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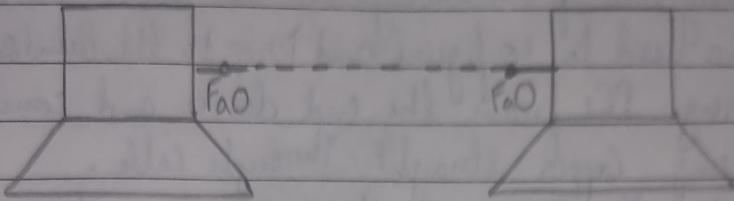
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Standard ^{8th} IIth Section E Roll No. 1BM22CS268

Subject CN (Lab)

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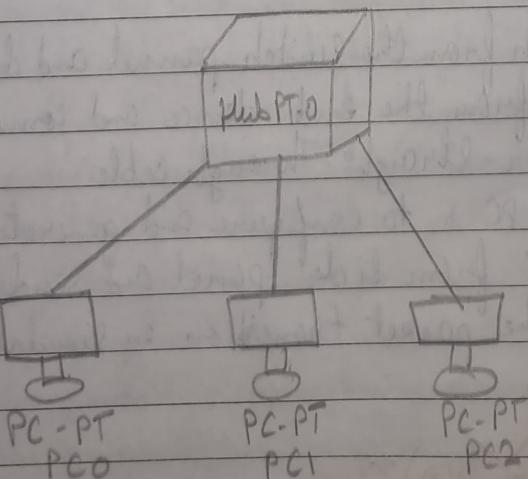
Computer - To - Computer Connections -



Steps :-

1. Drag PCs from the end devices and drop to the window.
2. Select Copper Cross-Over wire from connection to establish the links between the PC's.
3. Click on PC's go to configure and FastEthernet 0 to give IP address 10.0.0.1 for the respective subnet mask to be generated.
4. Select PDU from side panel and select the sender and receiver. Observe the Packet Tracing in simulation mode.

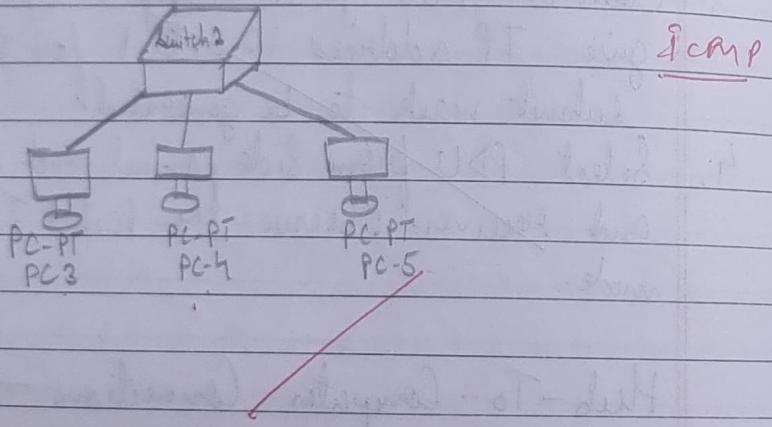
Hub - To - Computer Connections -



Steps :-

1. Drag hub from Hub panel as hub is connecting device so need to configure and drop to the windows
2. Drag PCs from the end device and connect that by using Copper - straight - Through cable.
3. Select the PC's go to the configure option and give the IP address for each PC's.
4. Select PDU from side panel and select sender and receiver.
5. Observe how the packet transition in simulation mode. Hub shares data to multiple port altogether.

Switch-to-Computer Connections -



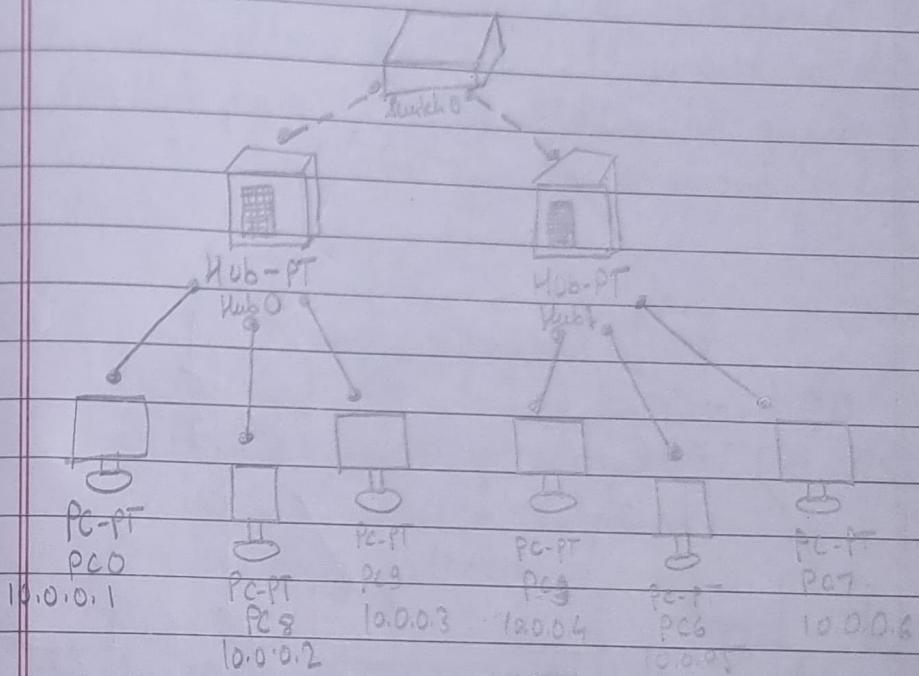
Steps :-

1. Drag switch from the switch panel and drop it.
2. Drag PCs from the end device and connect that by using Copper - straight - Through cable.
3. Select the PC's to configure and generate IP address -
4. Select PDU from side panel and sender-receiver -
5. Observe the packet transition in simulation mode.

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Task - 1

- Q. Create a topology involving multiple hub and a switch connecting them to simulator with simple PDU (Packet Data Unit).



