

Course Code: [CSE-360]

Computer Networks Laboratory

Lab Report: 01

Date of Performance: 29-09-22

Date of Submission: 19-03-23



**Submitted by
Afzal Hossain Babor
Class Roll: 392
Exam Roll: 191369**

**Submitted to
Dr.Md.Imdadul Islam
Professor**

Department of Computer Science & Engineering
Jahangirnagar University
Savar, Dhaka

**Department of Computer Science and Engineering
Jahangirnagar University
Savar, Dhaka, Bangladesh**

1 . Experiment No: 01

2 . Name of Experiment: Routing through Hub and Switch

3 . Objective:

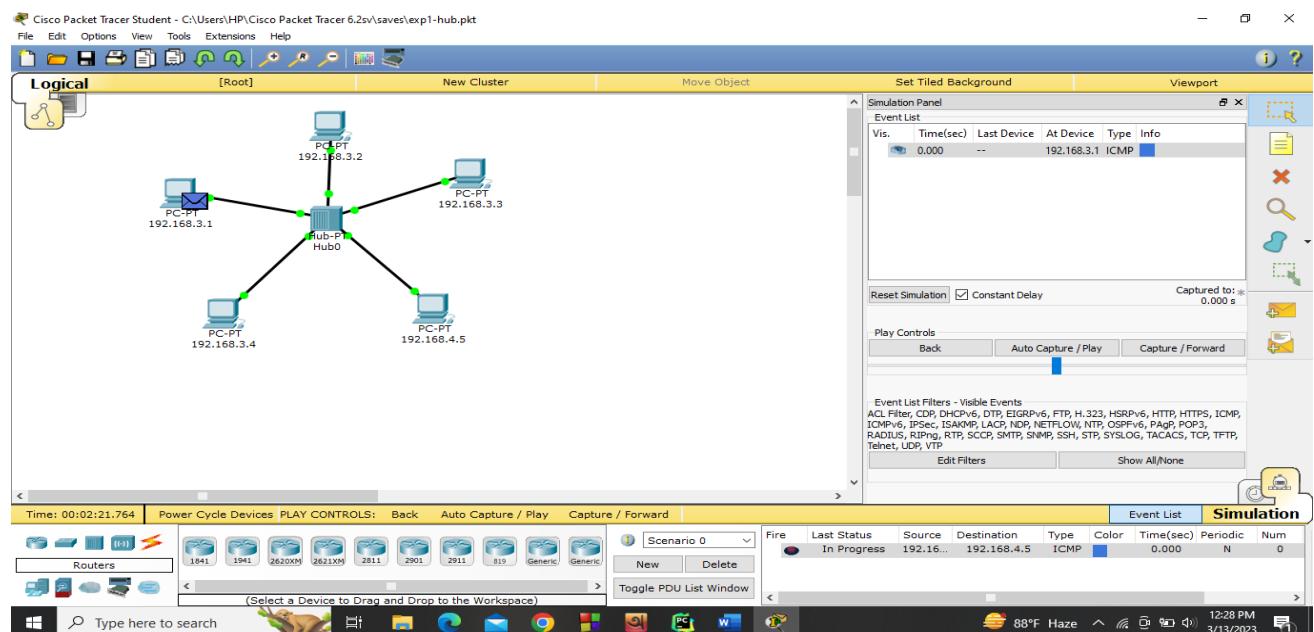
The objective of this experiment is to implement a network using Hub and Switch in packet tracer. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

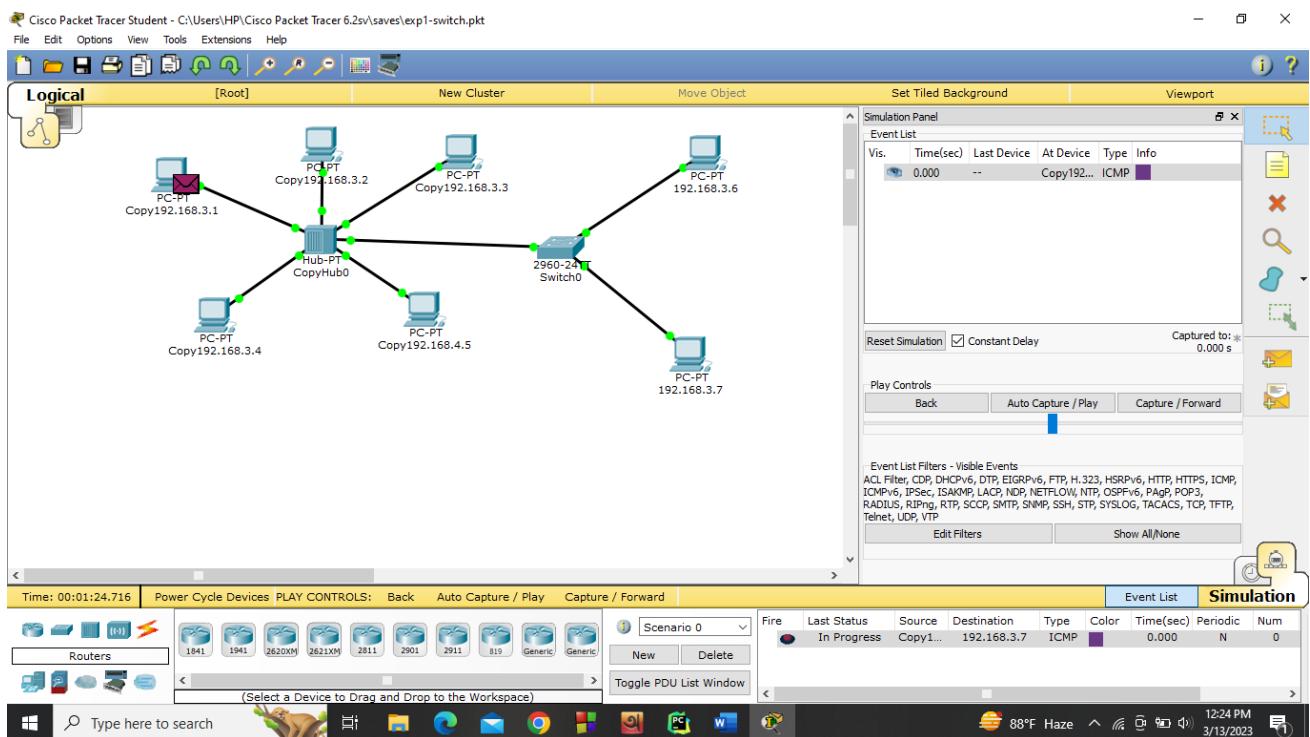
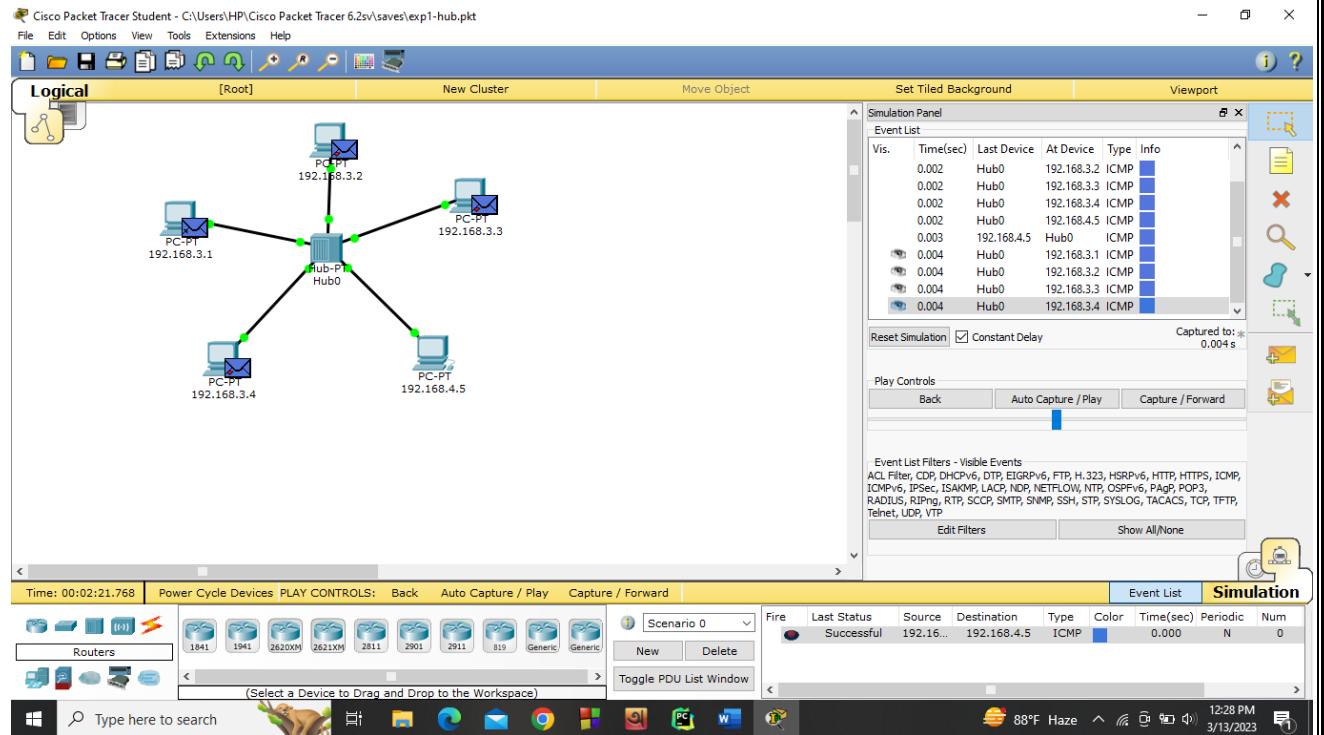
4 . Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5 . Network Diagram:





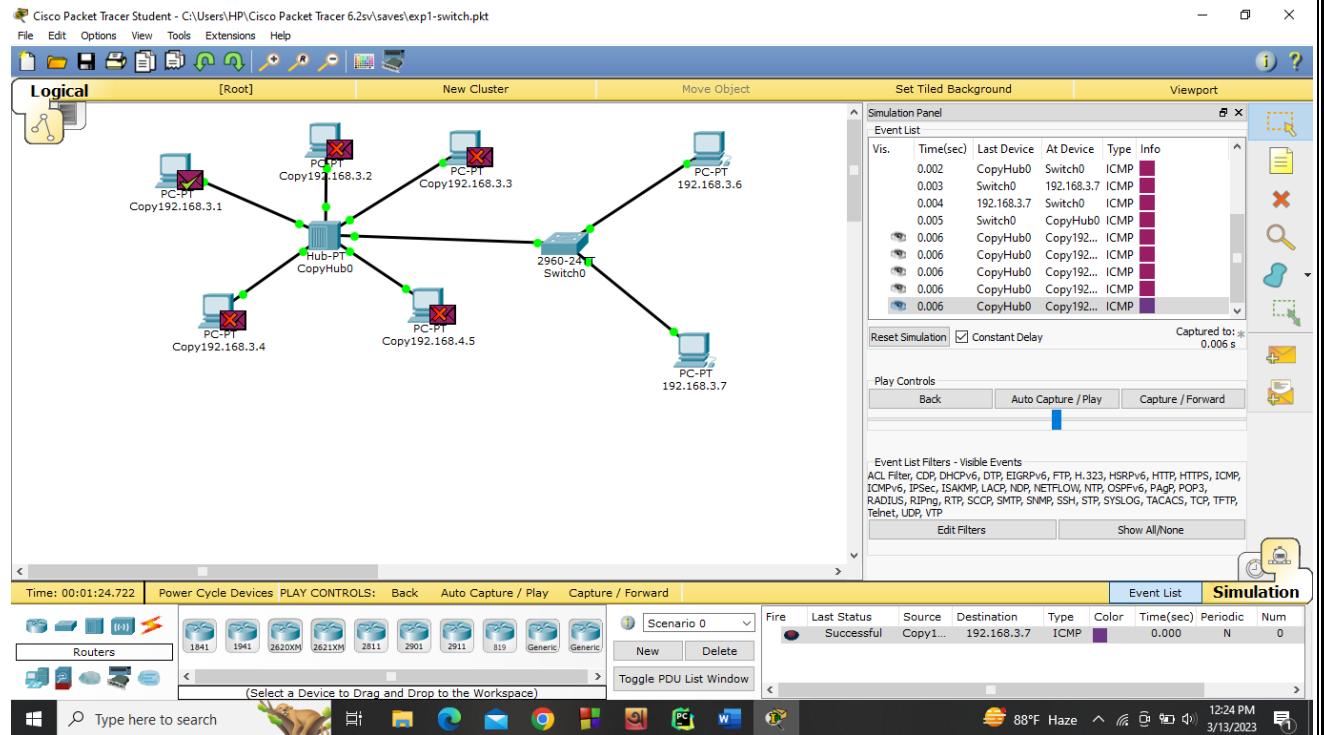


Fig: Hub & Switch network

6. Result & Discussion:

After performing this lab, we will see that in Hub any data packet coming from one port is sent to all other ports. It is then up to the receiving computer to decide if the packet is for it or not. But the problem is that there is a lot of wasted transmission. In switch, it actually checks for the destination MAC address and forward it to the relevant port to reach that computer only.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 02

Date of Performance: 13-10-22

Date of Submission: 19-03-23



**Submitted by
Afzal Hossain Babor
Class Roll: 392
Exam Roll: 191369**

Submitted To

**Dr.Md.Imdadul Islam
Professor**

Department of Computer Science & Engineering
Jahangirnagar University
Savar, Dhaka

1. Experiment No: 02

2. Name of Experiment: DSL configuration and routing in network

3. Objective:

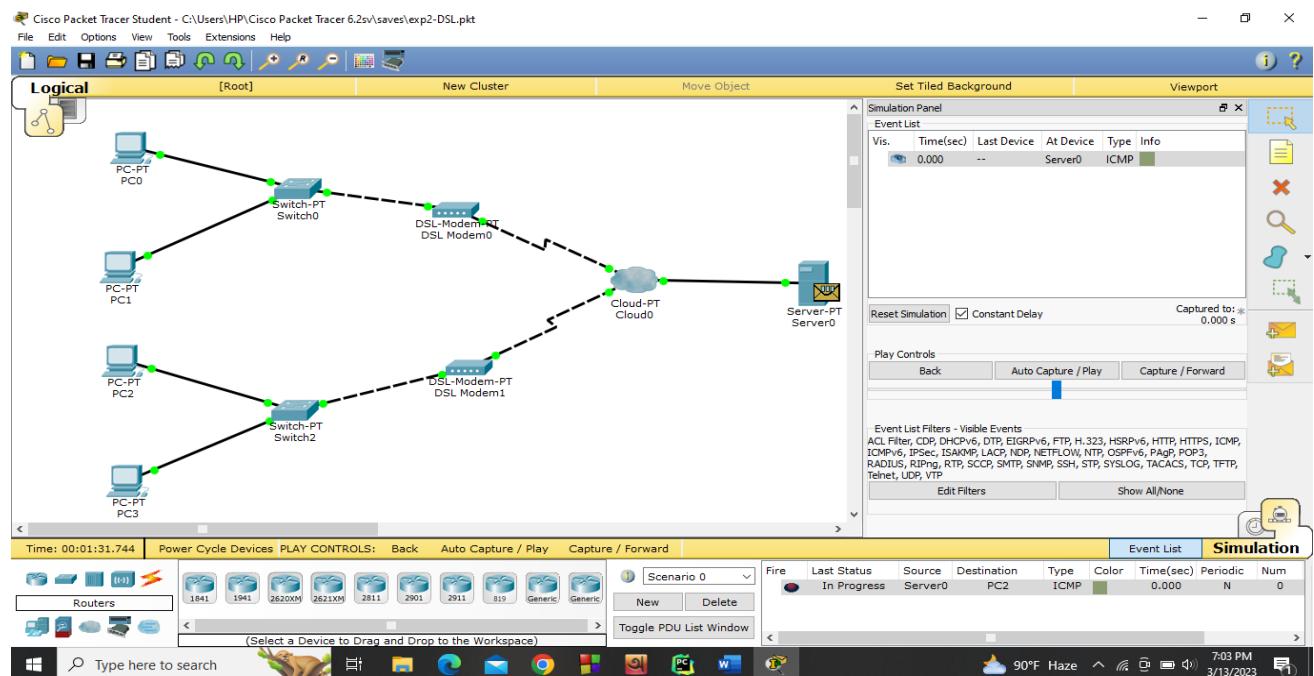
The objective of this experiment is to implement DSL modem and routing in WAN SS. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

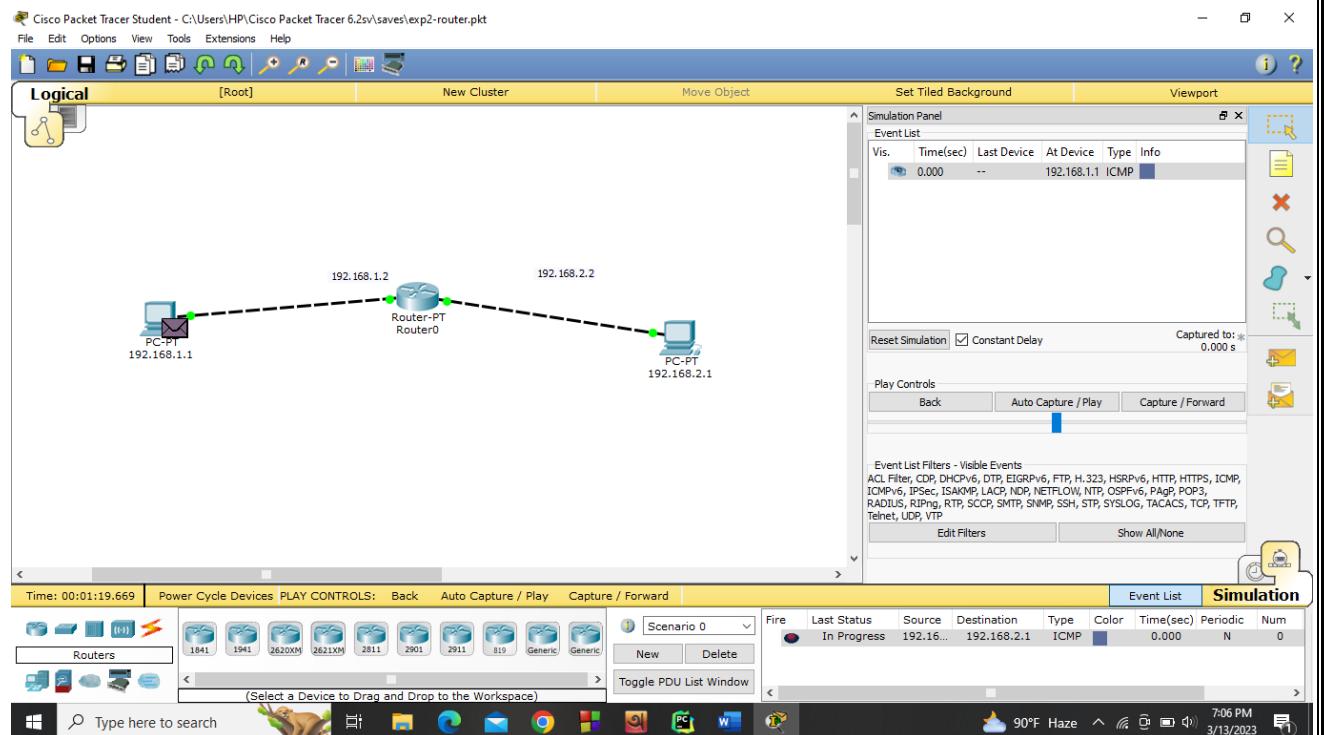
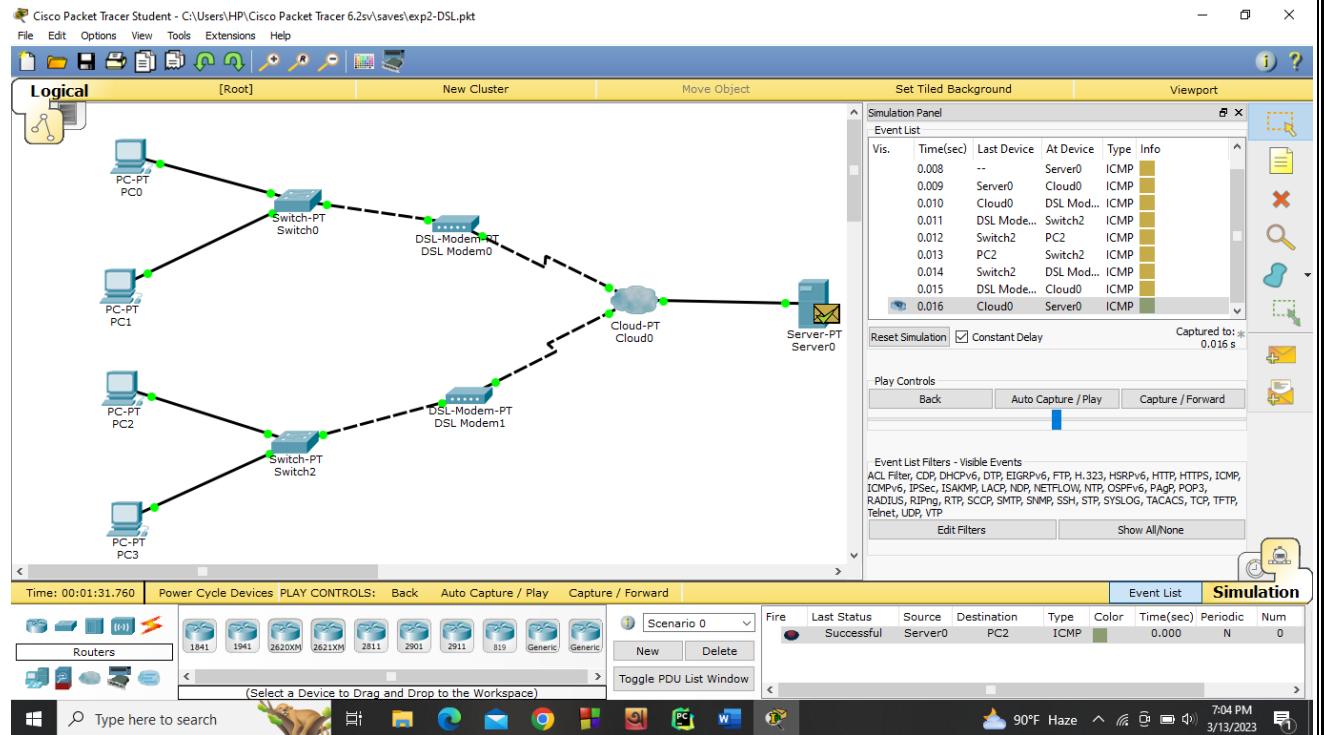
4. Apparatus:

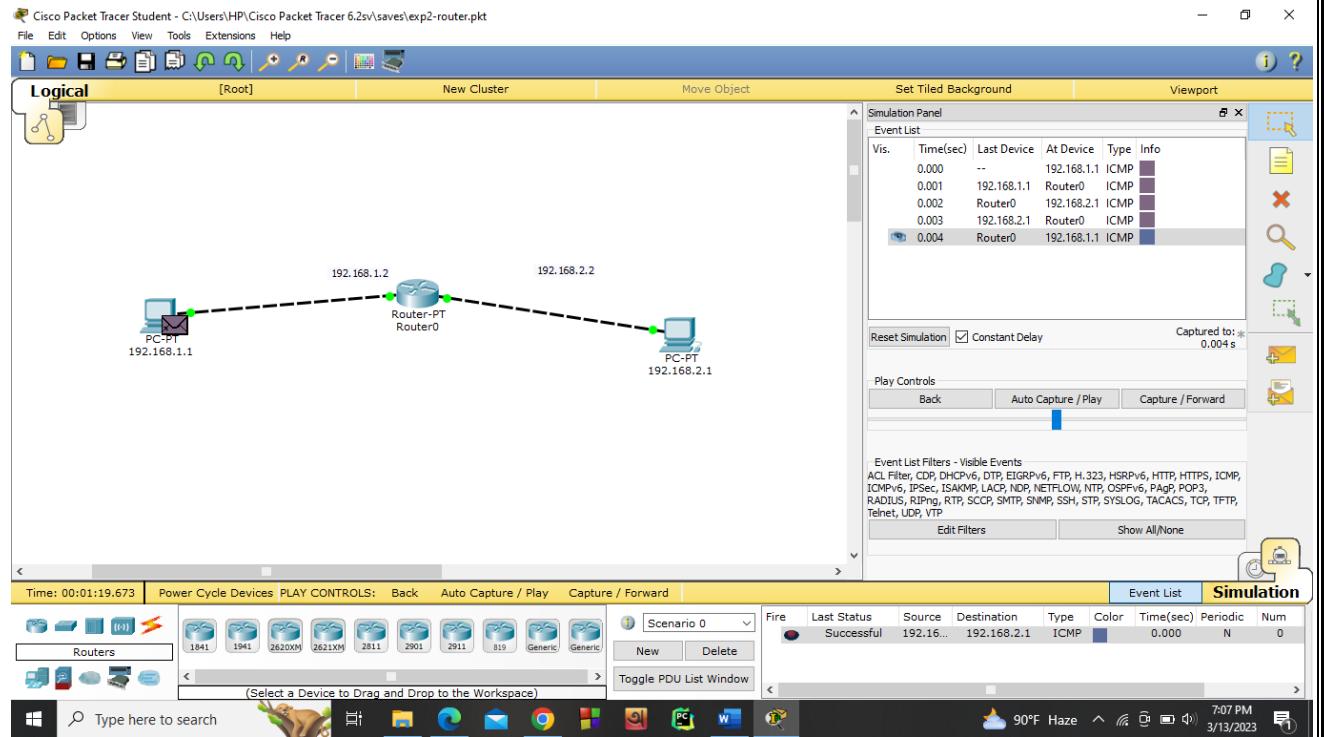
To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:







6. Result & Discussion:

After performing this experiment, we will be able to connect an ISP to the phone line using DSL (Digital Subscriber Line). The computer is connected to a DSL modem that converts between digital packets and analog signals that can pass unhindered over the telephone line. At the other end, a device called a DSLAM (Digital Subscriber Line Access Multiplexer) converts between signals and packets.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 03

Date of Performance: 20-10-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr.Md.Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 03

2. Name of Experiment: Router configuration using CLI

3. Objective:

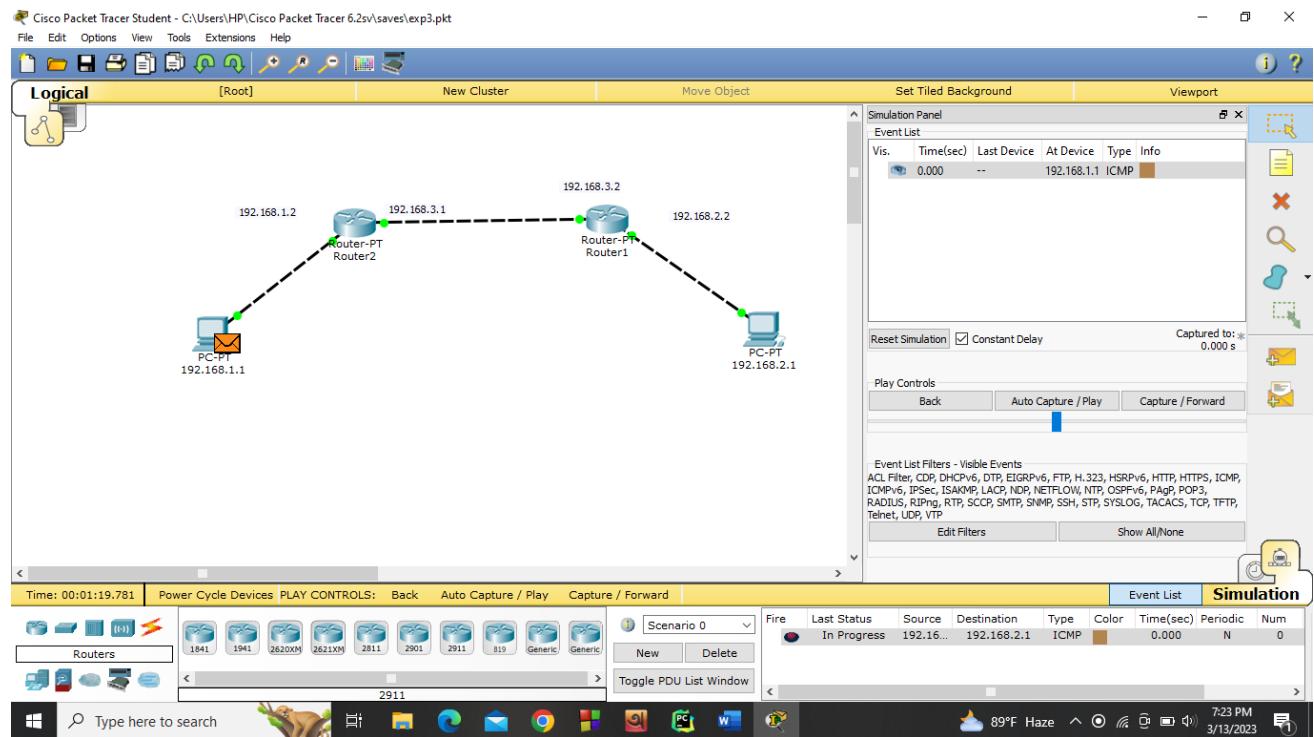
The objective of this experiment is to configure router in a network using CLI. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

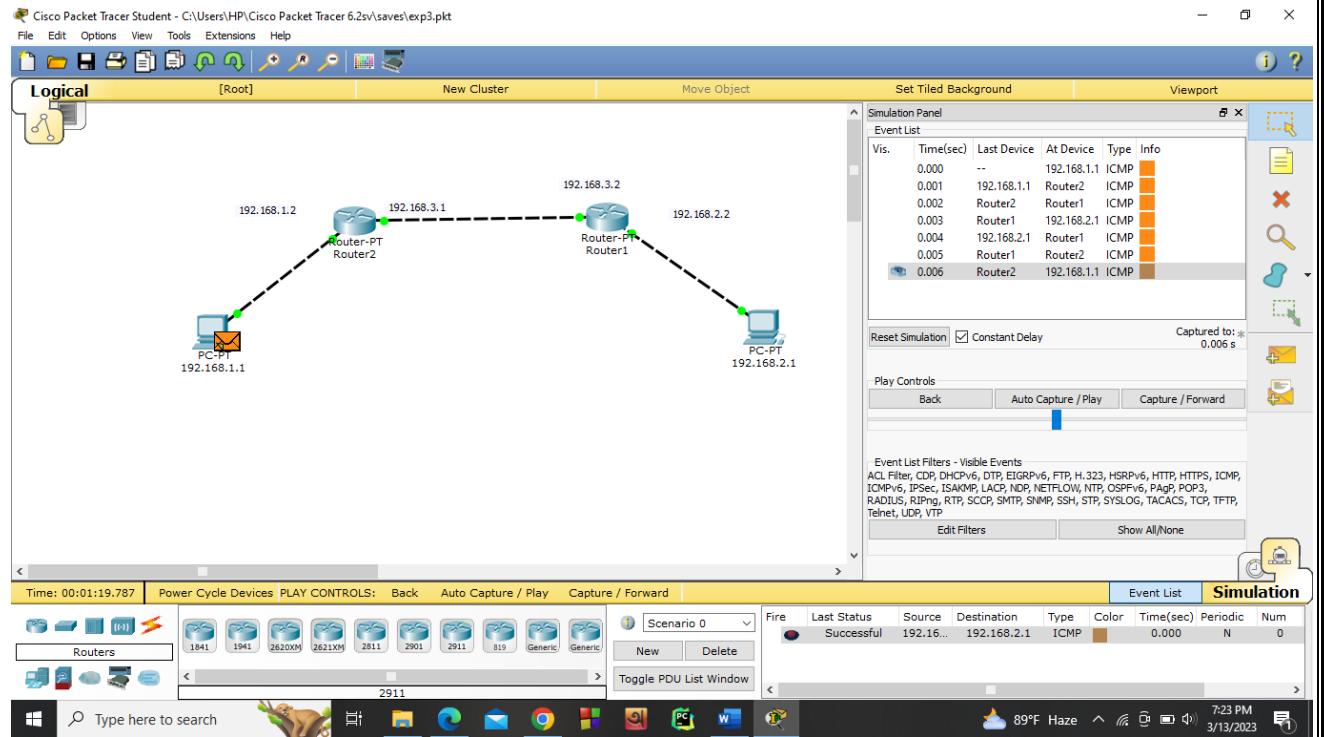
4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:





