Question one:

Consider a system with one server and one client. Both client and server are on the local host.

The server selects its port randomly from the range of ports [3000 – 3050]. The client does not the port number of the server.

Your client must be smart enough to find the server open port and connect to the server. Note that the client may make several trials before it succeeds to connect to the server.

Once the connection is established, the client sends the following message to the server "Hello Server. I was able to connect to your open port".

The server must respond by the message "Good luck client. I am closing the port".

Then the server must close the open port and all its input output ports.

1. Your server must print on the screen
    a. the randomly selected port
    b. The received message from the client "Hello Server. I was able to connect to your open port".
    c. The message sent to the client "Good luck client. I am closing the port".
    d. "I am closing all open sockets and input and output ports". This statement must be printed before closing all open sockets and ports
2. Your client must print the following:
    a. The server port number is "XXX" (XXX is the port number found by the client) the number of trials used by the client to scan and detect the port number of the server.
    b. The message sent by the client to the server "Hello Server. I was able to connect to your open port".
    c. The message received from the server "Good luck client. I am closing the port".

Question two:

1- Your system has a server and four clients. The server will create partners with two clients. Each client requests a number from the server. The server provides a number randomly between 1 and 10 for each client. If two clients receive the same number from the server, then they are considered partners. The server will request the clients to establish communication between the partners. The partners will exchange the message “happy to meet you”. For example, after the first request, the clients may have the following numbers
    a. C1 = 3
    b. C2 = 4
    c. C3 = 10
    d. C4 = 1

In this case, no partners are established; go to next trial (جرب مرة اخرى)

In the second round, the clients may get the following numbers

    a. C1 = 2
    b. C2 = 5
    c. C3 = 2
    d. C4 = 7

In this trial the clients, which have the same numbers, are

C1 and C3 = 2; so Client1 and 3 become partners

The server sends a message to clients 1 and 3 and ask them to communicate with each other. Clients 1 and 3 establish a connection, and exchange the message “happy to meet you”.

The server continue to generate random numbers for clients 2 and 4.

The server stops trying after 10 trials.

After 10 trials, the server declares the partners in the game or no partners at all.

For example: if clients 1 and 3 were partners, and two and four were not partners, the server will declare

Clients1 and three are happy partners

Clients 2 and 4 good luck

Note the following cases:

If all clients receive the same random number at any trial, then the server declares clients 1 and 2 as partners, and clients 3 and 4 as partners.

If three clients receive the same random number, then the server declares the first two of the clients as partners, and continue with the game with the other partners.

Good Luck ^-^