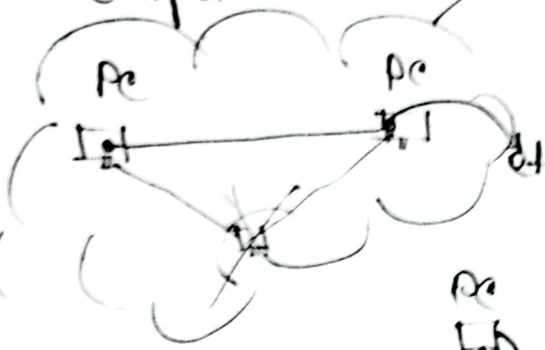
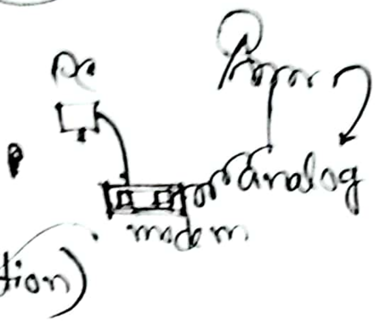
Lab-1

Computer network





→ Computing Devices (PC)

→ (NIC network interface card)

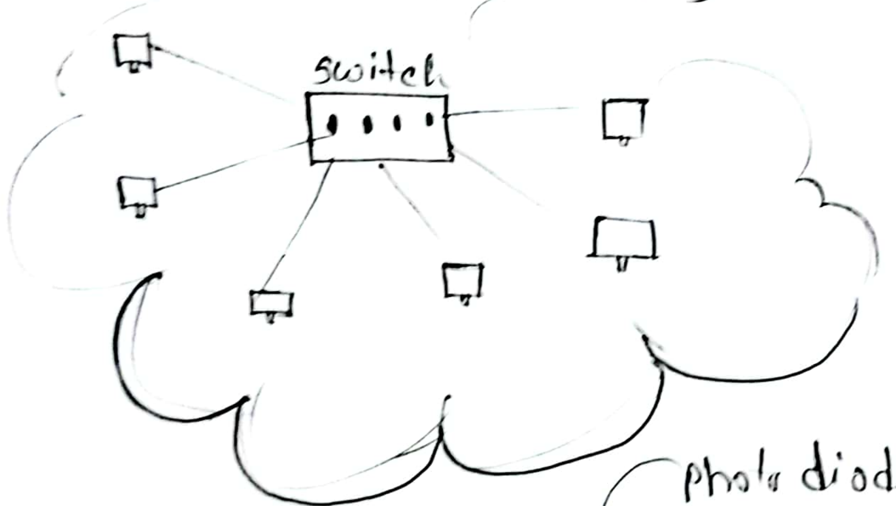
→ Transmission medium

a) Unguided (wireless)

b) Guided

- Fiber Optic
- Coaxial (Dish TV signal)
- Twisted pair cable

multiple PC connection এর জন্য switch use করতে হয়।

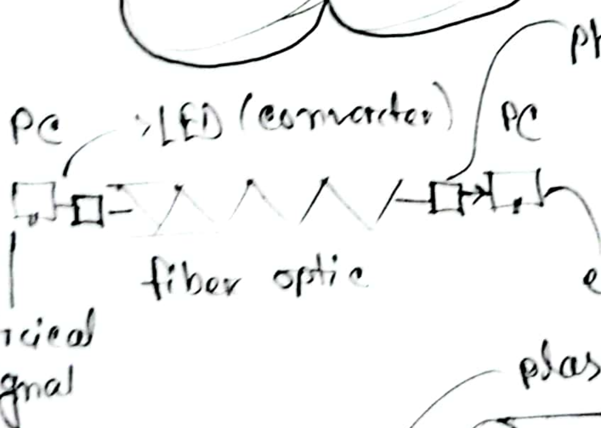


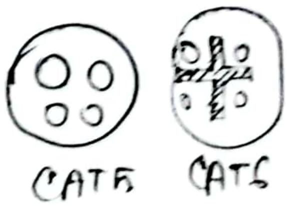
a) CAT5

b) CAT6 (professional)