6. Result & Discussion:

After performing this lab, we will be able to route using CLI. In both packet tracer and command prompt packet is passed successfully.

Since in router we use IP address instead of mac address so it is possible to send packet among different network id.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 04

Date of Performance: 27-10-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr.Md.Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 04

2. Name of Experiment: VLAN Configuration with Switch and Router

3. Objective:

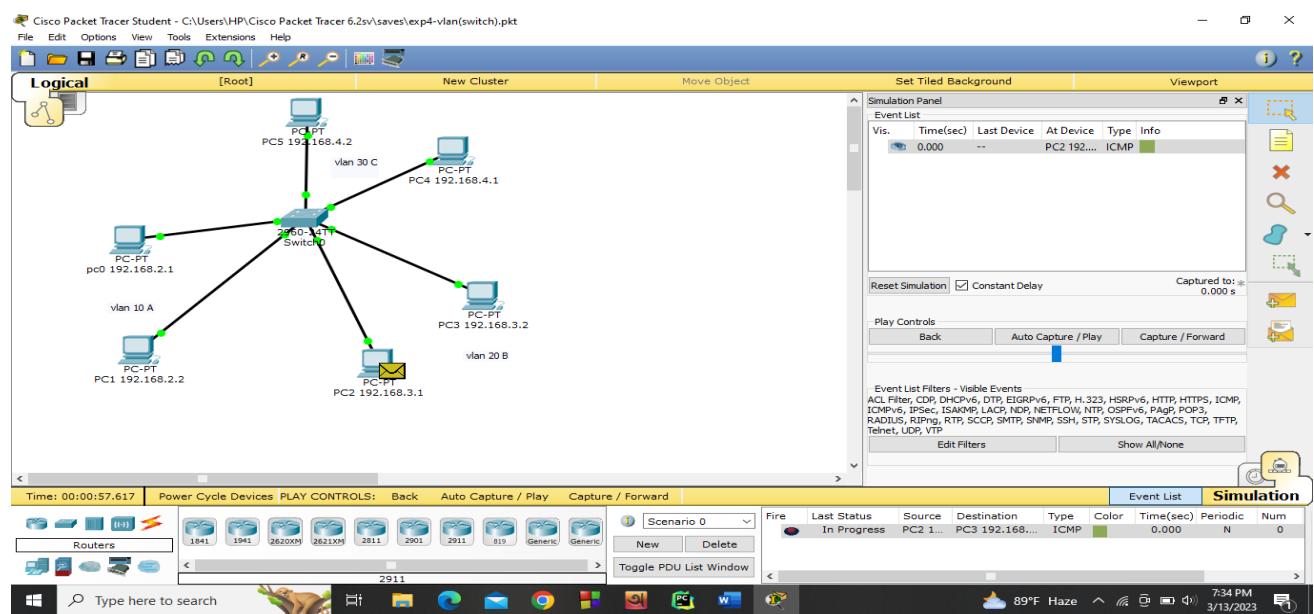
The objective of this experiment is to implement VLAN using switch and router. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:



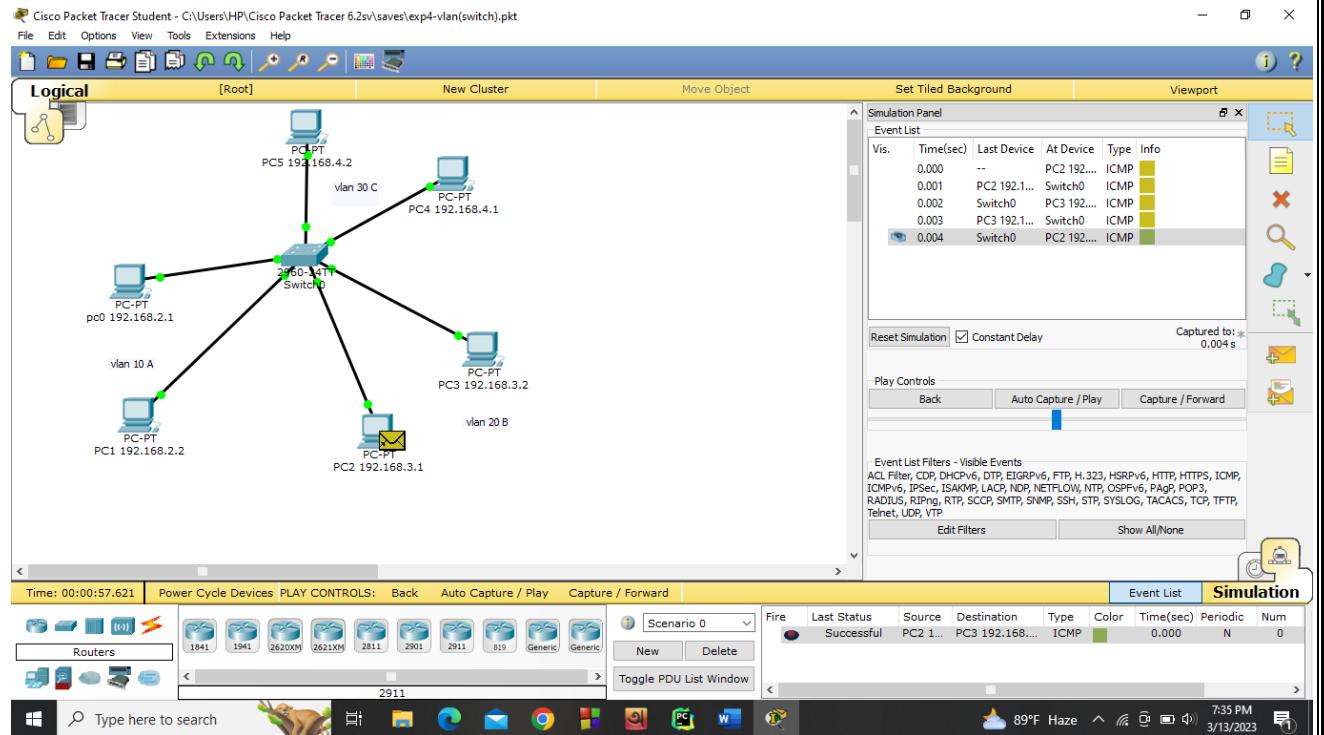


Fig: VLAN

configuration using switch & router

6. Result & Discussion:

After performing this lab, we will be able to configure VLAN using switch and router. In both packet tracer and command prompt packet is passed successfully. In this configuration we can send packet in same VLAN but not in different VLAN as we use router and switch and also, we don't need any default gateway.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 05

Date of Performance: 04-11-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr. Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 05

2. Name of Experiment: VLAN under sub-interface

3. Objective:

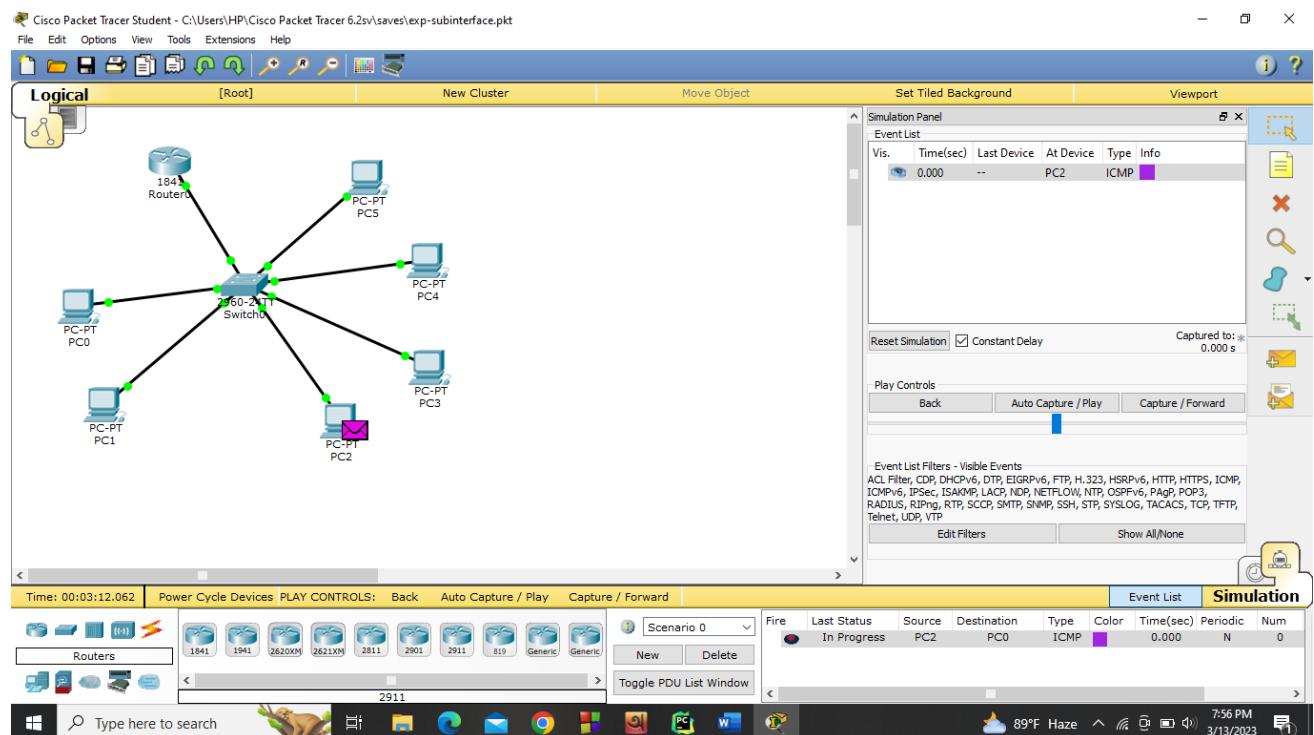
The objective of this experiment is to implement VLAN under sub interface. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:



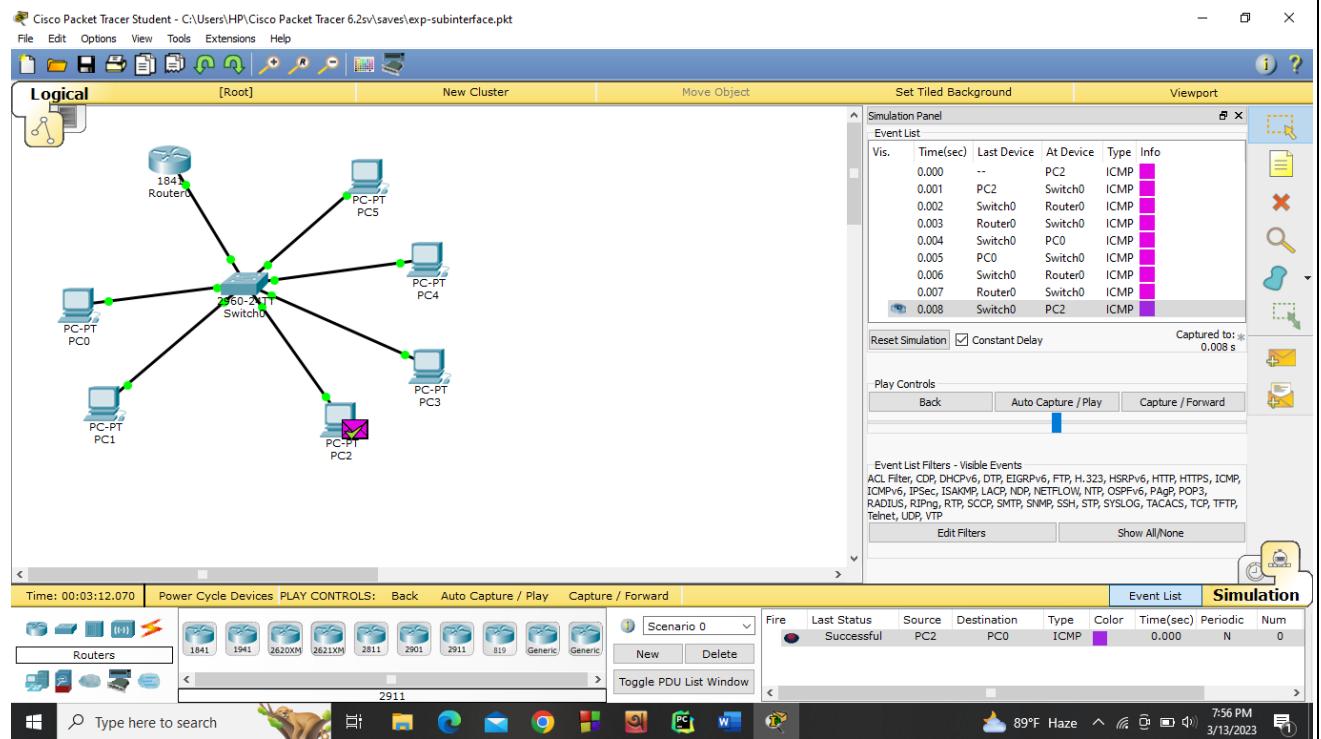


Fig: VLAN

configuration under sub interface

6. Result & Discussion:

After performing this lab, we will be able to configure VLAN under sub-interface. In both packet tracer and command prompt packet is passed successfully. In this configuration we can send packet in different VLAN using sub interface and we required a default gateway.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 06

Date of Performance: 10-11-22

Date of Submission: 19-03-23



Submitted by-
Afzal Hossain Babor
Class Roll: 392
Exam Roll: 191369

Submitted to-
Dr.Md.Imdadul Islam
Professor
Department of Computer Science & Engineering
Jahangirnagar University
Savar, Dhaka

1. Experiment No: 06

2. Name of Experiment: Implementation of wireless LAN (wifi)

3. Objective:

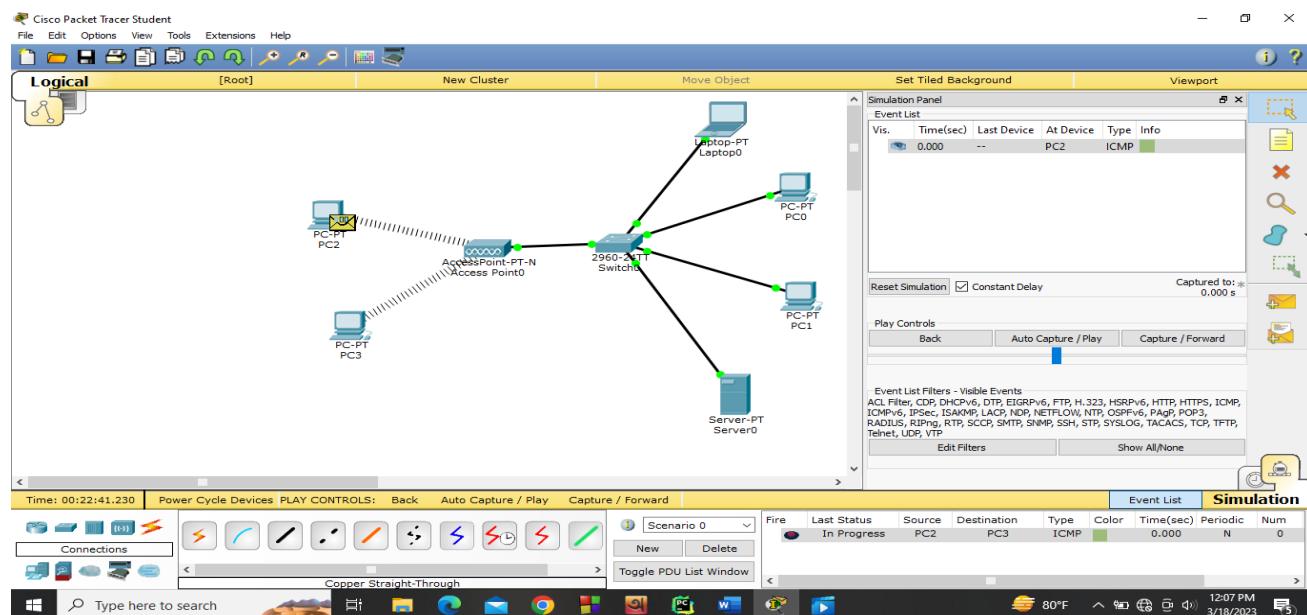
The objective of this experiment is to implement wireless LAN in cisco packet tracer. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

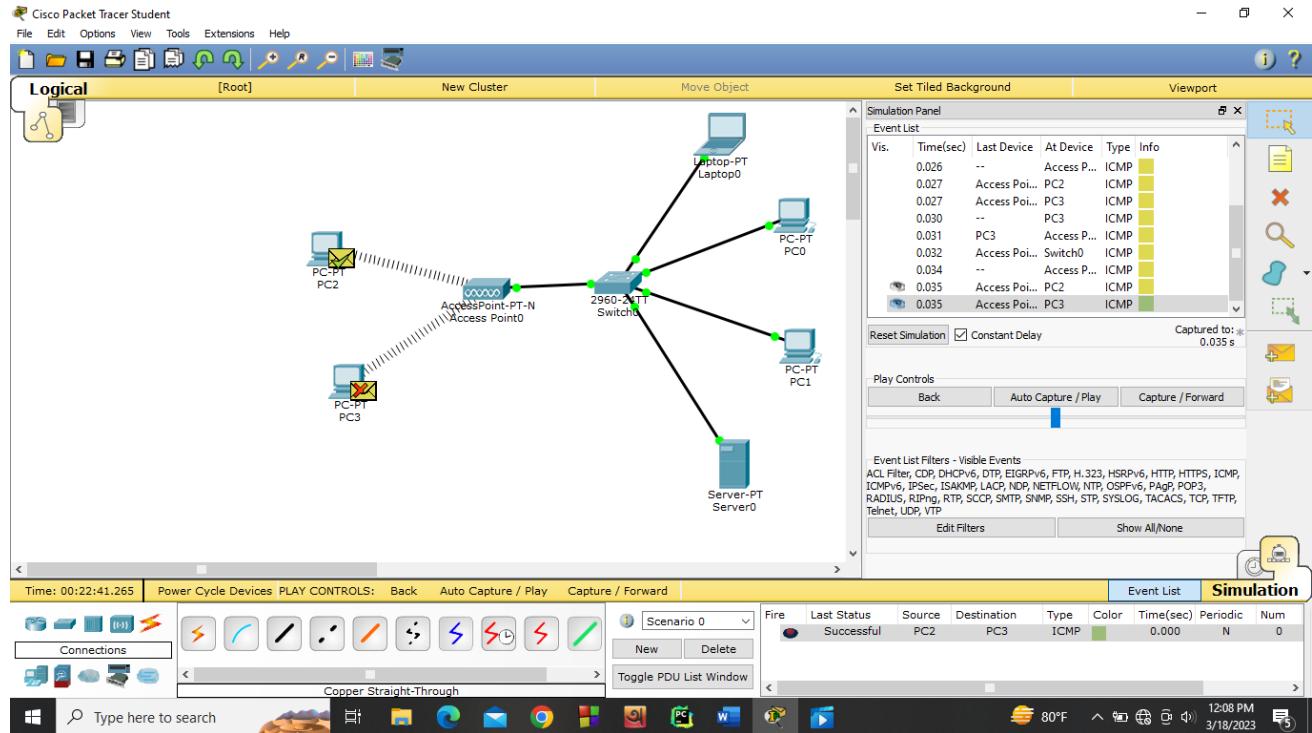
4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:





6. Result & Discussion:

After performing this lab we will be able to implement a wireless network (wifi). In both packet tracer and command prompt packet is passed successfully.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 07

Date of Performance: 22-11-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr.Md.Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 07

2. Name of Experiment: Implementation of IP Telephony

3. Objective:

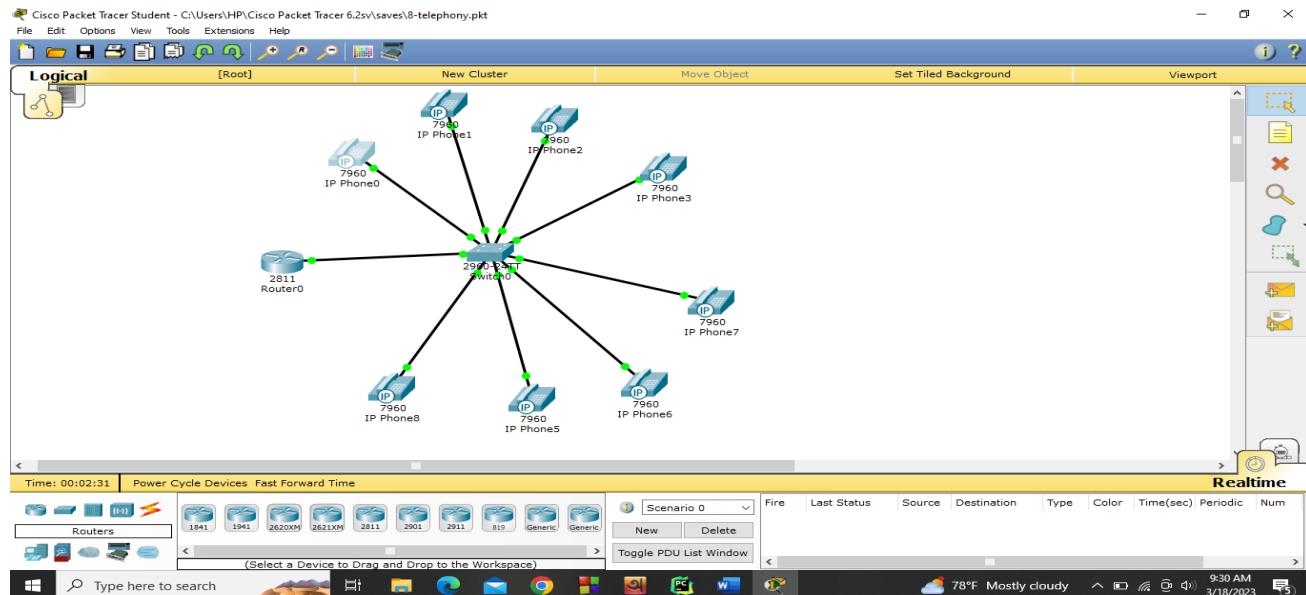
The objective of this experiment is to implement a small network of IP telephony. Each telephone will be verified with its content of IP address and corresponding telephone number. Finally, the network will be tested by dialing to each other IP phone.

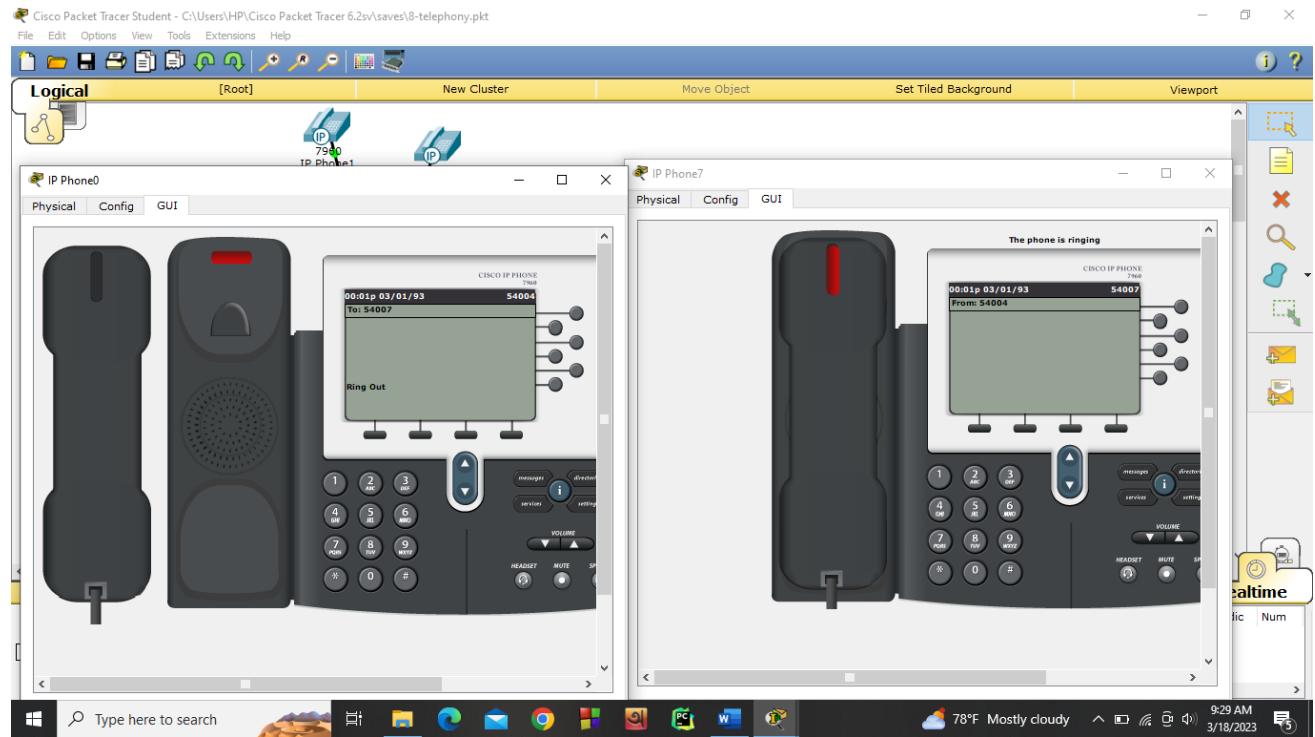
4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:





6. Result & Discussion:

After performing this lab, we will be able to implement IP telephony in a small network. In both packet tracer and command prompt packet is passed successfully. We verified each IP telephone by dialing each other.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 08

Date of Performance: 01-12-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr.Md.Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 08

2. Name of Experiment: Implementation of OSPF (Open Shortest Path First) Algorithm

3. Objective:

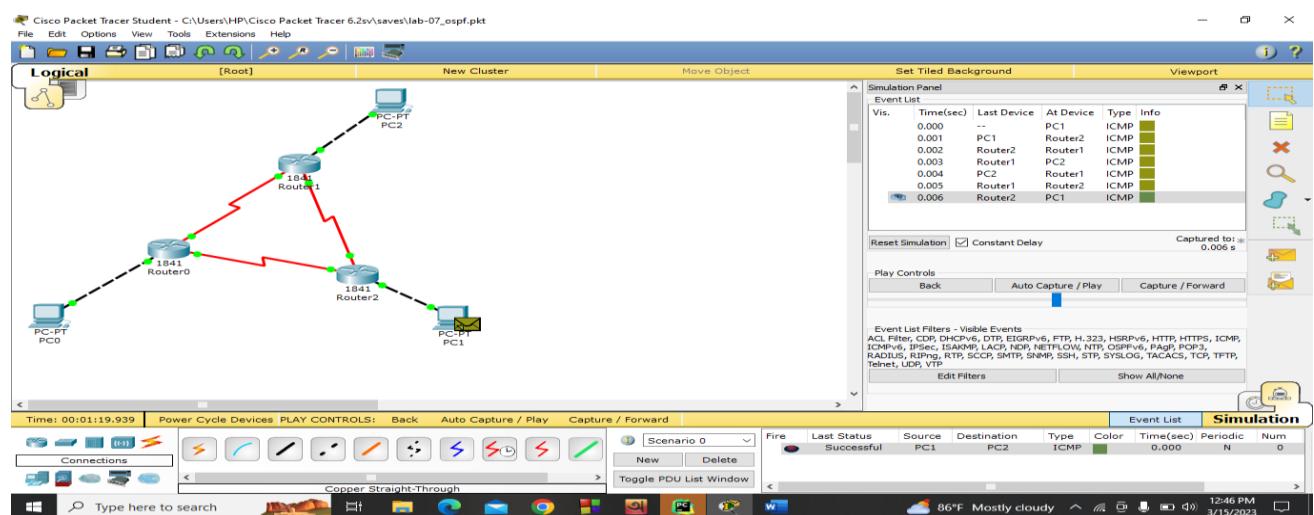
The objective of this experiment is to implement OSPF (Open Shortest Path First) Algorithm. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

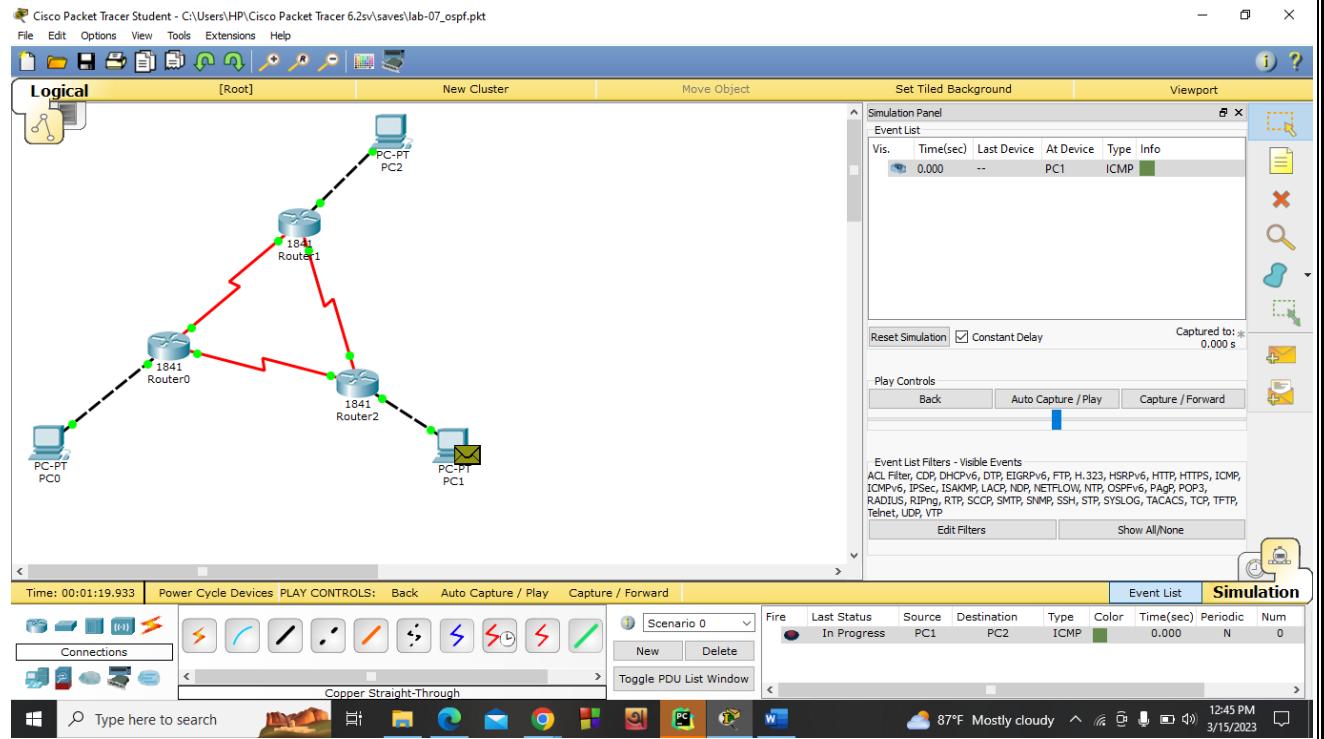
4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet Tracer