Command Prompt
Steps -

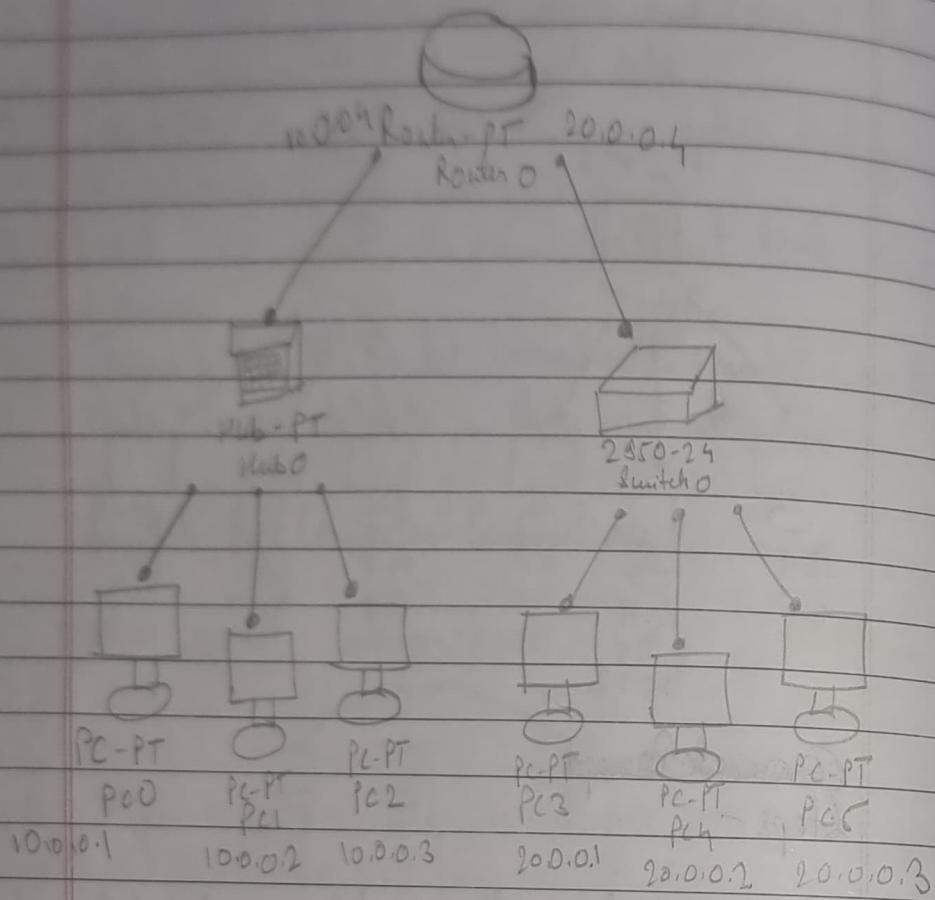
1. Drag switch from the switch panel and drop it.
2. Drag hub from hubs panel as hub is connecting device so no need to configure and drop to the windows.
3. Connect switch and hub through Copper Cross-Over.
4. Drag the PCs from end device config and give IP-address to them. Then connect with hub through Copper Straight-Through.
5. Select PDU from side panel and select the source-destination place.
6. Observe the packet transition in simulation mode.
7. For Ping-Command go to the desktop → Cmd Prompt → Run.

Ping - 10.0.0.1

✓ 4/10/24

Task-2

Q. Configure IP address to nodes in packet tracer using Router and Switch.



Steps:

1. Drag Router from the router panel name Router-PT and drop it.
2. Drag Hub from hub panel and drop it.
3. Drag Switch from Switch panel and drop it.
4. Drag PCs from end-devices and drop it.
5. Connect Router, Hub and Switch from Copper through. Through which is present in connection panel.
6. Click on the PC → Configure → IP address 10.0.0.1, 10.0.0.2, 10.0.0.3 which are connected with Hub.

7. Click on the PC → Configure → IP address 20.0.0.1, 20.0.0.2, 20.0.0.3 which are connected with switch.
8. Connect your Router and Hub with Fast Ethernet 0/0 and Router and Switch with FastEthernet 1/0.
9. Give IP address to Router. It should be different. For Hub give 10.0.0.4 and Switch give 20.0.0.4.
10. Go to CLI and give the command for enabling Router.

Router > enable

> Config terminal

Router (Config) # interface FastEthernet 0/0

Router (Config-if) # ip address 10.0.0.4 255.0.0.0

Router (Config-if) # no shutdown

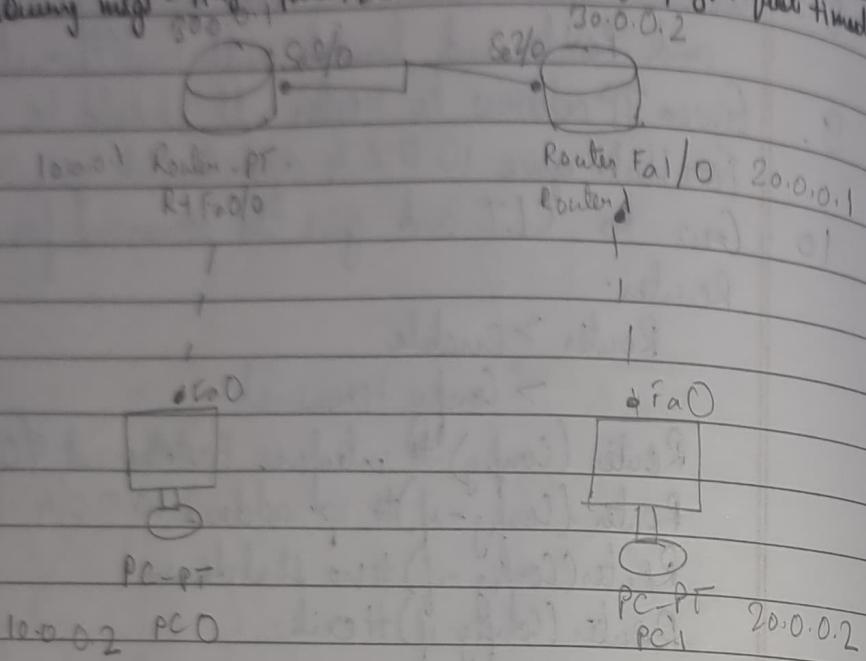
Router (Config-if) # exit

11. If the ~~enable~~ command is correct the router will enable and given green signal.
12. Select PDU from side panel and select the source and destination before that check if you have given the same gateway to every PCs which will show in Config of the PCs.

