

assignment 1

Due Today by 11:59pm **Points** 20 **Submitting** a file upload

1. Single server multiple clients: Assume that we have n number of clients and k th client have an array of numbers of size n_k . All of them want to use a high speed server to sort them. Now the communication between clients and server happens in the following way

- [Registration Phase]: All the clients will register to server by sending the information about the size of the array.
- [Data collection and processing phase]:
 1. Server will sort the clients according their IP address.
 2. In round-robin fashion, it takes one element from each client in each round.
 3. When a client sends its last element, server sorts them and sends the sorted array in the same round. After that terminates the connection and continues on the remaining clients in round robin fashion.

Write a client-server program which simulates the above scenario. Use **sockets** as communication interface for your implementation.

2. Multiple server single client: Suppose that a client want to sort an array of numbers of size n . It has access to k server. To do fast, client want to parallelize it. We want to do that in following steps.

- Client divide the array in k parts each of size n/k , assume n is divisible by k and sends these k arrays to k servers.
 - Each server sorts them.
 - After getting completion signal from each server, client merges these k sorted arrays using min-heap but in distributed fashion.
1. Client takes the smallest element of each server and creates a min-heap of size k .
 2. In each step client takes the root element of the min-heap and put it the final sorted array. Then it asks the corresponding server to send the next smallest element.

Write a client-server program which uses **RPC** for simulating the above scenario.

