UNP PROBABLE QUESTIONS-2022

UNIX Network Programming (CSE 4042)

Programme: B.Tech. **Semester: 6th**
Instructor: Dibyasundar Das **Set : 1**

NB: Each bit carry 2 marks.

1. Answer each of the following in brief. $[2 \times 3]$
   (a) What is the theoretical capacity of a channel if the bandwidth is 20 KHz and SNR is 40dB?
   (b) We have a channel with 4 KHz bandwidth. If we want to send data at 100 Kbps,what is the minimum SNR in dB?
   (c) What is the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 1 Gbps?

2. Answer each of the following in brief. $[2 \times 3]$
   (a) Write a function to print ip and port details of local and remote end of a TCP socket.
   (b) A TCP server with ip 200.130.40.1 is listening on port number 30. Write the code block for client to send and receive data from the server?
   (c) Write a code to design a concurrent echo-server that provides service on port number 33456, and can only provide service to local clients. Make sure that no zombie process should be created.

3. Answer each of the following in brief. $[2 \times 3]$
   (a) A UDP client want to verify the IP and port number of the server. Write a code to keep receiving data until data is received from correct server.
   (b) Write a code to create a UDP socket and set the send buffer size to twice of the current value.
   (c) Design a UDP echo-client that will resend the data if no response is received in 10 second.

4. Answer each of the following in brief. $[2 \times 3]$
   (a) Wite a code to use **`select`** function as as a replacement of sleep. Set the sleep time to 5 sec.
   (b) Wite a code to use **`poll`** function as as a replacement of sleep. Set the sleep time to 5 sec.
   (c) What is **`pselect`** ? Write it's prototype and describe how its better than **`select`**.

5. Draw the following diagram. $[2 \times 4]$

   (a) Draw TCP state transition diagram for server.

   (b) Draw TCP function interaction diagram for client-server model.

   (c) Draw Kernel interaction diagram for TCP server.

   (d) Draw the Packet exchange diagram for TCP connection establishment and termination.

6. Answer each of the following in brief. $[2 \times 3]$

   (a) Compare between **`sockaddr_in`**, **`sockaddr_in6`** , and **`sockaddr_un`** structures.

   (b) Show use of **`inet_aton`**, **`inet_addr`**, and **`inet_ntoa`** functions with example.

   (c) Write short notes on **`inet_pton`** and **`inet_ntop`** functions.

7. Answer each of the following in brief. $[2 \times 3]$

   (a) Match to its proper description

A	B
`AF_INET`	IPv6 protocols
`AF_INET6`	TCP transport protocol
`SOCK_STREAM`	datagram socket
`IPPROTO_TCP`	Unix domain protocols
`AF_LOCAL`	stream socket
`SOCK_DGRAM`	IPv4 protocols

   (b) Write a code to create a time server without bind function. How the socket is being assigned a port in such a case.

   (c) Explain with neat diagram how the kernel maintains the queue for listing socket.

8. Answer each of the following in brief. $[2 \times 3]$

   (a) Write a code print the current time stamp when ever **`ctrl + c`** is pressed.

   (b) Two file descriptor **`fd1`**, and **`fd2`** are to be monitored for data availability. Write a code segment using **`select()`** to monitor for data availability.

   (c) Two file descriptor **`fd1`**, and **`fd2`** are to be monitored for data availability. Write a code segment using **`poll()`** to monitor for data availability.

9. Answer each of the following in brief. $[2 \times 3]$

   (a) Write a UDP code to broadcast a message. The broadcast ip is given as **"192.168.255.255"** and client port number is **33456**.

   (b) Explain use of **SO_LINGER** socket option.

   (c) Write a code to create a UNIX domain socket and bind "/tmp/file1" to the socket.

10. Draw the following diagrams $[2 \times 3]$

   (a) Client-Server communication in UDP with its elementary functions.

   (b) How a forked child gets connected to client in Concurrent Server-Clint model?

   (c) I/O Multiplexing Model

11. Write short note on the given terms $[2 \times 3]$

   (a) Class-full addressing

   (b) Private IP

   (c) Asynchronous I/O Model

12. Answer the following questions $[2 \times 3]$

   (a) What is the subnet address and network address for a host 116.29.118.26 /19?

   (b) You have an IP address of 172.16.13.5 with a 255.255.255.128 subnet mask. What is your class of address, subnet address, and broadcast address?

   (c) The network class-full address of 172.16.0.0/19 provides how many subnets and hosts?

13. Answer the following questions $[2 \times 3]$

   (a) Write a TCP client program to send an array of integers to server.

   (b) Write a TCP server program to receive an array of integers.

   (c) **wait()** is always blocking. How to use **waitpid()** to have a non-blocking wait for **SIGCHLD**.

14. Answer the following questions $[2 \times 3]$

   (a) What is the difference between synchronous and asynchronous I/O? Have a comparative analysis of all five I/O Models.

   (b) Explain use of **SO_KEEPALIVE** socket option.

   (c) Write a program to print the default value of **SO_SNDBUF**, **SO_RCVBUF**, **SO_SNDTIMO**, **SO_RCVTIMEO** and, **SO_BROADCAST** options for a TCP socket.

15. Draw neat diagram for the following [2 × 3]

    (a) TCP Header
    (b) UDP Header
    (c) Three-way handshake

16. Answer the following questions [2 × 3]

    (a) Why TCP is more reliable than UDP?
    (b) How the listen function maintains the request in queue?
    (c) Explain the input to socket function. e.g. socket(AF_INET, SOCK_STREAM, 0).

17. Write short note on the given function [2 × 3]

    (a) fork()
    (b) value-result argument
    (c) bind()

18. Find output of the following code segments [2 × 3]

    (a) Write the output of the following code snippet assuming the host byte ordering of the required machine is little-endian.

```
int main(){
        uint16_t servport =20;
        struct sockaddr_in servaddr;
        servaddr.sin_port=htons(htonl(servport));
        printf("%hu\n",servaddr.sin_port);
        return 0;
}
```

    b) Select the suitable parameters in palce of **para-1** and **para-2** for connect() function call.

```
int main(){
        struct sockaddr_in sa;
        socklen_t len;
        len=sizeof(struct sockaddr_in);
        ......
        connect(cfd,(struct sockaddr *) para-1,para-2);
        ......
        return 0;
}
```

    (c) How many yes will be printed?

```
main()
{
        fork(); printf("yes\n");
        fork(); fork(); printf("yes\n");
}
```