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JSS Science And Technology University

(Established Under JSS Science and Technology University Act No. 43 of 2013)

(Formerly Known as SJCE)

JSS SCIENCE AND TECHNOLOGY UNIVERSITY MYSURU

Test of Lab Component

Computer Networks (EC620L)

Title: Computer Networks

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2021

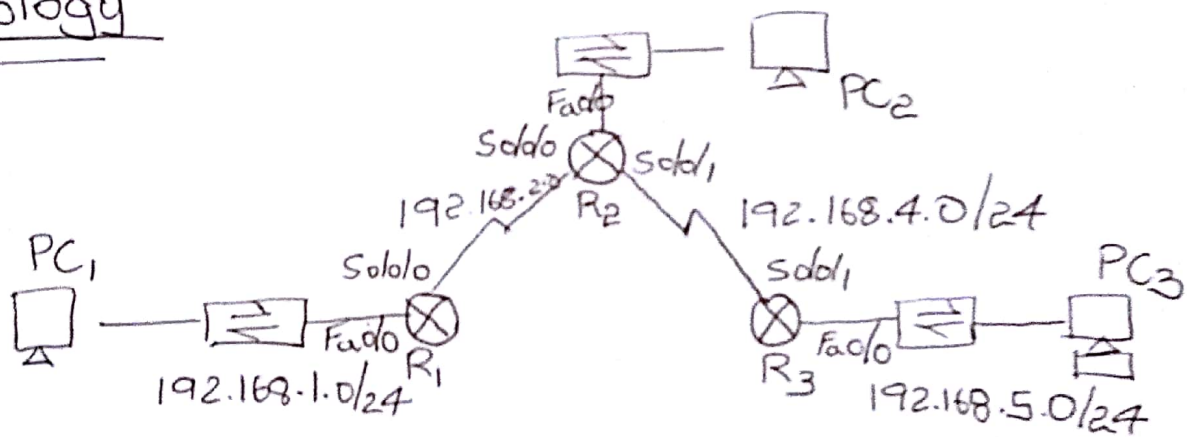
1. Using Cisco Packet tracer configure network topology using routing information protocol
   a. Running RIP V1 on classfull netwok
   b. Running RIP V1 on a subnetwork
2. For a given data use CRC/CCITT polynomial to obtain CRC code. Verify the program for two cases i. without error ii. with error.

1.

AIM : To configure network topology using routing information protocol on a a. classfull network and b. subnetwork.

Scenario A : Classfull network

Topology



Addressing Table

Device	Interface	IP address & Subnet mask	Default Gateway
R_1	Fa0/0	192.168.1.1/24	—
	S0/0/0	192.168.2.1/24	—
R_2	Fa0/0	192.168.3.1/24	—
	S0/0/0	192.168.2.2/24	—
	S0/0/1	192.168.4.2/24	—
R_3	Fa0/0	192.168.5.1/24	—
	S0/0/1	192.168.4.1/24	—
PC_1	—	192.168.1.10/24	192.168.1.1
PC_2	—	192.168.3.10/24	192.168.3.1
PC_3	—	192.168.5.10/24	192.168.5.1

Procedure:

i. The network is to be built as shown in Scenario A topology.

ii. Perform basic router configurations, assigning ip address as in table.

iii. Use the command "show ip interface brief" to verify configuration.

iv. RIP configuration:

a. Use command "router rip" in global configuration mode.

b. Enter the classful network / stub network address for the directly connected n/w using "network" command, on each router.

c. Then return to privileged EXEC mode & Save current configuration to NVRAM.

v. Verifying RIP routing:

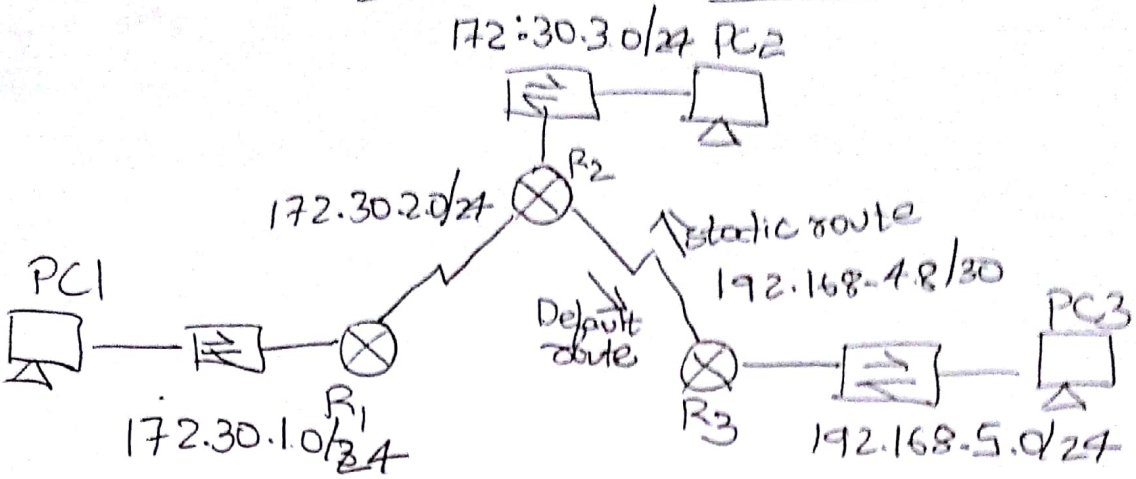
a. Use "show ip route" command to verify that each router has all the networks in the topology.

b Use "show ip protocols" command to view information about routing process.

c. Use "debug ip rip" command to view RIP messages beg sent & received.

d. Use "undebut all" command to turnoff debugging.

