

E06-03. Implement divide-and-conquer algorithms of mergesort and give some examples to test it.

Input: The first line is the number  $n$  for integers. The second line is a list of  $n$  integers

Output: a list of sorted  $n$  integers.

Example:

Input:

10

2 5 6 3 4 5 9 7 1 2

Output:

1 2 2 3 4 5 5 6 7 9

E06-04. Implement divide-and-conquer algorithms of counting inversions and give some examples to test it.

Input: The first line is the number  $n$  for integers. The second line is a list of  $n$  integers

Output: the number of inversions

Example:

Input:

12

1 5 4 8 10 2 6 9 12 11 3 7

Output:

22

E06-05. Implement divide-and-conquer algorithms of finding the closest pairs of points in 2D space and give some examples to test it.

Input: a list of  $n$  points in 2D space.

Output: the euclidean distance of the closest pairs of points, the coordinates of two points.

Example:

Input:

8

1 1

2 2

4 4

8 8

2 2.8

5 6

7 9

11 11

6

41 67

34 0

69 24

78 58

62 64

5

45

Output:

0.64

1 2 2 4 5 7 8 11