Threads and Sockets

Pre-requisite: Understanding of threads and socket programming

Write C program for each of the problem below. After executing each of the C program, you will need to capture the output using suitable screenshots. Use the following file naming convention to complete your submission.

- Server program
  - Using stream sockets 201801nnn_server_stream.c
  - Using datagram sockets 201801nnn_server_datagram.c
- Client program
  - Using stream sockets 201801nnn_client_stream.c
  - Using datagram sockets 201801nnn_client_datagram.c

Following is the program specification.

- Design a simple client server application where a server receives a messages from client A, then sends an acknowledgement to client A as well as the message received from client A to client B.
- When client B receives the message from the server, it sends a new message to the server, which then acknowledges back along with sending the message received from client B to client C.
- A similar message exchange happens between client C and client A through the common server assuming clients A,B and C were active clients at that instance of time. This scenario should well be extended to K active clients at any point of server execution.
- Server is listening to all the active clients on a user specified port.
- Client does not terminate after sending the message to the server, however, is ready to send the next message after it receives the acknowledgement from the server for the previous message.
- The server can run in two modes. One-to-one (OO) mode or Broadcast (BC) mode which could be specified through the command line when the server starts. If the server is in OO mode, it will work as indicated in above points. However, if it is in BC mode, it will broadcast the message received from one of the client to all the remaining active clients along with the acknowledgement to the client who has sent the message to the server.

Write a program for the above client server application using suitable system / library calls.

Show important test scenarios about how will you test this application to demonstrate the required working. Along with source program take screen shots (to be submitted as a separate pdf file) demonstrating the working for each of the following cases implemented through your program. [Hint: Server should have information above active clients]

1. Implement the client and server programs assuming that stream sockets are being used.
2. Repeat the above implementation assuming that datagram sockets are being used.

To ensure that you get a reasonable credit for this assignment, support your assignment submission with a pseudocode and blockdiagram in a separate pdf file.