Server code

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#include <arpa/inet.h>

#define PORT 8080

int main() {
    int server_fd, client_socket;
    struct sockaddr_in address;
    int addrlen = sizeof(address);
    char string1[100], string2[100], response[300];

    // Create socket
    server_fd = socket(AF_INET, SOCK_STREAM, 0);
    address.sin_family = AF_INET;
    address.sin_addr.s_addr = INADDR_ANY;
    address.sin_port = htons(PORT);

    // Bind the socket
    bind(server_fd, (struct sockaddr *)&address, sizeof(address));
    listen(server_fd, 3);

    printf("Server is waiting for a client...\n");

    // Accept client connection
    client_socket = accept(server_fd, (struct sockaddr *)&address, (socklen_t *)&addrlen);

    // Receive two strings from the client
    read(client_socket, string1, sizeof(string1));
    read(client_socket, string2, sizeof(string2));

    // Calculate lengths and create a response
    int len1 = strlen(string1);
    int len2 = strlen(string2);
    sprintf(response, "Sum of lengths: %d\nConcatenated string: %s%s", len1 + len2, string1, string2);

    // Send the response back to the client
    send(client_socket, response, strlen(response), 0);

    printf("Response sent to the client.\n");
    close(client_socket);
    close(server_fd);

    return 0;
}
```

Client code

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#include <arpa/inet.h>

#define PORT 8080

int main() {
    int sock;
    struct sockaddr_in server_address;
    char string1[100], string2[100], response[300];

    // Create socket
    sock = socket(AF_INET, SOCK_STREAM, 0);
    server_address.sin_family = AF_INET;
    server_address.sin_port = htons(PORT);
    inet_pton(AF_INET, "127.0.0.1", &server_address.sin_addr);

    // Connect to the server
    connect(sock, (struct sockaddr *)&server_address, sizeof(server_address));

    // Get two strings from the user
    printf("Enter the first string: ");
    fgets(string1, sizeof(string1), stdin);
    string1[strcspn(string1, "\n")] = 0; // Remove newline character

    printf("Enter the second string: ");
    fgets(string2, sizeof(string2), stdin);
    string2[strcspn(string2, "\n")] = 0; // Remove newline character

    // Send the strings to the server
    send(sock, string1, strlen(string1), 0);
    send(sock, string2, strlen(string2), 0);

    // Receive and print the server's response
    read(sock, response, sizeof(response));
    printf("Server response:\n%s\n", response);

    close(sock);

    return 0;
}
```

***Yeh codes ek **TCP client-server** program banate hain
Jo **strings** ke saath kuch operations karta hai.

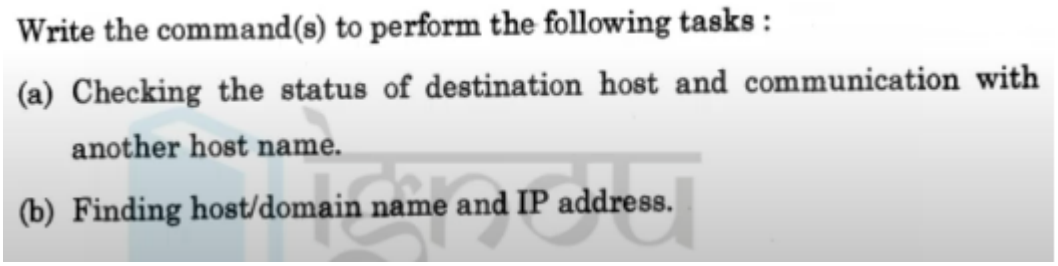
Client ka kaam:

Sabse phele user se input lete h
User se do strings le (e.g., "hello" aur "world") leta h.
Fir in dono strings ko Tcp connection k trough server ko bheja jata h
Fir client Server ka response receive karta h
(lengths ka sum aur concatenated string).
Server User ko result dikhata h.

Server ka kaam:

Server client ke saath connect hota hai.
Server Client se do strings leta h
Strings par operations lagata h
 Dono strings ko concatenate karta (e.g., "hello" + "world" = "helloworld").
Lengths ka sum calculate karta h (e.g., 5 + 5 = 10).
Fir client ko result wapas bhejta h

(a) Network interfaces aur unke assigned IP addresses ka pata karne ke liye:
ip addr show
(Note: ifconfig kaafi jagah outdated hai, toh ip addr show zyada prefer kiya jata hai.)
(b) Remote system tak pahunchne ke dauraan sabhi routers ki list nikalne ke liye:
Linux/Mac ke liye command:
traceroute <destination>
Windows ke liye command:
tracert <destination>
Yahan <destination> ki jagah aap remote system ka hostname ya IP address dalenge.


Write the command(s) to perform the following tasks :

(a) Checking the status of destination host and communication with another host name.

(b) Finding host/domain name and IP address.