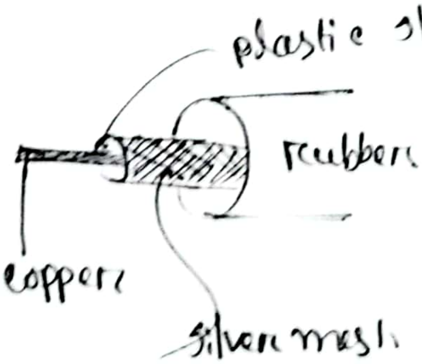
c)

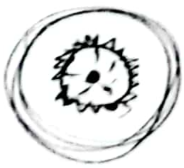
4 pairs cable





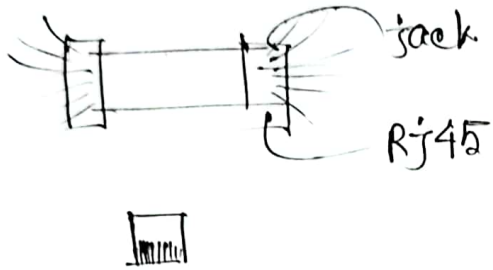
per inch-এ twist বেশি CAT6 এ





Twisted

- 4 solid colors [Green, blue, orange, brown]
- 4 Mixed with white [white - Brown
  white - Green
  white - Blue
  white - Orange]

