution Successful ===
```


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main.py

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```python
def find_min_max_sorted(arr):
    return arr[0], arr[-1]

arr = [2,4,6,8,10,12,14,18]
min_val, max_val = find_min_max_sorted(arr)
print("Min =", min_val, "Max =", max_val)
```

Output | Clear

```
Min = 2 Max = 18

=== Code Execution Successful ===
```


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main.py

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```
def find_min_max(arr):
    return min(arr), max(arr)

arr = [5,7,3,4,9,12,6,2]
min_val, max_val = find_min_max(arr)
print("Min =", min_val, "Max =", max_val)
```

Output | Clear

```
Min = 2 Max = 12

=== Code Execution Successful ===
```

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