



VIT[®]

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

CSE 1004

Network and Communication

CLOSED ASSESSMENT

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Q1-a) Indian Bank at VIT campus has Loan, Credit, Direct banking and Customer care departments with 20 hosts, 16 hosts, 8 hosts and 10 hosts each along with a application server, web server and mail exchange server. All these servers have to be connected to the internet. Using CPT create the complete network infrastructure for the above given scenario by assigning any class of Private IP address. Simulate the designed network by exchanging simple messages between different network LAN segments. Also check whether the devices between different departments could reach each other. Display the raw statistics of the currently designed individual LAN.

Ans1-a)

Handwritten (Steps and Interpretation of output):

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Q1a) Steps

* Components used :

Switches	X 4	-	2960	}
Routers	X 2	-	1841	
PCs	X 54	-	PC	

* Assigning IP :

- o LAN with 20 hosts
1-20 PC given IP : 10.0.0.1 to 10.0.0.20
- o LAN with 8 hosts
1-8 PC given IP : 192.168.0.1 to 192.168.0.8
- o LAN with 16 hosts
1-16 PC given IP : 172.16.0.1 to 172.16.0.16
- o LAN with 10 hosts
1-10 PCs given IP : 10.10.0.1 to 10.10.0.10

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* Assigning IPs for Routers

Router 0 :

FastEthernet 0 : 10.0.0.100

FastEthernet 1 : 192.168.0.100

Serial 0/0 : 12.12.0.1

Serial 0/1 : None

Static :

→ 10.0.0.0/8 via 12.12.0.2

Router 1 :

FastEthernet 0 : 192.168.0.100

" 1 : 10.10.0.100

Serial 0/0 : 12.12.0.2

" 0/1 : none

Static

→ 192.168.0.0/24 via 12.12.0.1

Interpretation of output :

We can draw conclusion from our output, that our network design is correct and working just fine. As we can see that PC with IP address 10.0.0.1 can ping PC with IP address 192.168.0.1.

Screenshot of Network Design:

Cisco Packet Tracer - C:\Users\Vibhu\OneDrive\Desktop\IAB_cAT.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x 2396, y 1000

PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 10.0.0.100: Destination host unreachable.
Reply from 10.0.0.100: Destination host unreachable.
Reply from 10.0.0.100: Destination host unreachable.

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>cls
Invalid Command.

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=7ms TTL=128
Reply from 10.0.0.2: bytes=32 time=7ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 72ms, Average = 19ms

C:\>ping 192.168.0.1
```

Time: 00:32:30

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

New Delete

Toggle PDU List Window

(Select a Device to Drag and Drop to the Workspace)

Realtime Simulation

09:03 21-05-2021

Cisco Packet Tracer - C:\Users\Vibhu\OneDrive\Desktop\IAB_cAT.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x 1673, y 407

Time: 00:32:35

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

New Delete

Toggle PDU List Window

(Select a Device to Drag and Drop to the Workspace)

Realtime Simulation

09:03 21-05-2021

Q1-b) Write a code to find the hamming code distance for any 4-bit sequence binary data. Input to the code is any SIX 4-bit sequence binary data at the runtime.

Ans1-b)

Handwritten (Algorithm and Source Code):

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```
else
    ans += "1";
}
for (int i = 0; i < 4; i++)
{
    if (ans[i] == "1")
    {
        count++;
    }
}
return count;
}

int main ()
{
    cout << "Enter 6 Binary strings: \n";
    string arr[6];
    int min = 9999;
    for (int i = 0; i < 6; i++)
    {
        cin >> arr[i];
    }
    for (int i = 0; i < 6; i++)
    {
        for (int j = i + 1; j < 6; j++)
        {
            int d = hamming(arr[i], arr[j]);
            if (d < min)
            {
                min = d;
            }
        }
    }
}
```

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Algorithm:

- ① Get 6 binary string input from the user.
- ② Initialise min as infinity.
- ③ Store each string of binary input (4-length) into an array.
- ④ Calculate the hamming distance between each element of the array and keep updating min. Update min if current hamming distance is lesser than previous hamming distance.
- ⑤ At the end of the iteration, the number stored by min is the minimum hamming distance of the 6-4 bit binary strings.

Source code:

```
#include <iostream>
using namespace std;
```

```
int hamming(string a, string b)
```

```
{
```

```
    string ans = "";
```

```
    int count = 0;
```

```
    for (int i = 0; i < 4; i++)
```

```
    {
```

```
        if (a[i] == b[i])
```

```
            ans += "0";
```

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cout << "Minimum Hamming Distance of
these 6 Binary strings are: " << min;

return 0;

}

Scanned with CamScanner

Screenshots:

```
File Edit Selection View Go Run Terminal Help
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB> cd "c:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB\HammingDistance"
Enter 6 Binary Strings:
0000
0001
0110
0011
1010
1100

Minimum Hamming Distance of these 6 Binary strings are: 1
PS C:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB>
```

```
File Edit Selection View Go Run Terminal Help
HammingDistance.cpp - LAB - Visual Studio Code
1: Code

Windows PowerShell
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PS C:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB> cd "c:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB" ; if ($?) { g++ HammingDistance.cpp -o HammingDistance } ; if ($?) { .\HammingDistance }
Enter 6 Binary Strings:
0010
0010
0000
1111
0101
0110

Minimum Hamming Distance of these 6 Binary strings are: 0
PS C:\Users\Vibhu\OneDrive\Desktop\Winter Semester 20-21\NC\LAB>
```