Task-3

Q. Connection b/w two routers -

Config. IP address to routers in packet tracer, explore the following nsgs - Ping response, Destination Unreachable, reply, Request Timed out



Steps :-

1. Drag two router from the router panel name Router-PT and drop it.
2. Drag two PC from the endless device connect it with two different router using Copper cross over and Config 1st PC as 10.0.0.2 and 2nd PC as 20.0.0.2
3. Connect the ^{both} Router with serial DTE connection with Se2/0
4. We need to give two different ip address because there are two connection.
One is for Fast ethernet 0/0 - give 10.0.0.1 and enable it or give CLI command.
One is for serial 2/0 - 30.0.0.1 and enable it or give CLI Command. Same for another router

5. If you go to CLI exit it and come to Router
Give Command Router# show ip route
Gateway of last resort is not set

10.0.0.0/8 is directly connected, FastEthernet 0/0
30.0.0.0/8 is directly connected, Serial 2/0

6. For sending message we need to connect all the IP-address with each other.

For that give command

Router# config t

Router (Config) # ip route 20.0.0.0 255.0.0.0 30.0.1

Do the same thing for another router.

Router (Config) # ip route 10.0.0.0 255.0.0.0 30.0.2

Give default gateway.

7. Now send the PDU it will show successful.

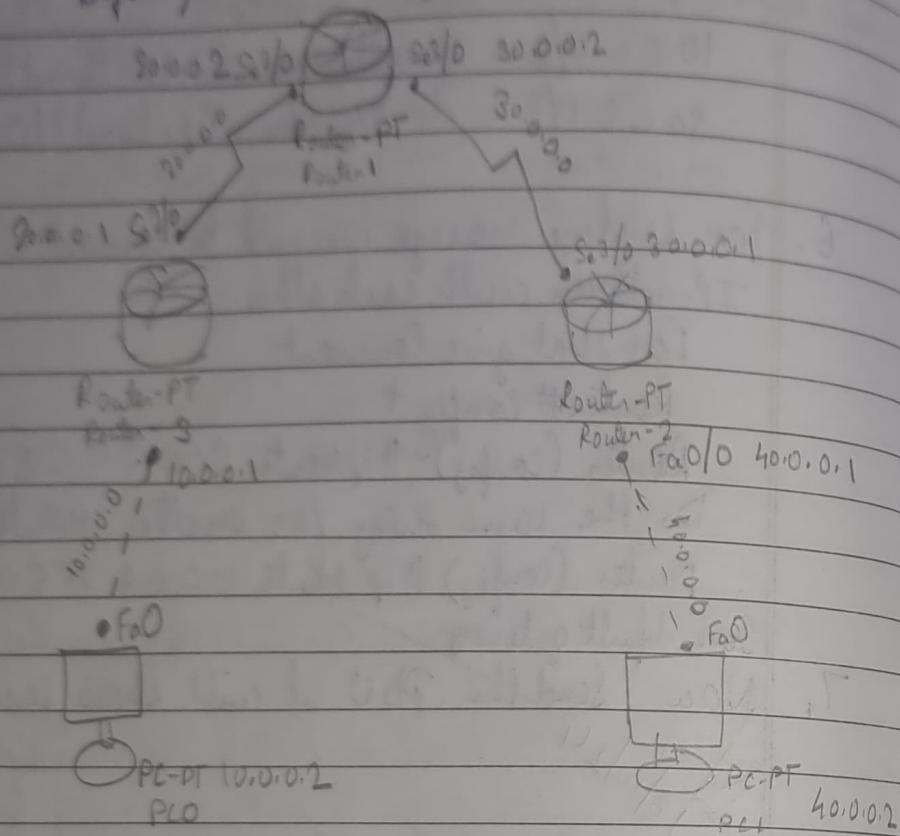
~~18/10/24~~

25/10/25

8

Task - 4

- Q. Configure default route, static route to the router.
Default / Static Routing



Steps:

- ① Drag three router from the router panel and connect it with Serial DTE connection.
- ② Drag the PCs from endless device and connect it with Copper cross-over with the router.
- ③ Configure every router from CLI
From Router 3:
Router# config

Router (config)# ip route 30.0.0.0 255.0.0.0 20.0.0.2

Router (config)# ip route 40.0.0.0 255.0.0.0 30.0.0.1

Router (config)# exit

Router# show ip route

From Router 2 :

Router # Config t

Router (config) # ip route 10.0.0.0 255.0.0.0 30.0.0.1

Router (config) # exit

Router# show ip route

From Router 3 :

Router # Config t

Router (config) # ip route 10.0.0.0 255.0.0.0 20.0.0.1

Router (config) # exit

Router# show ip route

④ Give the gateway for the PC 100.0.1 ad 40.0.0.1.

⑤ Now send the PDU it will show successful.

For Default Routing -

Give CLI Command -

From Router 3 to Router 2 .

Router# Config t

Router (config) # ip route 0.0.0.0 0.0.0.0 30.0.0.2

From Router 1 to Router 2 .

~~Router# config t~~

~~Router (config) # ip route 0.0.0.0 0.0.0.0 20.0.0.2~~

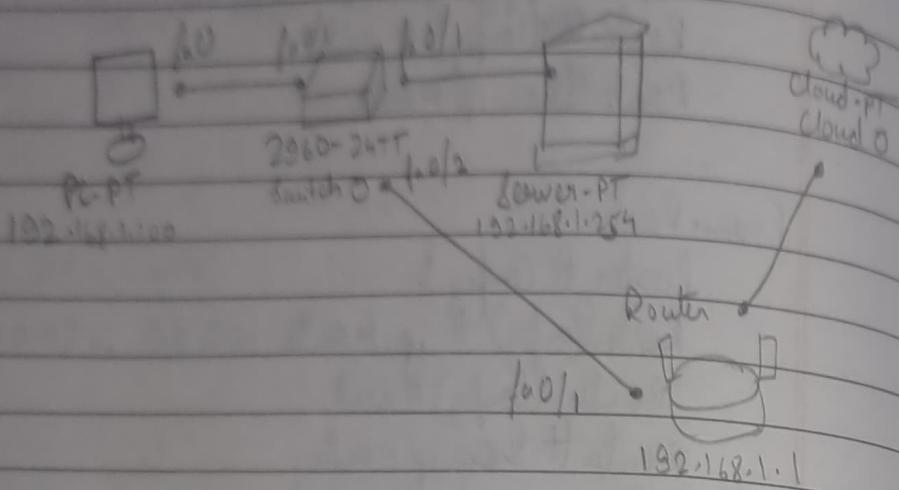
~~Router# show IP route~~

X
2nd step

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Task-5

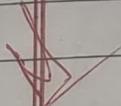
Q. How to demonstrate WEB server and DNS using Packet Tracer.



