SOCKET PROGRAMMING

1. Build a simple client-server system (use TCP), where you use the single client to chat with a dummy server. The protocol between the client and server is as follows.

- The server is first started on a known port.
- The client program is started (server IP and port are provided).
- The client connects to the server, and then asks the user for input. The user types his message on the terminal (e.g., "Hi", "Bye", "How are you"). The user's input is sent to the server via the connected socket.
- The server reads the user's input from the client socket. If the user has typed "Bye" (without the quotes), the server must reply with "Goodbye". For any other message, the server must reply with "OK".
- The client then reads the reply from the server, and checks that it is accurate (either "OK" or "Goodbye").
- If the user had typed "Bye", and the server replied with a "Goodbye" correctly, the client quits. Otherwise, the client asks the user for the next message to send to the server.

2. Develop a client-server application using TCP where the client will send two operands and an operator to the server in operand1 operator operand2 format and the server will calculate the result and display it. Allowed operators are +, -, *, /, %

3. Develop a Client-Server application using UDP where the client will send a decimal integer to the server and the server will calculate the sum of its digits and send back the result to the client. The client will display the result. [Example: Input: 123, Output: 1+2+3=6]