**ONLINE TEST SYSTEM**

You have to design an Online Test System (using TCP Multithreading to cater specific number of clients) which contains three types of tests

* Science.
* Mathematics.
* English.

Every test type further contains different areas as following

* Science 🡪 ( Physics, Chemistry, Biology )
* Mathematics 🡪 ( Geometry, Algebra, IQ )
* English 🡪 (Analogies, Antonyms, RC Questions )

**Details:**

Whenever a client connects to the main server, it will display three kinds of tests (Science, Mathematics and English). The main server does not want to overburden itself by communicating with all the incoming clients and handle the tests, so it only stores the info about which sub-server contains what sort of test (Three sub-servers each of which contains one type of test i.e., Science, Math or English). When a sub-server connects to the main server it sends the main server a string containing the Test Name which it can carry out along with its IP and Port number (e.g. Mathematics, Sub-server IP, Sub-server Port). When a client connects to main server it has to choose the type of test (e.g., Math). The main server will then send the information of corresponding sub-server to the client. The client will then connect to the corresponding sub-server. The sub-server will then show different types of the corresponding test (e.g, Geometry, Algebra and IQ for Math Sub-server) to the client. The client will select the test type and complete the test (You don’t need any test. Just make the sub-server to assign random marks to the client from 1 to 100). Then sub-server will send the information related to client (Client IP, Client Port, Test Name, Test Type, Marks) back to main server and also to the client. The main server will store the information within a file for all the clients.

Client A

Sub Server 1 (Science)

Sub Server 2 (Math)

Main Server

Sub Server 3 (English)

**You have to:**

1. Design a Main Server in C.
2. Design a Client.
3. Design 3 TCP Sub-servers.

**The string a sub-server send to the main server will have the following format:**

**Test\_name, Sub-server IP, Sub-server Port**

1. Each sub-server will connect to main server. Main server will make a database about the sub-server information it gets from the sub-servers.
2. When client connects with main server and makes a request to give a specific test (e.g., Math), main server will search the record in the database it has for the corresponding sub-server and will send sub-server information to the client.**The string a main server will send to the client will have the following format:**

**Test\_name**, **Sub-server IP, Sub-server Port**

1. Using that information the client will reconnect to the sub server using TCP connection (Note: more than one clients can be connected to any particular sub server.) The sub-server will then show different test-types to client. Client will select one and sub-server will assign random marks to client on that test type in the range of 1 to 100.
2. The sub server will send the final result to the client and also to the main server for the record of that client. The format of the information will be as follows:

**Client IP, Client Port, Test Name, Test Type, Marks**

1. The client will show the result on the terminal and then quit. The main server will store the information in a file with the below mentioned format and keep listening for next clients.

**Client IP, Client Port, Test Name, Test Type, Marks**

**Remember!!** Your understanding of the code will give you most of the credit. Your understanding will be reflected only if you **properly comment the code.**

**Note: The last date for submission of your Post lab is 20 April 2018, 8:00 AM on SLATE. No postlab will be accepted via email or via USB. This postlab will carry absolute 5 marks. Any kind of cheating will make you lose all 5 marks in postlab and it will also result in -5 Absolute marks from your total marks. Bring your codes along with you in the Labs which are to be conducted on 20 April, 2018. You will be evaluated during the lab only if you have submitted the codes on SLATE until the deadline. There will be no leniency in the instruction mentioned above.**