Steps-

- ① First create a LAN.
2. Connect PC and Switch 2960 with generic server with Copper-straight through cable.
3. To connect the server to the switch, ~~is also~~ ^{label} label them with 192.168.1.254 for server, 192.168.1.100 for PC and label it also.
Make sure that your port status is On under static ip address enter 192.168.1.100.
4. We will now ping from the pc to the server to make sure that we have connection.
5. For checking go to the Desktop Card - ping 192.168.1.254
6. Now click on the http to observed the web browser and look to the html. There type ipaddress 192.168.1.254
Now you are connected to http server.
7. Connect Router and Cloud-PT with each other And give ip address to Router 192.168.1.1.
8. Lets Configure wireless router.

9. Click on desktop tab \rightarrow Cmd - ping 192.168.1.1 , now configure default gateway for the PC.
10. Go to IP configuration give it default gateway as 192.168.1.1.
11. For connecting more server we need to setup DNS.
12. Click on DNS and make sure that is turned on.
13. Under address type: 192.168.1.254 so Super@yahoo.com resolves to the ip address 192.168.1.254
14. Now click on your pc and click IP configuration and under that server we see our server.
15. So now if we open up our web browser and type in Super@yahoo.com we should see our new webpage displayed.

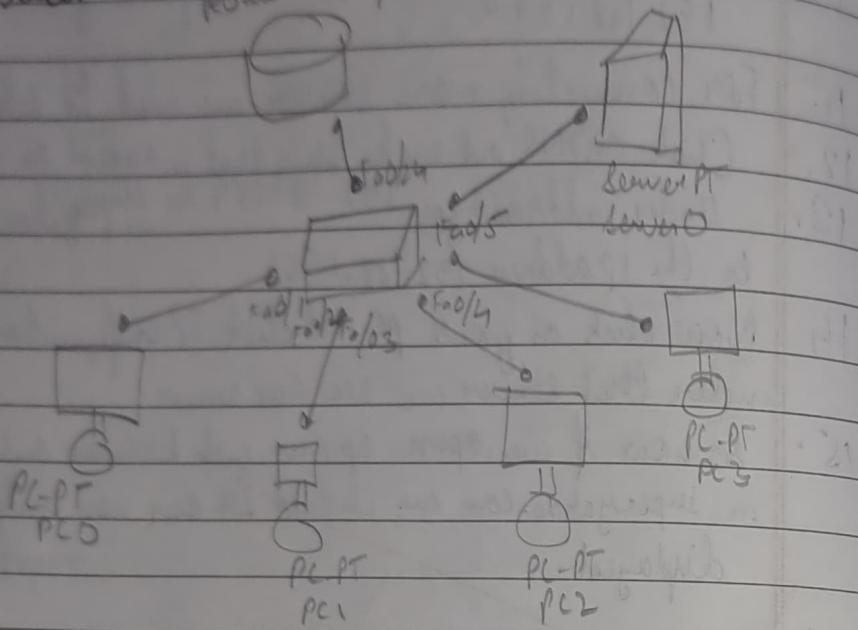


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Task-6

Q How to configure DHCP within a LAN in a packet

Tracer Router fast 0 points!



Steps -

1. Create a LAN
2. Configure Router interface with ip 10.0.0.1 and subnet mask 255.0.0.0
3. Click on Server \rightarrow Config, then assign gateway 10.0.0.1
4. Click on Fastether net and assign ip as 10.0.0.2 and mask 255.0.0.0 for our server.
5. Click on DHCP, give default gateway 10.0.0.1 and DNS server 10.0.0.2.
6. Edit the start ip address 10.0.0.10.
7. Give maximum no. of user give 500.
8. Assign TFTP server ip address with 10.0.0.2.
9. Click Save.
10. Click on any of the PC \rightarrow click Desktop \rightarrow Ip Config - choose DHCP wait for some time if your DHCP request failed try some more time.

- (11) Create a topology with another switch.
- (12) Configure the router interface fastethernet 0/0 and fastethernet 0/1 with IP address.
- (13) Give the gateway ip address is 10.0.0.1
- (14) Click the fastethernet assign ip address 10.0.0.2 then DHCP server automatically assign 10 network.
- (15) Click on PC in LAN \rightarrow Desktop \rightarrow Ip Config \rightarrow Choose DHCP, you will get ip from dhcp server for this PC.
- (16) For observing PC in a network without server add network, click server \rightarrow Config \rightarrow DHCP.
- (17) Edit pool name auth 20 Network
- (18) Now Router will work.
- (19) For checking choose DHCP. To get ip address from dhcp server.

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Task-7

- Q. Write a program for Error Detection Using
CRC - CCITT (16 bits) -

```
# include <stdio.h>
```

```
# include <string.h>
```

```
int crc (char * ip, char * op, char * poly, int mode){  
    strcpy (op, ip); // Copy input to output.  
    if (mode) {  
        // Append zeros to the output  
        for (int i = 1; i < strlen (poly); i++) {  
            strcat (op, "0");  
        }  
    }  
}
```

```
// Perform XOR on the message with the selected polynomial  
for (int i = 0; i < strlen (ip); i++) {  
    if (op[i] == '1') {  
        for (int j = 0; j < strlen (poly); j++) {  
            if (op[i+j] == poly[j]) {  
                op[i+j] = '0';  
            } else {  
                op[i+j] = '1';  
            }  
        }  
    }  
}
```

~~// Check for errors. Returns 0 if error detected~~
~~for (int i = 0; i < strlen (op); i++) {~~
~~if (op[i] == '1') {~~
 ~~return 0; // Error detected~~

```

3
3
return 1; //No error

3
int main() {
    char ip[50], op[100], recv[50];
    char poly[] = "10001000000100001";
    printf("Enter the input message in binary:");
    scanf("%s", ip);
    // Calculate the CRC and get the transmitted message
    crc(ip, op, poly, 1);
    printf("The transmitted message is: %s\n", op);
    printf("Enter the received message in binary:");
    scanf("%s", recv);
    // Check received message for errors
    if (crc(recv, op, poly, 0)) {
        printf("No error in data\n");
    } else {
        printf("Error in data transmission has occurred\n");
    }
    return 0;
}

```

Output -

- ① Enter the input message in binary: 11111
 The transmitted message is: 00000111000110011110
 Enter the received message in binary: 11111
 Error in data transmission has occurred.
- ② Enter the input message in binary: 11111
 The transmitted message is: 00000111000111101110
 Enter the received message in binary: 11111
 No error in data.