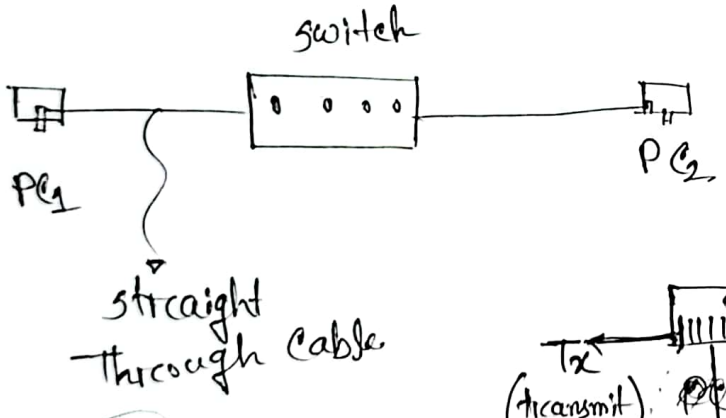


Next lab

CAT5 — 2m

Rj45 — 5/6 pcs

Crimping tool



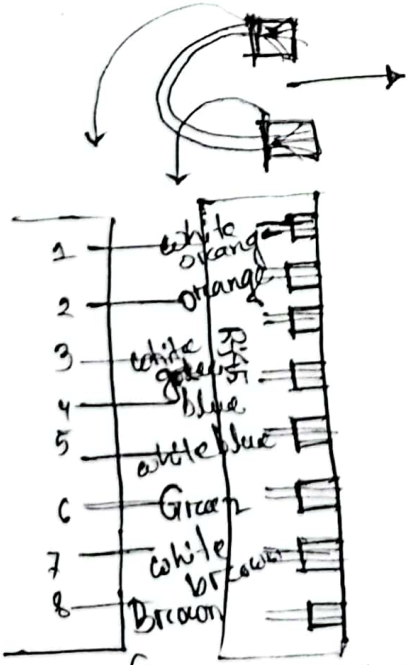
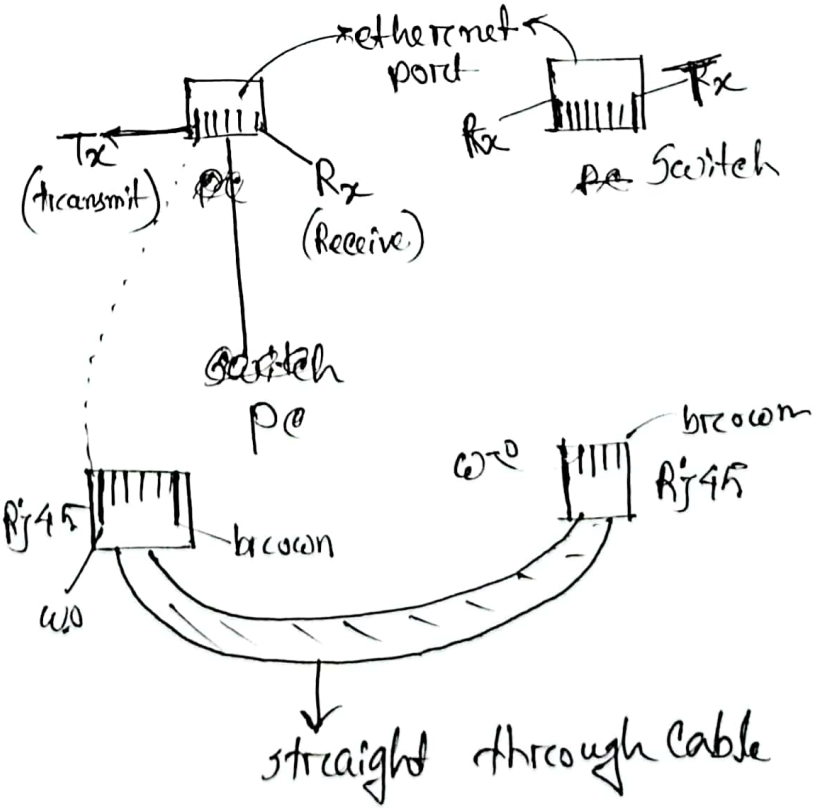
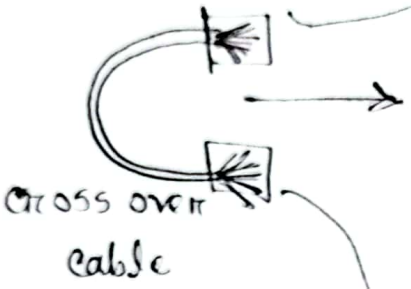


