

# FINAL EXAMINATION

Spring 2022

Department of Computer Science & Engineering  
Independent University, Bangladesh (IUB)

CSE316: Data Communication and Computer Networks

**Total Marks: 70**

**Time Allowed: 80 Minutes**

- 
- Answer all **four (4)** questions
  - Figure in bracket [] next to each question indicates marks for that question
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*This question paper has three (3) pages (including cover page).*

1. Briefly explain the following concepts:

- (a) Circuit-Switched versus Packet-Switched network. [5]
- (b) Physical versus Logical connection. [5]
- (c) Connectionless versus Connection-Oriented protocol. [5]
- (b) Flow Control versus Congestion Control. [5]

(20 marks) [CO1]

2. An organization is granted the following Class B address: 128.56.0.0. The administrator wants to create 256 subnets.

- (a) Determine the number of addresses in each subnet. [5]
- (b) Concisely present the network addresses of the subnets. [5]
- (c) Find the first and last addresses in the first subnet. [5]
- (d) Find the first and last addresses in the last subnet. [5]

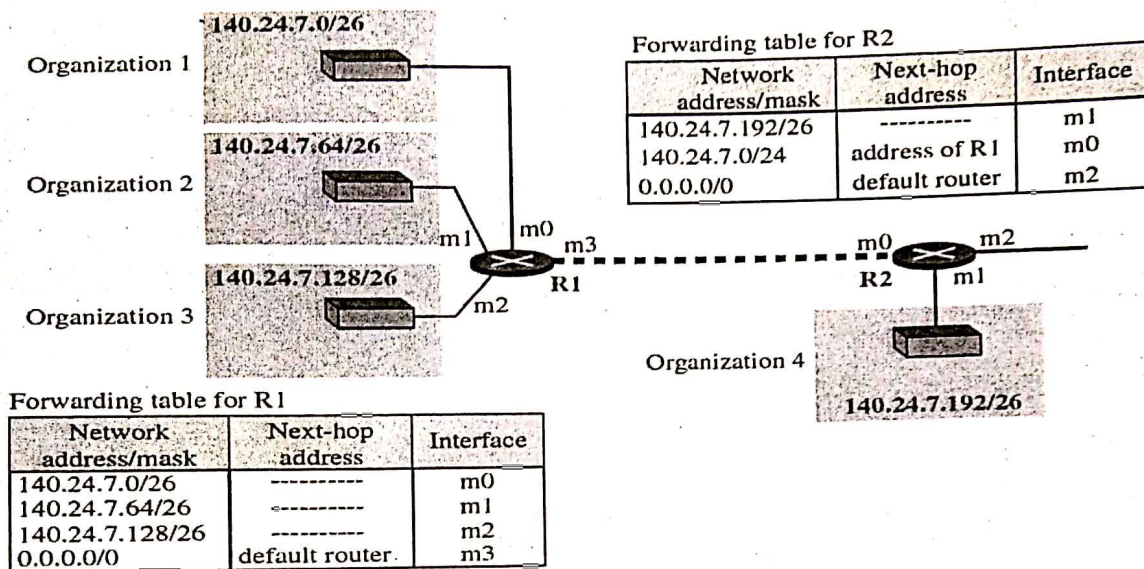
(20 marks) [CO1]

3. An ISP granted the IP address block 80.70.250.0/22. It needs to allocate addresses to three subscribing organizations with 50, 250 and 500 nodes, respectively.

Allocate ranges to each of the three subscribing organizations, and determine state what address space still remains unallocated.

(20 marks) [CO1]

4. You are given the following network topology:



- (a) Can a packet with Destination IP Address **140.24.7.194** ever arrive at Router **R1**? What happens if a packet with such a Destination IP Address arrives at R1? [5]
- (b) Assume Router **R2** receives a packet with Destination IP Address **140.24.7.42**. How is this packet routed to its final destination? [5]

(10 marks) [CO1]

**THE END**

Name: Rani Bindu Bashiri

ID: 182222

Sec: 2

Course Name: Data communication and Computer Net.

code: CSE316

Answer to the question NO: 1

a. ~~circuit~~ → circuit switched versus packet switch network:

circuit switched versus

In circuit switch network a dedicated connection called circuit is always available between the two end system.

→ switch can only make it active

or inactive. As it is a d.

→ As it is a dedicated connection there is an assurance of guaranteed performance however it is only fully effective when used of full capacity.

