COMP4621 Lab 5

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Q1) Describe the components of a socket address structure. Why do we use the data structure sockaddr_in instead of socketaddr?

For the structure of sockaddr, it includes:

- sa_family_t sa_familty (the address family)
- char sa_data[] (the socket address)

For the structure of sockaddr_in, it includes:

- sa_family_t sin_family (the address family)
- in_port_t sin_port (the port number)
- struct in_addr sin_addr (the IPv4 address)

The reason for using the data structure of sockaddr_in instead of sockaddr is because although both sockaddr_in and sockaddr can store both the port number and the IP addresses, but sa_data in sockaddr requires programmer to tediously pack the pairs of IP address and port number together in a single data members, whereas sockaddr_in allows the port number and IP addresses stores in separate data members

Q2) What is the purpose of the bind() function in socket programming? Does the client require it? Why?

The purpose of the bind() function is to bind the socket that we have created to the IP address and port number specified in addr.

The client does not require it. It is because when the client connect to the server using connect(), the client would automatically know which IP address and port number it has been bind to once the connection is successful.

Q3) Explain the purpose of the listen() function in socket programming. How does it work with the accept() function to establish connections between clients and servers? What does the argument "backlog" in the listen() function mean?

The purpose of the listen() function is to allow the server to stay in a passive state and wait for the clients to connect to the server.

It works in the following way. After the server call the listen() function, this means the server is ready to welcome any clients to connect to it. Now, suppose there is a client call the connect() function to try to connect to the server, the server would receive the connection request from the server. If the server is willing to accept this request, it would call accept() function in response to tell the clients that it can connect to the server. Hence, the connection between a client and a server is established.

The argument "backlog" in the listen() function states the longest length of the queue allowed that is used to store the connection requests from the clients that would try to connect with the server, before the server can reject the new requests.

Q4) For the recv () and recvfrom () functions, what does the argument "size_t len" mean and what's the difference between it and the return value?

The argument "size_t len" specifies the longest length of the buffer allowed.

The difference between it and the return value is that the return value is the acutal length of the buffer you received. Sometimes, you may get a return value of 0 if you receive nothing from the client, or you may receive -1 as return value if error occurs. While for "size_t len", it only specifies the biggest size of buffer allowed to store the received message.