Q. Write a program for leaky bucket algorithm.

```
#include <stdio.h>
int main() {
    int no_of_packets, storage, output_pkt_size;
    int input_pkt_size, bucket_size, size_left;
    storage = 0;
    no_of_packets = 4;
    bucket_size = 10;
    input_pkt_size = 4;
    output_pkt_size = 1;
    for (int i = 0; i < no_of_packets; i++) {
        size_left = bucket_size - storage;
        if (input_pkt_size <= size_left) {
            storage += input_pkt_size;
        } else {
            printf("Packet loss = %d\n", input_pkt_size);
        }
        printf("Buffer size = %d out of bucket size = %d\n",
               storage, bucket_size);
        storage -= output_pkt_size;
    }
    return 0;
}
```

Output -

Buffer size = 4 out of bucket size = 10

Buffer size = 7 out of bucket size = 10

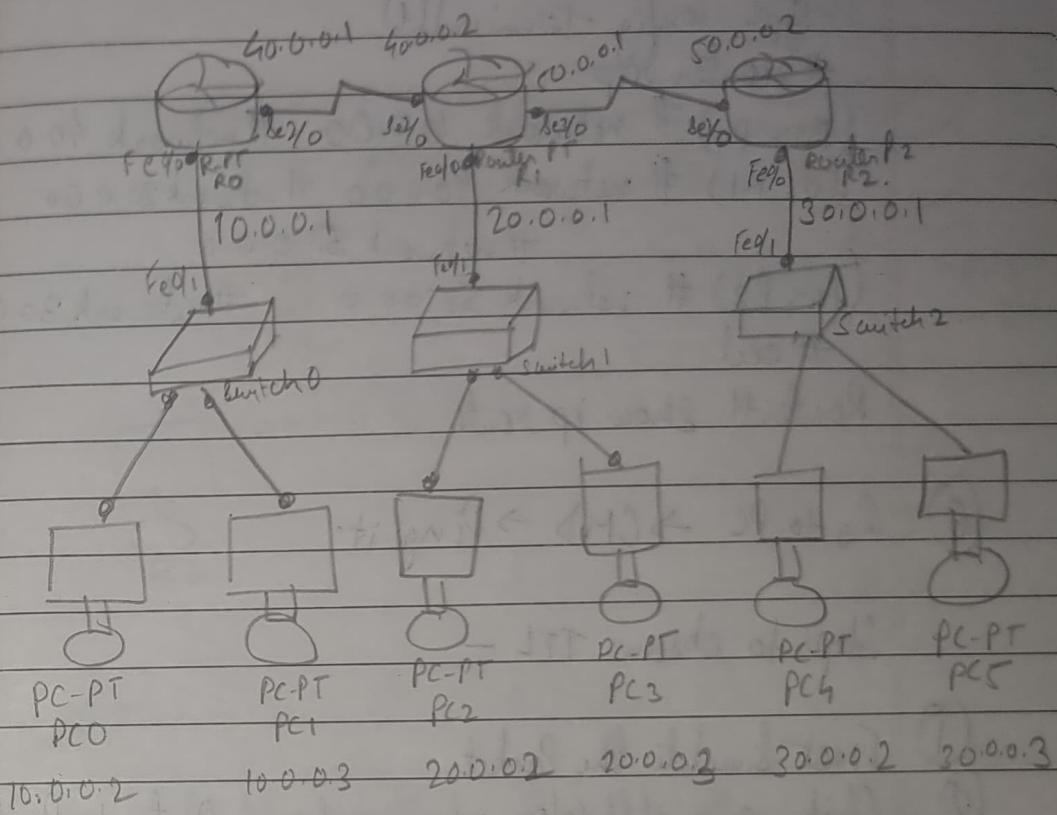
Buffer size = 10 out of bucket size = 10

Packet loss = 4

Buffer size = 9 out of bucket size = 10

Task - 8

Q Routing Information Protocol (RIP) -



Steps -

- ① Connect all the PCs from end devices to switch and switch to router with copper-straight through wire.
- ② Connect all the router with serial DTE.
- ③ Give IP-address for Router -

R0 → Se2/0 40.0.0.1 Fe0/0 10.0.0.1

R1 → Se2/0 40.0.0.2 Fe0/0 20.0.0.1 Se3/0 50.0.0.1

R2 → Se3/0 50.0.0.2 Fe0/0 30.0.0.1

- ④ Configure IP address and give gateway to PCs.

PC0 → IP address 10.0.0.2 gateway 10.0.0.1

PC2 → IP address 20.0.0.2 gateway 20.0.0.1

PC4 → IP address 30.0.0.2 gateway 30.0.0.1

⑤ Click the first Router.

Go to []

Type enable → Router > enable

Type config terminal(t)

router rip

(for R0) # network 10.0.0.0 # network 40.0.0.0

(for R1) # network 40.0.0.0 # network 20.0.0.0

network 30.0.0.0

(for R2) # network 50.0.0.0 # network 30.0.0.0

exit

Router# show ip route

⑥ Go to PC → CMD → Ping it.

Steps to observe TTL -

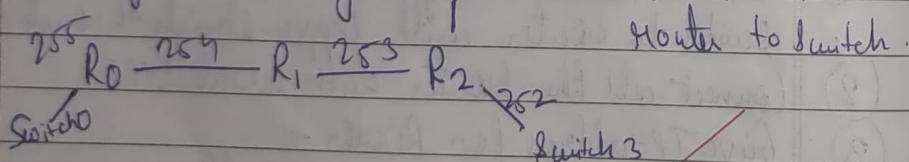
① First simulate the packet.

② Click any of the color who is performing Router to Router.