→ Usually used in telephon network (P.T.O)



The Answer to the question NO: 4 (a)

R1 Router R1 had a subnetworks are

14.24.7.0/26

00001110 . 00011011 . 00000111 . 00000000

00011110 11111111 11111111 . 111 . 00000

00001110 . 00011011 00000111 . 111

organization

first IP

140.24.7.0/26 to 140.24.7.63/26

organization<sup>2</sup> 140.24.7.64/26 to 140.24.7.127/26

organization<sup>3</sup> 140.24.7.128/26 to 140.24.7.255/26

if a IP of Address 140.24.7.191

which does not belong to any organization

IP range so when the packet arrive in

R1 the packet get discarded

Answer to the question NO: 4 (b)

The address of R1 and to R1 ~~can~~ is 140.24.7.0

when a destination IP Address of 140.24.7.42 arrive it

pass through 140.24.7.0/24 address and

on to m, for R1.

## Answer to the question NO: 3

~~According to CIDR~~

$$500 = 512 = 2^9$$

$$250 = 256 = 2^8$$

$$50 = 64 = 2^6$$

for 500 nodes

$$n = N - \log_2 512 = 23$$

We have

80.70.250.0/22

~~010101000~~

01010000.01000110.11111010.00000000

Host Part

Network

01010000.11111100.00000000

01010000.01000110.11111000.00000000

80.70.248.0/23

for 500 nodes

80.70.248.255/23 to 80.70.249.255/23

for 250

$$n = N - \log_2 250 = 24$$

01010000.01000110.11111010.00000000

Host Part

Network

0101000.01000110.11111010.00000000

for 250

80.70.250.0 to 80.70.250.255

for 50 nodes

$$n = N - \log_2 4 = 26$$

~~80~~

80.70.250.0

↓

01010000.01000110.11111010.00000000  
Network Port Host Port

01010.000.01000110.11111111.11100000

010.10000.01000110.11111010.111

80.70.251.0/26 to 80.70.251.255/26

Allocate ranges to each of three  
subscribing organizations

first Host 10

$$2^{10} - 2^9 - 2^8 - 2^6 = 162$$

Allocate ranges to each of the three  
subscribing organizations, and determine  
state ~~what~~ 162 space still remains

Answer to the first question NO:2

class B Address : 128.56.00 As we know

class B  $2^{16}$  subnet

the number of subnet is  $2^{11} = 65536$

Number of address in each subnet

$$= 65536 / 256$$

$$= 256 \text{ subnets}$$

11 10 11 10 11 10



b. 1st add : 128.56.0.0  
 2nd add : 128.56.10  
 2nd add : 128.56.255.255  
 concisely present the network addresses

of the subnet is (c) prefix =  $256 - 28$   
 $= 32 - 8$   
 $= 24$

1st  
 128.56.0.0

2nd Address 128.56.1.0

Last address 128.56.255.255

e. First address in first subnet = 128.56.0.1  
 Last address in first subnet = 128.56.0.255

d. Last address in first subnet = 128.56.255.1  
 Last address in first subnet = 128.56.255.255

Answer to the question NO : e

connectionless versus  
 protocol ~~connection-oriented~~

It is related to the

telephone system

It is preferred by

long and steady  
 communication

connection-oriented  
 connectionless

It is related to  
 postal system

It is preferred  
 by bursty  
 communication



b. Answer to the question NO: (b)  
when two divis

3. connection-oriented  
is necessary

4. connection-oriented  
is feasible

5. In connection  
oriented congestion  
is not possible

6. packet ~~flow~~ follow  
the same route

connectionless  
is not  
compulsary

4. connectionless  
is not feasible

5. In connectionless  
congestion is  
possible

6. Packet do not  
follow the  
same Route

Answer to the question NO: (b)

when connection are made with cables  
are physical connection

Answer to the question NO: b.

Flow control: whatever an entity produces it and and

Answer to the question NO1(a)

Instead of continuous dedicated connection data is sent in packet

- > These packets are blocks of data
- > The links are on demand so that link never sits idle and is more efficient

Answer to the question NO: (b)

Physical	Logical
The physical address is a location in a memory unit	It is the virtual address generated by CPU
The user can not directly access physical address	The user uses the logical address to access the physical address
It is computed by MMU	The logical address is generated by the CPU

Answer to the question NO: (b)

~~Flow~~ Flow control:

Whenever an entity produces it and another entity consumes them, there should be a balance between production and consumption rates. If the item are produced faster than they can be consumed the consumer can be overwhelmed. Then we need flow control. It controls the packet production flow so that some packets will be discarded.

congestion control:

It refers to the mechanism and technique that control the congestion and keep the load below capacity.

congestion in network occurs because router and switches have queue buffers that hold



the packet before and after processing.

Answer to the question 2(c)

$$\begin{aligned}\text{Prefix} &= 256 = 2^8 \\ &= 32 - 8 \quad [32 - \log_2 256] \\ &= 24\end{aligned}$$

1st subnet :

1st add : 128.56.0.0/24

last add : 128.56.0.255/24

(d) 2nd subnet

1st add : 128.56.255.0/24

last add : 128.56.255.255/24