5. Network Diagram:





6. Result & Discussion:

After performing this lab, we will be able to implement OSPF algorithm. In both packet tracer and command prompt packet is passed successfully. This algorithm is used to route the network. Here DTE (Data Terminal EQUIPMENT) and DCE (Data Communications EQUIPMENT) both are serial ports. DCE, makes signal conversion, coding, and line clocking, controls the data rate like MODEM, and the other side (DTE) only receives or sends data at the clock rated provided by DCE like PC.

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 09

Date of Performance: 08-12-22

Date of Submission: 19-03-23



Submitted by-

Afzal Hossain Babor

Class Roll: 392

Exam Roll: 191369

Submitted to-

Dr.Md.Imdadul Islam

Professor

Department of Computer Science & Engineering

Jahangirnagar University

Savar, Dhaka

1. Experiment No: 09

2. Name of Experiment: Implementation of RSA algorithm in text and image encryption/decryption

3. Objective:

The objective of this experiment is to implement RSA algorithm in text and image encryption/decryption. To encrypt a message, P, we compute $C = P^e \pmod{n}$ and to decrypt C, we compute $P = C^d \pmod{n}$. For image encryption & decryption we use RGB image.

4. Apparatus:

To implement this experiment, we use

- PC
- MATLAB

5. Network Diagram:

For text-

The screenshot shows a MATLAB command window with the following code and output:

```
>> e=3;n=33;d=7;
y='JAHANGIRNAGAR';
z=double(y);
S=z-60;
for i=1:length(z)
Encrypt(i)=mod(S(i)^e,n);
end
char(Encrypt)
Encrypt=double(Encrypt);
for j=1:length(z)
Decrypt(j)=mod(Encrypt(j) ^d,n);
end
Recover=char(Decrypt+60)

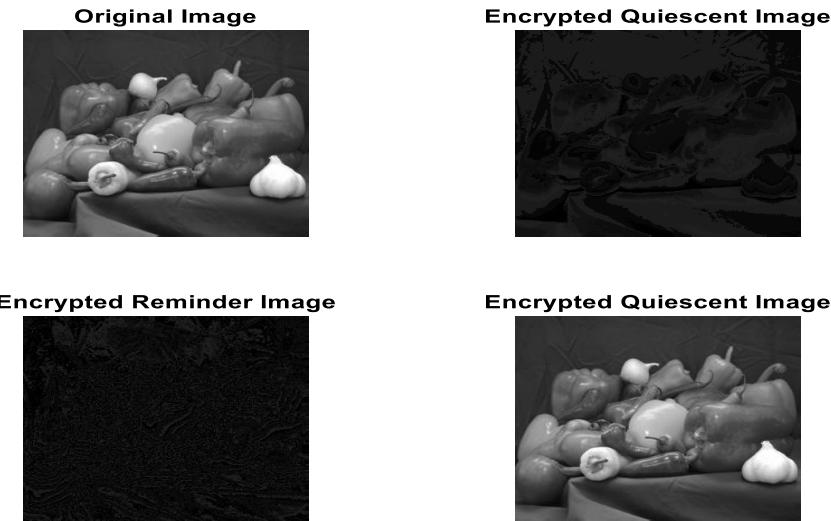
ans =
    '□□▲□□□□□□□□'

Recover =
    'JAHANGIRNAGAR'

>> s
```

The code performs RSA encryption and decryption on the string 'JAHANGIRNAGAR'. It uses e=3, n=33, and d=7. The encrypted output is '□□▲□□□□□□□□' and the recovered output is 'JAHANGIRNAGAR'.

For image-



A screenshot of the MATLAB R2018a interface. The menu bar includes HOME, PLOTS, APPS, EDITOR (selected), PUBLISH, and VIEW. The toolbar includes New, Open, Save, Print, and various navigation and run buttons. The current file is 'quantize3.m' in the Editor tab. The code in the editor window is:

```
close all
e=3;n=33;d=7;N=256;
I=imread('peppers.png');
I=rgb2gray(I);
I=imresize(I,[N,N]);
subplot(2,2,1)
imshow(I)
title('Original Image')

I=double(I);
R=mod(I,16);
for i=1:N
    for j=1:N
        Q(i,j)=uint8((I(i,j)/16)-0.5);
    end
end

Q=double(Q);
for i=1:N
    for j=1:N
        Qe(i,j)=mod(Q(i,j)^e,n);
        Re(i,j)=mod(R(i,j)^e,n);
        Qd(i,j)=mod(Qe(i,j)^d,n);
        Rd(i,j)=mod(Re(i,j)^d,n);
    end
end

Rec=Qd*Rd;
subplot(2,2,2)
imshow(uint8(Rec))
title('Encrypted Quiescent Image')
subplot(2,2,3)
imshow(uint8(Re))
title('Encrypted Reminder Image')
subplot(2,2,4)
imshow(uint8(Rec))
title('Encrypted Quiescent Image')
```

The workspace on the right contains variables: d, e, i, j, n, N, Q, Qd, Qe, R, Rd, Re, and Rec.

For RGB image-

```
Q=double(Q);
for i=1:N
    for j=1:N
        Qe(i,j)=mod(Q(i,j)^e,n);
        Re(i,j)=mod(R(i,j)^e,n);
        Rd(i,j)=mod(Qe(i,j)^d,n);
        Rd(i,j)=mod(Re(i,j)^d,n);
    end
end

Rec=Qd*16+Rd;
subplot(2,2,2)
imshow(uint8(Quiescent Image))
title('Encrypted Quiescent Image')
subplot(2,2,3)
imshow(uint8(Re))
title('Encrypted Reminder Image')
subplot(2,2,4)
imshow(uint8(Rec))
title('Encrypted Quiescent Image')

>> I=imread('peppers.png');
I1=I(:,:,1);
I2=I(:,:,2);
I3=I(:,:,3);
subplot(2,2,1)
imshow(I1)
title('Red plate')
subplot(2,2,2)
imshow(I2)
title('Green plate')
subplot(2,2,3)
imshow(I3)
title('Blue plate')
Y=cat(3,I1,I2,I3);
subplot(2,2,4)
imshow(Y)
title('RGB Image')
```

Red plate



Green plate



blue plate



RGB Image



6. Result & Discussion:

After performing this lab we will be able to implement RSA algorithm both in text and image.

In this method for encryption we use public key and for decryption we use private key. For better realization we use RGB image.

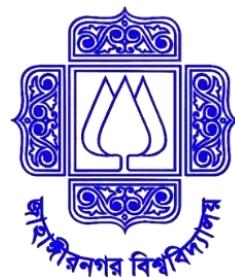
Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 10

Date of Performance: 05-01-23

Date of Submission: 19-03-23



Submitted by-
Afzal Hossain Babor
Class Roll: 392
Exam Roll: 191369

Submitted to-
Dr.Md.Imdadul Islam
Professor
Department of Computer Science & Engineering
Jahangirnagar University
Savar, Dhaka

1. Experiment No: 10

2. Name of Experiment: DNS server configuration

3. Objective:

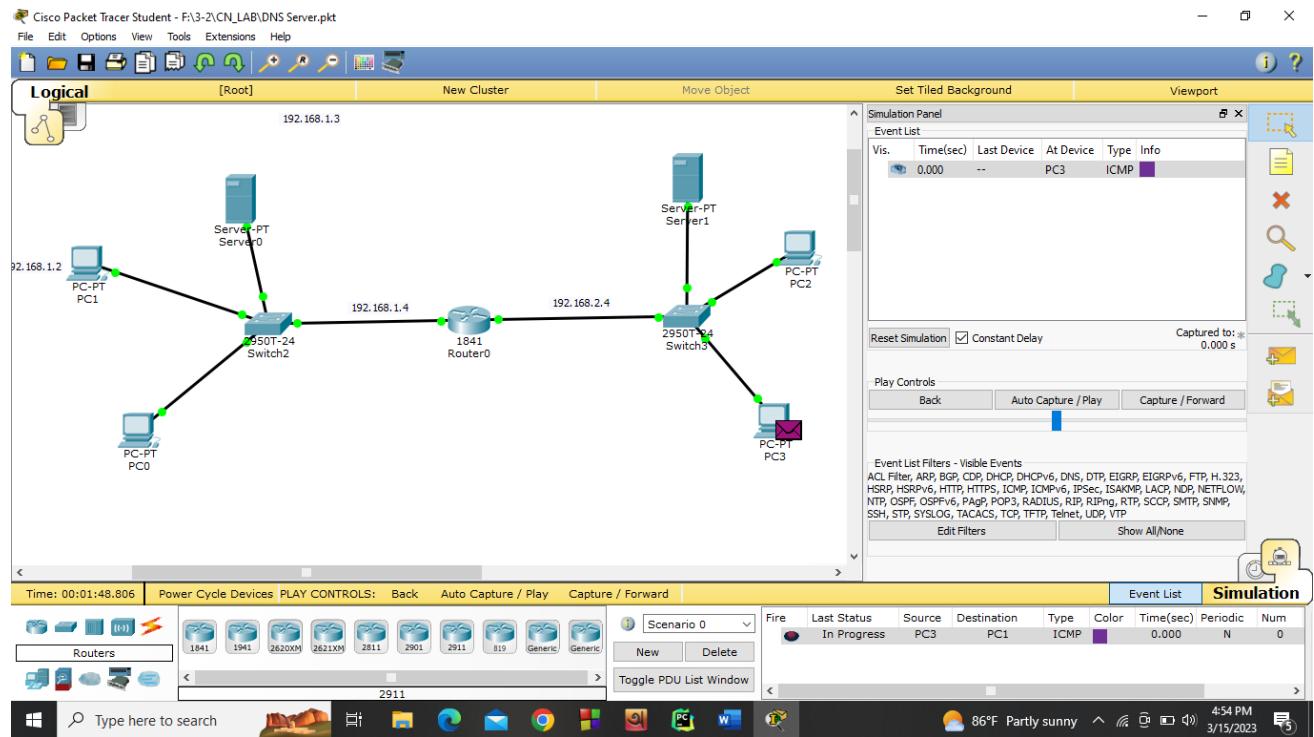
The objective of this experiment is to configure DNS server in packet tracer. Then we will simulate it in packet tracer. For real life simulation we will taste and trace it in command prompt.