③ Go to Inbound PDU Details [see]

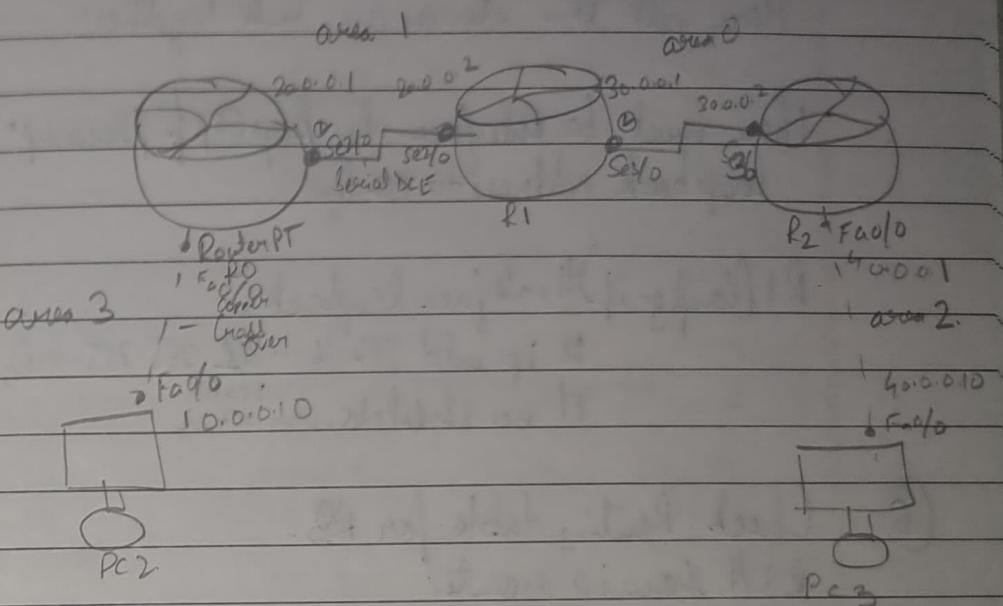
TTL = 255

④ It will get lost one by one if we move Router to Router.



Tank-9

Q) OSPF (Open Short Path First) -



Steps -

- ① Connect all the routers with each other by with serial DCE and PCs through copper cross over.
- ② Configure ip address to all interfaces.
- ③ Then wherever is clock give clock rate as 64000
- ④ Enable ip routing by configuring ospf routing protocol in all routers -.

In Router R1,

R1(config) # ~~router ospf 1~~

R1(config-router) # ~~router-id 1.1.1.1~~

R1(config-router) # ~~network 10.0.0.0 0.255.255.255 area~~

20.0.0.0 0.255.255.255 area

R1(config-router) # ~~exit~~

Similarly for R2 & R3.

- ⑤ Now check Routing table of all Router -
Router # show ip route -

Here all the devices are link together.

There must be interface to keep OSPF processing. To configure loopback address to routers.

R1(config)# interface loopback 0
ip add 172.16.1.22 255.255.0.0
no shutdown

- ⑥ Check Routing table for R3.
R3# show ip route

Here R3 doesn't know the area 3 so we create virtual link -

In Router R1,
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2

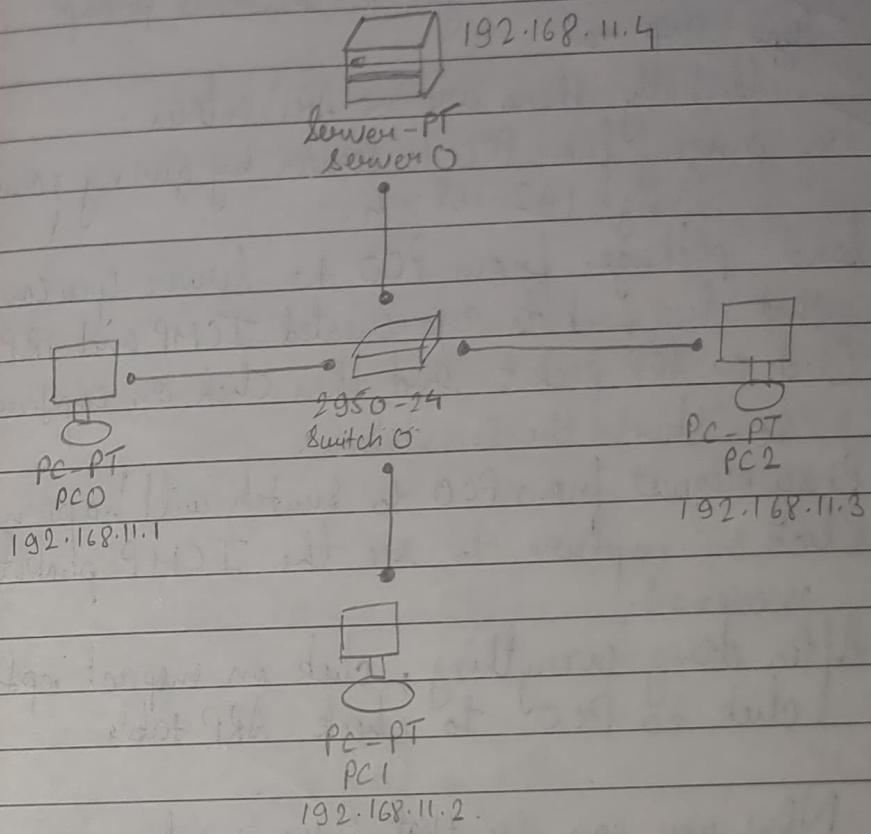
In Router R2,
R2(config-router)# area 1 virtual-link 1.1.1.1

- ⑦ R2 & R3 get updates about Area 3. Check it.

- ⑧ Check connectivity b/w host 10.0.0.10 to 40.0.0.10 by giving ping cmd -
ping 40.0.0.10

Task 10

- ① To construct simple LAN and understand the concept and operation of Address Resolution Protocol.

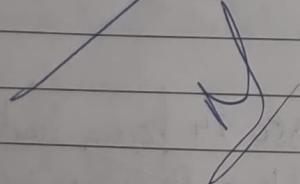


Steps -

- ① Drag Switch 2950-24 from Switch Panel, Server-PT from hub and two PC from endless device. Connect all them with switch using Copper-Straight Through wire.
- ② Assign IP address to all PCs and Server with 192.168.11.1, 192.168.11.2, 192.168.11.3, 192.168.11.4
- ③ Go to simulation panel, click on inspect and right click on PC0 (i.e. search option).

- (4) After clicking on PCO click ARP table and notice that there are entries and there's not in ARP table. Repeat some four times.
- (5) Click on PCO and go to command prompt.
Type arp -a.
Initially there are no ARP entries.
- (6) Try pinging from PCO to server by giving command - ping 192.168.11.4.
- (7) Send package from PCO to server you can notice that two packets are created ICMP and ARP.
- (8) Click on ARP packet and then click on capture button to start the simulation.
- (9) Ping request from PCO to switch will happen.
- (10) Click on capture to see the ICMP packet received.
- (11) After doing everything, click on inspect option and click to PCO to check ARP table.