Scenario B: Stub network



Expected output

i. "show ip route" command displays the type of connection & the networks connected. The type is either 'C' for direct connection & 'R' for RIP.

ii. "show ip protocols" command displays the routing protocol used i.e. "rip" along with the respective networks. and the sent & received data

iii. "debug ip rip" command displays the messages being sent along with number of hops. every 30s.

Output:

The output was correctly obtained as expected.

Inference:

- The network topology was successfully routed using routing information protocol.
- The connection from one PC to another was successfully verified.

2.

Aim : To obtain CRC code and verify the program for two cases : with and without error.

Algorithm :

Sender side :

i. The string sent by sender is converted to binary string.
ii. This data is encoded using CRC code using the key.
iii. The encoded data is sent to receiver.
iv. Receiver decodes to verify the error.

Receiver Side :

i. The receiver receives the data.
ii. Receiver with the help of the same key decodes the data & finds remainder.
iii. If remainder is zero, then there is no error
iv. If remainder is non-zero, there is an error in transmission.

Expected output :

Sender :

```
        11101
1101 | 100100000
       1101
       ----
        1000
        1101
        ----
        1010
        1101
        ----
        1110
        1101
        ----
        0110
        0000
        ----
        1100
        1100
        ----
         001
```

Receiver : with error

```
        11101
1101 | 10000001
       1101
       ----
        1001
        1101
        ----
        1100
        1101
        ----
        0110
        0000
        ----
        1100
        1100
        ----
        0011
        0000
        ----
         011
```

Without error

```
        11101
1101 | 10010000
       1101
       ----
        1000
        1101
        ----
        1010
        1101
        ----
        1110
        1101
        ----
        0110
        0000
        ----
        1101
        1101
        ----
        0000
```

Code:

Sender side & Reciver side :

```
import socket
def xor(a, b):
    result: []
    for i in range(1, len(b)):
        if a[i] == b[i]:
            result.append('0')
        else:
            result.apped('1')
    return ''.join(result)
def modediv(divid, div)
    pick=len(div)
    temp= divid[0: pick]
    while pick < len(divid):
        if temp[0] == '1':
            temp=xor(div,temp) + divid[pick]
        else:
            temp= xor ('0'*pick, temp) + divident[pick]
        pick+ = 1
    if temp[0]=='1':
        temp=xor(div, temp)
    else:
        temp= xor('0'*pick, temp)
    checkword = temp
    return checkword
def encode(data, key):
    l_key = len(key)
    append_data = data + '0' * (l-key - 1)
    codeword = data + reminder
    print("Reminder : ", reminder)
    print("Encoded Data : ", codeword)
data = "100100"
key = input ("Enter key: ")
encode(data, key)
```

Result / output :

a. Sender side

Data to send : 100100
Polynomial key : 1101
Data 110001110000 Received
No error found

Receiver side

Polynomial key : 1101
Remainder after decoding : 000
No error.

b. Sender side

Data to send : 100100
Polynomial key : 1101
Data 110001110111 Received
The received data is currupt

Receiver side

Polynomial key: 1100
Reminder after decoding : 100

Inference :

. The data transmission for both the case i.e. without error and with error was successfully verified by making use of the reminder of modulo 2 division using Python.

Viva

1. Differentiate b/w RIP v1 & RIP v2.
2. Explain load balancing in RIP.
3. Differentiate b/w error correctn & detectn
4. What is ~~exter~~ ARQ.

5.

1. RIP v1 :
   i. Routers are specified by IP destination network & hop count.
   ii. The routing table is broadcast to all other stations on the attached network.
2. RIP v2 :
   i. Route specification also includes subnet mask & gateway.
   ii. The routing table is sent to a multicast address

2. RIP automatically performs load balancing using equal-cost routes.
   - Both routes have a metric of 1, i.e. hop count
   - RIP cannot perform unequal-cost load balancing

3. Error detection :
   - It refers to a class of techniques for detecting garbled messages.
   - Adding some extra bits to detects error

   Error Correction :
   - Adding enough redundant bits deduces what the correct bits are.
   - This is very hard & expensive.

4. Automatic repeat request is an error-control method for data transmission.
   - This uses acknowledgements & timeouts to achieve reliable data transmission over an unreliable communication channel