Task (a):
Check karna hai ki doosre computer ke sath connection hai ya nahi? Uske liye **ping** command use karte hain
ping example.com
Task (b):
Website ya computer ka IP address ya naam find karna hai? Uske liye nslookup ya host command use kar sakte hain.
nslookup example.com
host example.com

1. `cat`: Ek file ka pura content dikhata hai.
    - Example: `cat file.txt`
2. `sort`: File ke lines ko arrange karta hai (a-z order mein).

    - Example: `sort file.txt`
3. **`ping`**: Check karta hai ki internet ya network connect hai ya nahi.
    - Example: `ping google.com`
4. **`more`**: File ka content thoda-thoda karke dikhata hai.
    - Example: `more file.txt`
5. **`df -h`**: computer ke storage ka status dikhata hai (kitna bhara hai aur kitna khaali hai).
    - Example: `df -h`
6. **`tail -f`**: File ke last 10 lines live dikhata hai.
    - Example: `tail -f logfile.txt`

1. Put
local computer se file ko server par upload karta h Example: put file.txt

2. get
file ko server se computer par recieve karta h (Yeh file ko server se download karega)

3. Mput
ek saath bhot saari files ko server par upload karta h

4. mget
ek saath bhot sari files ko server se download karta h

5. lcd
Ye command ftp k saath computer par folder badalne ke liye hota hai

6. cd
Yeh command server par folder badalne ke liye hota hai.

top command
computer par chal rahe processes aur unke usage (jaise CPU aur memory) ko live dikhata

Init() Process
program shuru karte samay zaroori setup aur resources ready karta hai
jisse program ya application theek se chalta h

ps-aef:
background me chal rahe programs ki list aur unke details ko dikhata hai.

ls-of:
Jo files abhi open hain aur kaunse programs un files ko use kar rahe hain, ye batata hai

netstat:
Network connections aur data flow ki details dikhata hai.

listen() function

server ko connection request bhejta h aur server accept karta h

route/netstat-rn
packets send karne ka rasta find karta h routelnetstat-rn network ki problems ko samajhta h

2. Lsmod
Lsmod Ek Linux command h Lsmod linux system me load hue drivers ko dikhata hai

Ipconfig
Windows computer ka current network status dikhata hai jaise IP address aur gateway

Nslookup
1. Nslookup domain names ko IP addresses mein convert karta hai.

Dhclient
Dhclient computer ko automatically IP address aur network settings assign karta h Dhclient Ek Linux command h

FDM
(Frequency Division Multiplexing)
ek hi connection par alag-alag signals ko alag-alag frequencies par bheja jata hai, taki wo ek doosre ko disturb na karein.

IP Header
ek packet ka part hota hai jo sender aur receiver ka address aur data bhejne ki basic jaankari rakhta hai, taki packet sahi jagah pahunch sake.

BGP
(Border Gateway Protocol)
ek routing protocol hai jo internet ya bade networks ke beech mein data packets ko route karta h

EIGRP
ek routing protocol hai
jo network mein data bhejne ke liye best raasta dhoondta hai.
EIGRP (Enhanced Interior Gateway Routing Protocol)

OSPF
(Open Shortest Path First)
ek routing protocol hai jo network ke andar data packets ko bhejne k liye shortest aur efficient raaste dhundta h

Routing Information Protocol (RIP)
ek network protocol hai jo routers ko network ke routes ki information exchange karta h

Network
do ya do se zyada devices ek doosre se connect hote hain
aur information share karte hain

ip address
IP address internet पर devices को identify करनेवाला unique number होता है
ipv4
IPv4 इंटरनेट पर डिवाइस ko identify karne k लिए 4-डॉट वाला 32-बिट का एड्रसे सिस्टम है
IPv6
8-ग्रुप वाला 128-बिट का एड्रसे सिस्टम है
Jo aane wale time me bhot saare device ko support karega

Subnet mask
network ko chhote subnetworks me divide karta h
ek network ke andar host aur network addresses ko alag karta h
Ye 32-bit number hota h

Subnetting
network ko chhote subnetworks me divide karta h
taaki IP addresses ka waste na ho aur use ho sake aur network mein sahi tarike se kaam kare

TOPOLOGY
devices ke arrangement ko describe karta hai
kaise devices ek dusre se connected hote hain.
Network Topology
Star Topology
multiple devices ek central hub ya switch se connect hote hain
Ring topology
Har device apne najdiki device se connected hota hai, jo ek circle banata h
aur information ek hi direction mein flow hoti hai
Bus topology
devices ke arrangement ek single line me hota hai
Mesh topology
har device ko multiple connections se interconnect kiya jata hai
taki agar koi connection fail ho jata h, toh dusre alternate routes ka use hota h
Tree Topology
devices ke arrangement ek tree ki form me hota h jisme ek central node se multiple branches connect hote hain
Hybrid Topology
jisme do ya do se zyada alag-alag topologies ko combination hota h, jaise ki star, bus, ya ring, etc

socket
socket ek endpoint hota hai
Jisme data ko send aur receive kiya jata hai
socket client aur server ke beech communication banata h.
Stream Sockets (TCP): connection-oriented hota hain
jisme data reliable aur order mein send aur receive hota hai.
Datagram Sockets (UDP): connectionless hota hain

jisme data reliable aur order mein send aur receive nhi hota hai.
aur speed zyada hoti hai

Proxy server
ek beech ka server hota hai jo client aur internet ke beech mein data ka exchange karta hai, client ka asli IP address chhupata h aur security provide karta h

Router
Router ek network device hai
aur data ko ek device se doosre device tak bhejta hai.