Now you can see that there is entries present



Q. Construct ~~the~~ TELNET Protocol -

192.168.1.2

PC - PT
PC1

192.168.1.1

Router - PT
Router O

Steps -

- ① Drag PC and Router PT from the panel and connect both with Copper cross wire.
- ② Configure the IP address and gateway for PC 1
Go to desktop \rightarrow 192.168.1.2, 255.255.255.0,
Gateway - 192.168.1.1, DNS server - 0.0.0.0
- ③ Configure the Router in CLI -

Router > en.

Router # conf t

Router (config)# hostname R1

R1 (config) # enable secret 1234

R1 (config) # int Fa0/0

R1 (config-if) # ip add 192.168.1.1 255.255.255.0

R1 (config-if) # no shut

R1 (config-if) # line vty 0 5

R1 (config-line) # login

✓ Login disabled on line 2, until password is set.

R1 (config-line) # password tp

R1 (config-line) # exit

R1 # w8

Building Configuration -

[OK]

R1 #

④ Go to PC Command prompt

C:\> ping 192.168.1.1

C:\> telnet 192.168.1.1

Telnet 192.168.1.1 - - - open

User Access Verification

Password:

R1>en

Password:

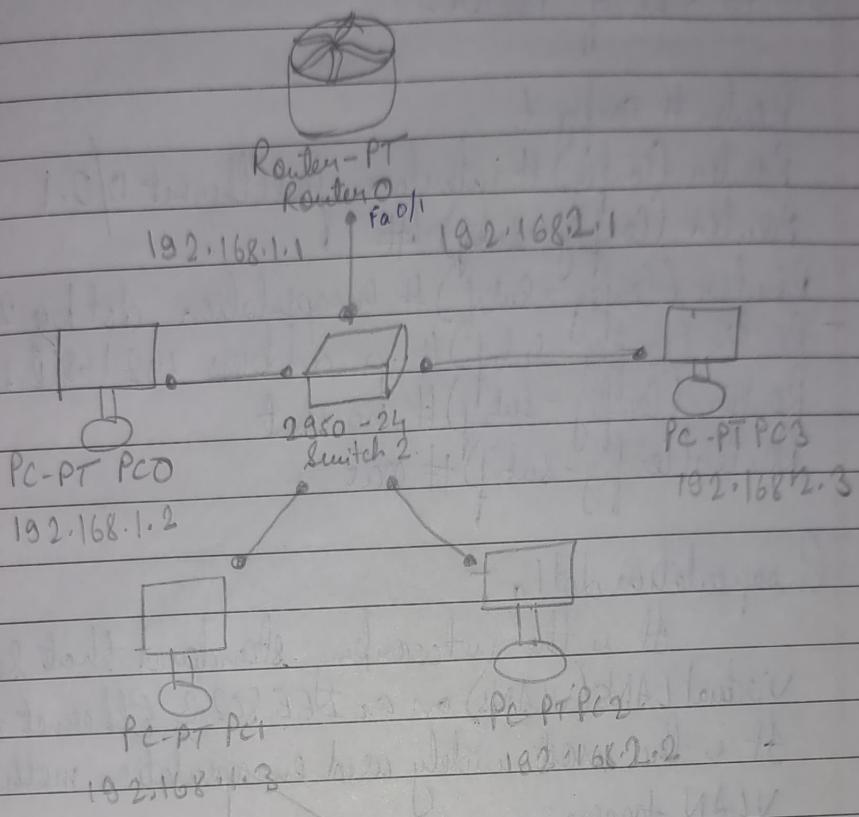
R1#tp

R1#tp

R1#

⑤ Now the password is set

Q. Construct Virtual LAN:



Steps -

- ① Drag Router, PCs and Switch from the panel and connect switch with copper straight with everything.
- ② Configure all PCs and Router.
- ③ For Configuring other ip-address in Router go to switch → Config tab and select VLAN Database.
Give VLAN Number - 2, VLAN Name - NewVLAN and add them.
- ④ In switch whatever wire is connect with wire click on that like in ours it is Fa 0/1 and make it the trunk.

Basically VLAN trunking allows switches to forward frames from different VLANs over a single link called trunk.

This makes the switch understand NEWVLAN.

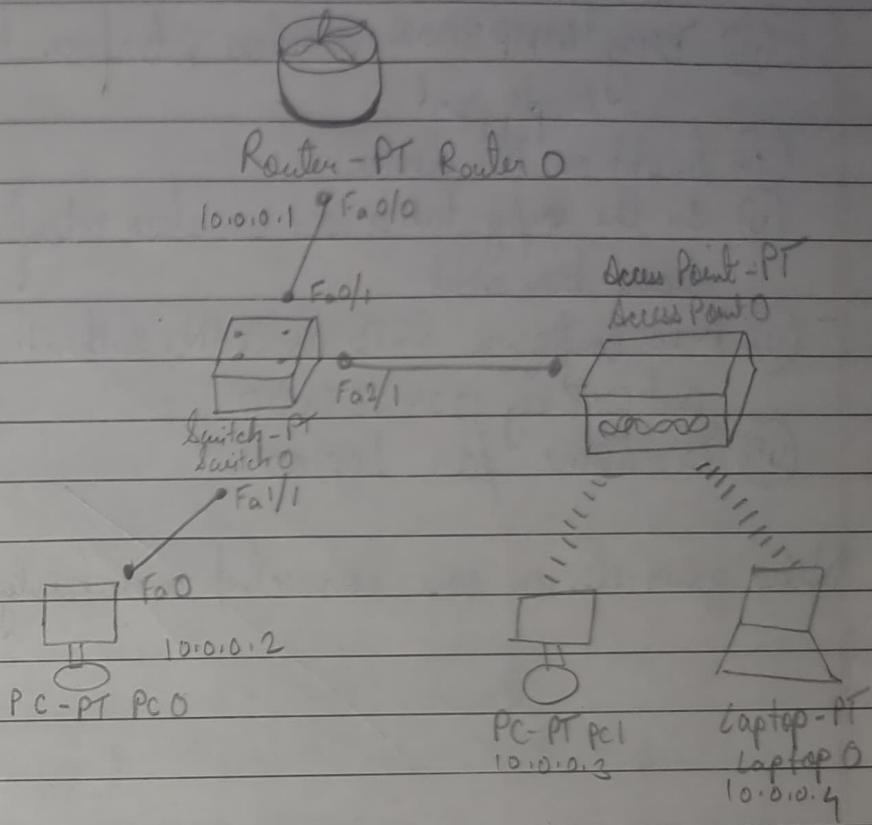
- ⑥ Go to CLI of Router -

```
Router# config t  
Router (config)# interface fastEthernet 0/0.1  
Router (Config-subif) #  
Router (Config-subif) # encapsulation dot1q 2  
Router (Config-subif) # ip address 192.168.2.1 255.255.255.0  
Router (Config-subif) # no shutdown  
Router (Config-subif) # exit
```

Encapsulation dot1q -

It is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. It is the most widely used encapsulation method for VLAN tagging.

