

Q1) Implement a java program that uses the Quick Sort algorithm to sort an array.

Your main program should sort the following array

```
int arr[] = {6, 5, 1, 3, 8, 4, 7, 9, 2};
```

In the comments of your code write the worst case time complexity for the Quick Sort algorithm. Below is a helpful video if you are unfamiliar with the algorithm.

<https://www.youtube.com/watch?v=aQiWF4E8fIQ>

Ex) - Program should output the following

Given Array

6 5 1 3 8 4 7 9 2

Sorted Array

1 2 3 4 5 6 7 8 9

Q2) Implement a java program that uses the Merge Sort algorithm to sort an array.

Your main program should sort the following array

```
int arr[] = {17, 87, 6, 22, 41, 3, 13, 54};
```

In the comments of your code write the worst case time complexity for the Merge Sort algorithm. Below is a helpful video if you are unfamiliar with the algorithm.

<https://www.youtube.com/watch?v=iMT7gTPpaqw&list=PLj8W7XlvO93qVnnXxyeWmCSvMFqRBP4Jw&index=4>

Ex) - Program should output the following

Given Array

17 87 6 22 41 3 13 54

Sorted array

3 6 13 17 22 41 54 87

Q3) Implement a java program that finds smallest and largest numbers in an integer array.

Your main program should find the min and max integer in the following array

```
int arr[] = {17, 87, 6, 22, 41, 3, 13, 54};
```

Ex) - Program should output the following

Given integer array :

17 87 6 22 41 3 13 54

Largest number in array is : 87

Smallest number in array is : 3