Osi model
1. Ek open system interconnection model hai
3. Jo communication protocols ko 7 Leyers me organised karta h
6. Osi model mein Sevan layers hote Hain

1. Physical
jo hardware devices jese cables aur signals jaise चीज़ंो se data ko ek devices se dusre device par transfer करता है.
Ethernet, usb, dsl, isdn

2. Data Link
application, software, website k data को स्टोर और मैनेज करता h
Mac, atm, hdml, frame relay

3. Network layer
डाटा पैके ट को एक नेटवर्क से दूसेर नेटवर्क में data भेजने का काम करता है।
Ex. ipv4, ipv6, icmp, arp

4. Transport
End to end communication aur data integrity provide karta h
Transport layer data transfer ke liye udp aur TCP use Karta h

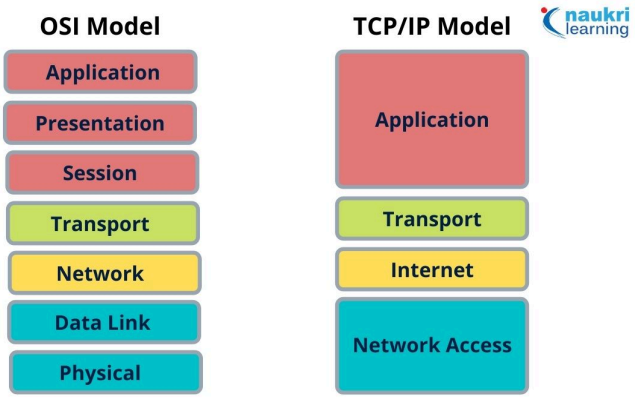
5. Session
applications के andar communication sessions ko manage करता है
Yah data exchange aur synchronization ko control karta h
Rps, tls, scp

6. Presentation
Jo data ko show karta h
Ex. jpg, png, gif, ascii, css

7. Application
web browser aur email jaise software को network se communicate करने mein madad करता है
Ex. http, ftp, smtp, nfs, telnet

TCP/IP Model
communication protocol hota h
inernet par network device k liye data transfer ko handle karta h aur interconnect karta h

DIFFERENCE
OSI model me 7-layer hoti h
jo network par data communication ko batata h
TCP/IP me 4-layer hoti h



Telnet
Telnet me user ek system se dusre remote system par command chalata h aur login karta h

SMTP
1. Simple Mail Transfer Protocol
3. smtp email message ko ek server se dusre server tak bhejta hai.

HUB
Ek network device h jo sare connected device ko ek saath data bhejta h
3. hub me Traffic jyada hota hai aur Speed kam hoti hai

Switch
Ek network device h jo data ko specific device ko bhejta ha
hub me Traffic kam hota hai aur Speed tej hoti hai

(File Transfer Protocol)
3. Ftp internet par files ko ek computer se doosre computer par transfer karta h
6. FTP par secure file transfer ke liye (SFTP) ya FTPS ka use karta h

HTTP
Hypertext Transfer Protocol
web browsers aur servers ke beech data transfer karta hai.
browser me web page me Information ko display aur transmit karta h

TCP
Transmission Control Protocol
devices के बीच me connection बनाकर
reliable data transfer karta h order k saath, guarantee k saath
Connection based hota h

UDP
User Datagram Protocol
devices के बीच me connection बनाकर
reliable data transfer nhi karta h
Data order me nhi hota, bina guarantee k deliver hota h

Firewall
ek security system hota hai
jo computer networks ko unauthorized access se protect karta hai.

internet
Bhot sare interconnected computers ka network hota h

Intranet
ek private network hota hai jo limited computers ka network hota h

URL
Uniform resource locator
URL website ka address होता है jo internet par website dhundta h
Absolute url
Website ka Complete address h
relaive url
Website ka complete addres nhi hota h

DNS server
ek aisa server hota hai jo domain names (jaise www.google.com) ko IP addresses (jaise 142.250.183.206) mein convert karta hai, taaki devices internet par ek doosre se connect ho sakein.

MAC address
ek unique number hota hai
jo har device ko internet ya network par identify karta h

IP address
ek unique number hai jo devices ko identify karta hai
Aur
URL ek web address hai jo specific website ya page tak pahunchata hai.

DNS
jo website ke naam ko uski IP address mein convert karta ha
taaki aap website ko access kar sakein.
VPN
internet par data ko surakshit rakhne ke liye usse encrypt karta hai
taaki aapka connection private rahe

protocol
jo computer ko ek doosre se baat karne ka medium hai