Q. Construct a WLAN and make the nodes communicate wirelessly.



Steps -

- ① Drag switch, PC and Router and configure it them after connecting with copper straight through wires.
- ② Drag access point from the ~~wireless~~ wireless device and drag it. Drag one PC and Laptop also.
- ③ For router give ip address 10.0.0.1 and for PC O give ip address 10.0.0.2 following the gateway 10.0.0.1.
- ④ Connect switch and access point - P with copper straight wire.
- ⑤ In access point go to Port 1, give SSID - WLAN, Change it to c) EP and give WEP key as 1234567890
- ⑥ Configuring PCs and Laptop with wireless standard follow the steps -

- i) Switch off the device.
- ii) Drag the existing PT-HOST-NM-LAM to the Component listed in the LHS.
- iii) Drag WMP300N wireless interface to the empty port.
- iv) Switch on the device
- v) In the Config tab a new wireless interface would have been added.
- vi) Now configure SSID as WLAN, authentication WEP and WEP key 1234567890
- vii) Do same for Laptop.

⑦ Now your devices are connected wirelessly.

Q. Write Python Program for Socket Programming -

- ① Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

⇒ ClientTCP.py -

```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
sentence = input("\nEnter file name:")
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print('From Server:\n')
print(filecontents)
clientSocket.close()
```

ServerTCP.py -

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_STREAM)
serverSocket.bind((serverName, serverPort))
serverSocket.listen(1)
```

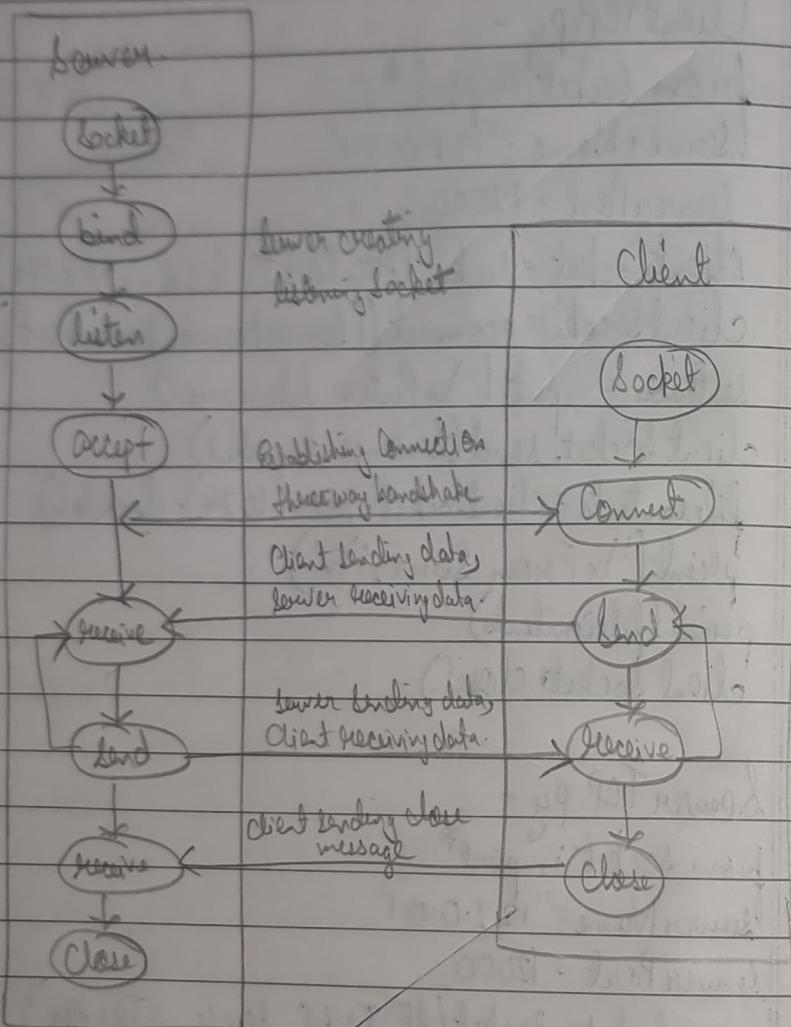
while 1:

```
print("The server is ready to receive")
connectionSocket, address = serverSocket.accept()
sentence = connectionSocket.recv(1024).decode()
```

```

file = open(sentence, "r")
l = file.read(1024)
connectionSocket.send(l.encode())
print('In sent contents of ' + sentence)
file.close()
connectionSocket.close()

```



② Using UDP sockets, write a client - Server program to make client sending the file name and the server to send back the contents of the requested file if present.

3 Client UDP.py -

```
from socket import *
```

```
ServerName = "127.0.0.1"
```

```
ServerPort = 12000
```

```
clientSocket = socket(AF_INET, SOCK_DGRAM)
```

```
Sentence = input("In Enter filename: ")
```

```
clientSocket.sendto(bytes(Sentence, "utf-8"), (ServerName, ServerPort))
```

```
filecontents, ServerAddress = clientSocket.recvfrom(2048)
```

```
print("\nReply from Server: \n")
```

```
print(filecontents.decode("utf-8"))
```

```
# for i in filecontents:
```

```
    # print(str(i), end = "")
```

```
clientSocket.close()
```

```
clientSocket.close()
```

~~Server UDP.py -~~

```
from socket import *
```

```
ServerPort = 12000
```

```
serverSocket = socket(AF_INET, SOCK_DGRAM)
```

```
serverSocket.bind(("127.0.0.1", ServerPort))
```

```
print("The server is ready to receive")
```

```
while 1:
```

sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file = open(sentence, "r")
con = file.read(2048)

serverSocket.sendto(bytes(con, "utf-8"), clientAddress)

print('In Sent contents of', end = '')
print(sentence)

for i in sentence:

print(str(i), end = '')

file.close()

X
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