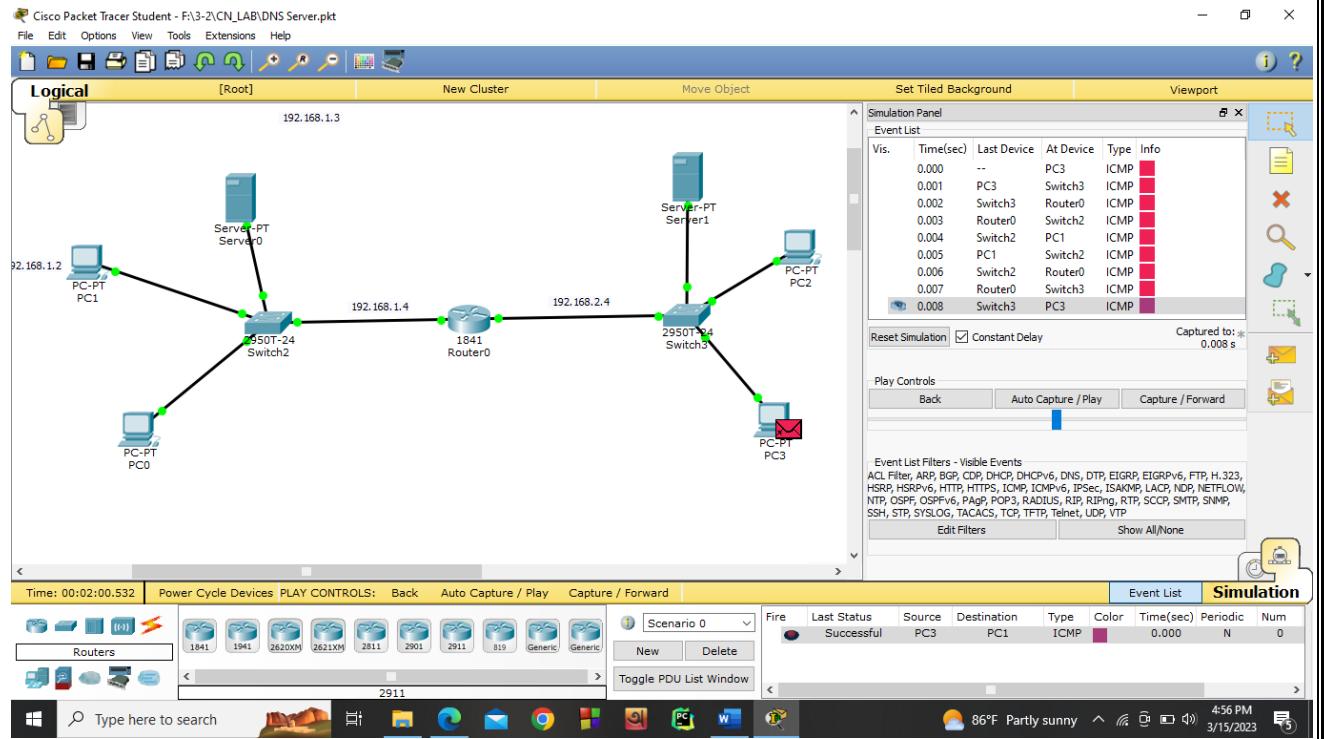
4. Apparatus:

To implement this experiment, we use

- PC
- Cisco Packet tracer

5. Network Diagram:





6. Result & Discussion:

After performing this lab, we will be able to configure DNS (Domain Name System) sever. In both packet tracer and command prompt packet is passed successfully. We also browse the URL page of each server from terminal .

Course Code [CSE-360]

Computer Networks Laboratory

Lab Report: 11

Date of Performance: 17-01-23

Date of Submission: 19-03-23



Submitted by
Afzal Hossain Babor
Class Roll: 392
Exam Roll: 191369

Submitted To
Dr.Md.Imdadul Islam
Professor
Department of Computer Science & Engineering
Jahangirnagar University
Savar, Dhaka

1. Experiment No: 11

2. Name of Experiment: Socket programming establishes connection between two nodes of a network

3. Objective:

The objective of this experiment is to establishes connection between two nodes client and server of a network called socket programming. Socket is considered as the endpoint (like an object at the communication device) of a 2-way communication. Socket program on each side sends/receives message. Message is first received by a port, then sent to socket and finally sent to the socket program. We will implement this experiment in python .

4. Apparatus:

To implement this experiment, we use

- PC
- VS code

5. Network Diagram:

For server-

```
import socket
LOCALHOST = "127.0.0.1"
PORT = 8080
server = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
server.bind((LOCALHOST, PORT))
server.listen(1)
print("Server started")
print("Waiting for client request..")

clientConnection, clientAddress = server.accept()
print("Connected client :" , clientAddress)
```

```

msg = ''
while True:
    in_data = clientConnection.recv(1024)
    msg = in_data.decode()
    if msg=='bye':
        break
    print("From Client :" , msg)
    out_data = input()
    clientConnection.send(bytes(out_data, 'UTF-8'))
print("Client disconnected....")
clientConnection.close()

import socket
LOCALHOST = "127.0.0.1"
PORT = 8080
server = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
server.bind((LOCALHOST, PORT))
server.listen(1)
print("Server started")
print("Waiting for client request..")
clientConnection, clientAddress = server.accept()
print("Connected clinet :" , clientAddress)
msg = ''
while True:
    in_data = clientConnection.recv(1024)
    msg = in_data.decode()
    if msg=='bye':
        break
    print("From Client :" , msg)
    out_data = input()
    clientConnection.send(bytes(out_data, 'UTF-8'))
print("Client disconnected....")
clientConnection.close()

for client -

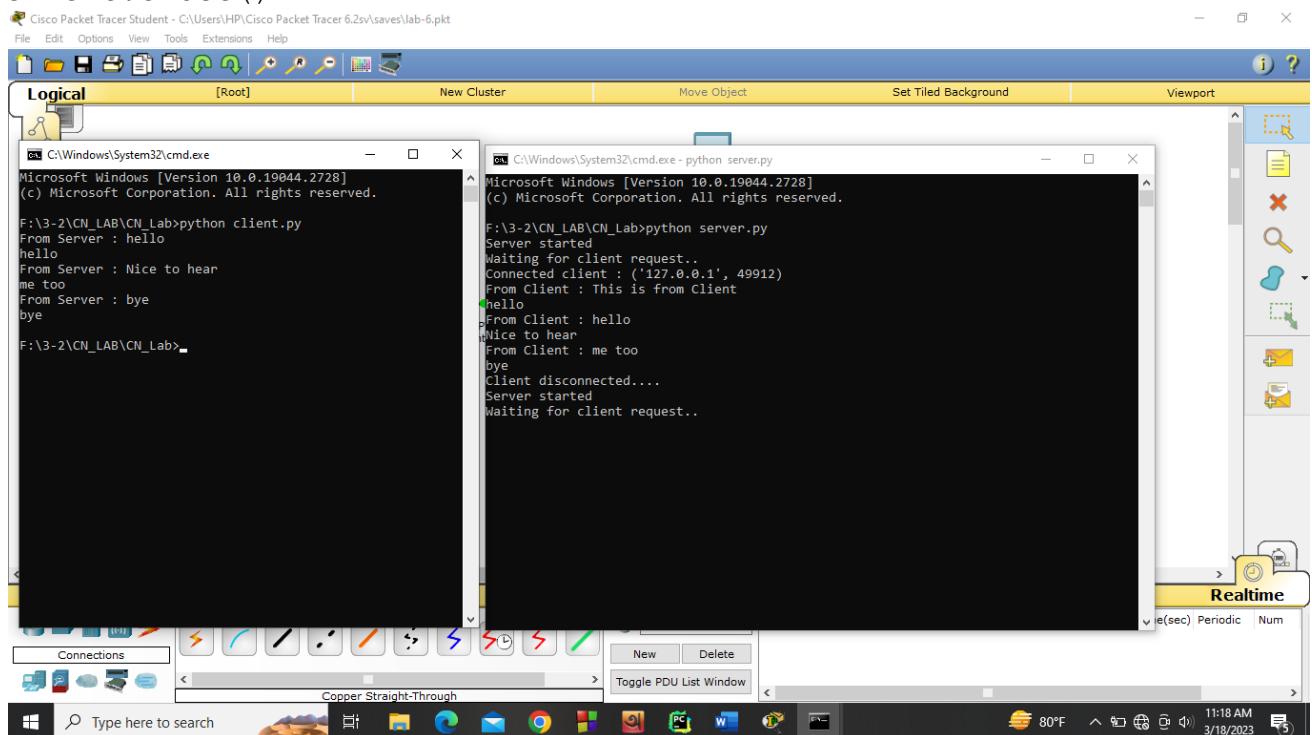
import socket
SERVER = "127.0.0.1"
PORT = 8080
client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
client.connect((SERVER, PORT))
client.sendall(bytes("This is from Client",'UTF-8'))

```

```

while True:
    in_data = client.recv(1024)
    print("From Server :" ,in_data.decode())
    out_data = input()
    client.sendall(bytes(out_data, 'UTF-8'))
    if out_data=='bye':
        break
client.close()

```



6. Result & Discussion:

After performing this lab, we will be able to establish a connection between client and server. After a connection is established, the server prints out the client address and then waits for data. The client can SEND and RECEIVE data according to the protocols being used. When both client and server issue the CLOSE primitive, the connection will be torn down.