# Question 2

1. [34,22,5,15,27,55,8,29,3,44,6,4]
2. **Merge sort:**

BEGIN

Declare left variable as 34 and the right variable as 4.

Find the midpoint by using formula mid=(left+right)/2.

Call merge sort function on (left, mid).

Call merge sort function on (mid+1, rear).

Continue till the left is less than the right.

Call the merge function.

END

1. **Insertion sort:**

Compare the first two elements.

If element 1 is greater than element 2, swap the two elements.

Move on to the next two elements and repeat the process.

Continue until the array is sorted.

**In this example:**

34 > 22 thus, swap places to become [22, 34,5,15,27,55,8,29,3,44,6,4].

34 > 5 thus swap to become 22, 5, 34, but 22 > 5 so it becomes [5, 22, 34,15,27,55,8,29,3,44,6,4].

34 > 15 and 22 >15 bur 5< 15 thus, it becomes [5,15,22,34,27,55,8,29,3,44,6,4].

34>27 thus, [5,15,22,27,34,55,8,29,3,44,6,4].

34< 55 but 55>8,34> 8, 27>8,22>8 and 15> 8 thus, [5,8,15,22,27,34,55,29,3,44,6,4].

55>29 and 34> 29 thus, [5,8,15,22,27,29,34,55,3,44,6,4].

3<55,34,29,22,15,8 and 5 thus, [3,5,8,15,22,27,29,34,55,44,6,4]

55> 44 thus, [3,5,8,15,22,27,29,34,44,55,6,4].

6<55,44,34,29,27,22,15 and 8 thus, [3,5,6,8,15,22,27,29,34,44,55,4].

4< 55,44,34,29,27,22,15,8,6 and 5 thus, [3,4,5,6,8,15,22,27,29,34,44,55].

1. **Quick sort:**

Choose a pivot, this can be any element in the array.

Place the pivot in the correct position.

Compare all the elements in the array with the pivot.

If the element is less that the pivot place that element to the left of the pivot.

If the element is greater that the pivot place that element to the right of the pivot.

Then we have every element roughly where they should be, so we just sort the array into the final order

**In this example:**

We choose 22 as our pivot.

[34,5,15,27,55,22,8,29,3,44,6,4]

Now we compare each element to 22.

34 > 22, 5 < 22, 15 < 22, 27 > 22, 55 > 22, 8 < 22, 29 > 22, 3 < 22, 44 > 22, 6 < 22 and 4 < 22.

[5,15,8,3,6,4,22,44,29,55,27,34]

Now we just sort the array.

[3,4,5,6,8,15,22,27,29,34,44,55]

# Resources

<https://www.geeksforgeeks.org/c-program-for-merge-sort/>

<https://www.geeksforgeeks.org/insertion-sort/>

<https://www.geeksforgeeks.org/quick-sort/>