fig: 568 'B' standard



Cross over cable



Cross over cable

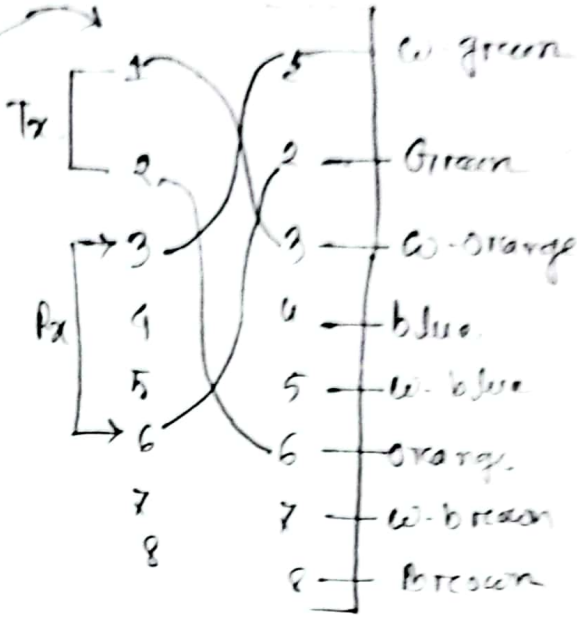


fig: 568 'A' standard

Same type device

PC - PC, switch - switch

→ cross over cable

Diff type of device — straight through cable

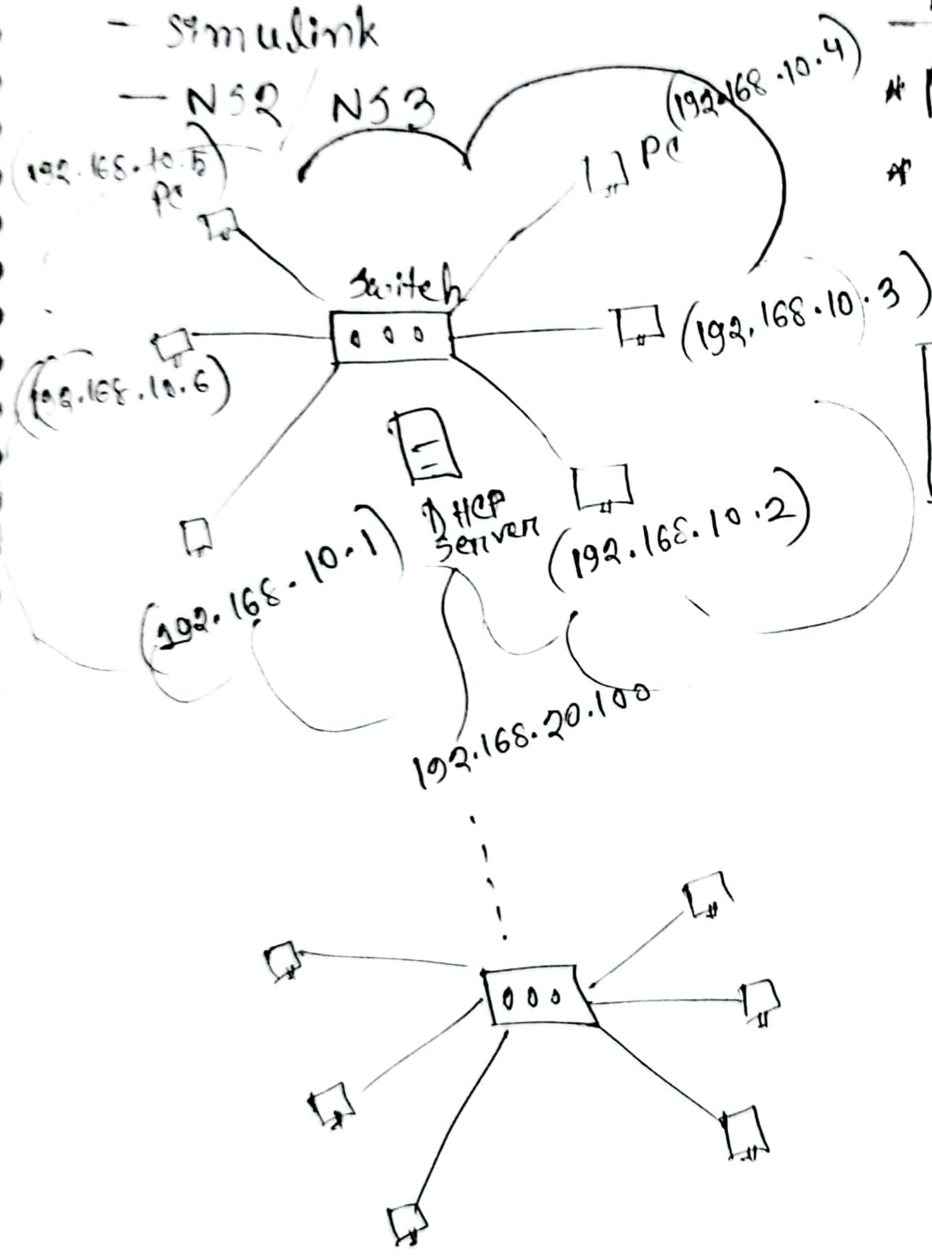
lab-03

Simulation

- ✓ CISCO packet Tracer (pre-defined আছে)
- OPNET
- OMNET
- simulink
- NS2 / NS3

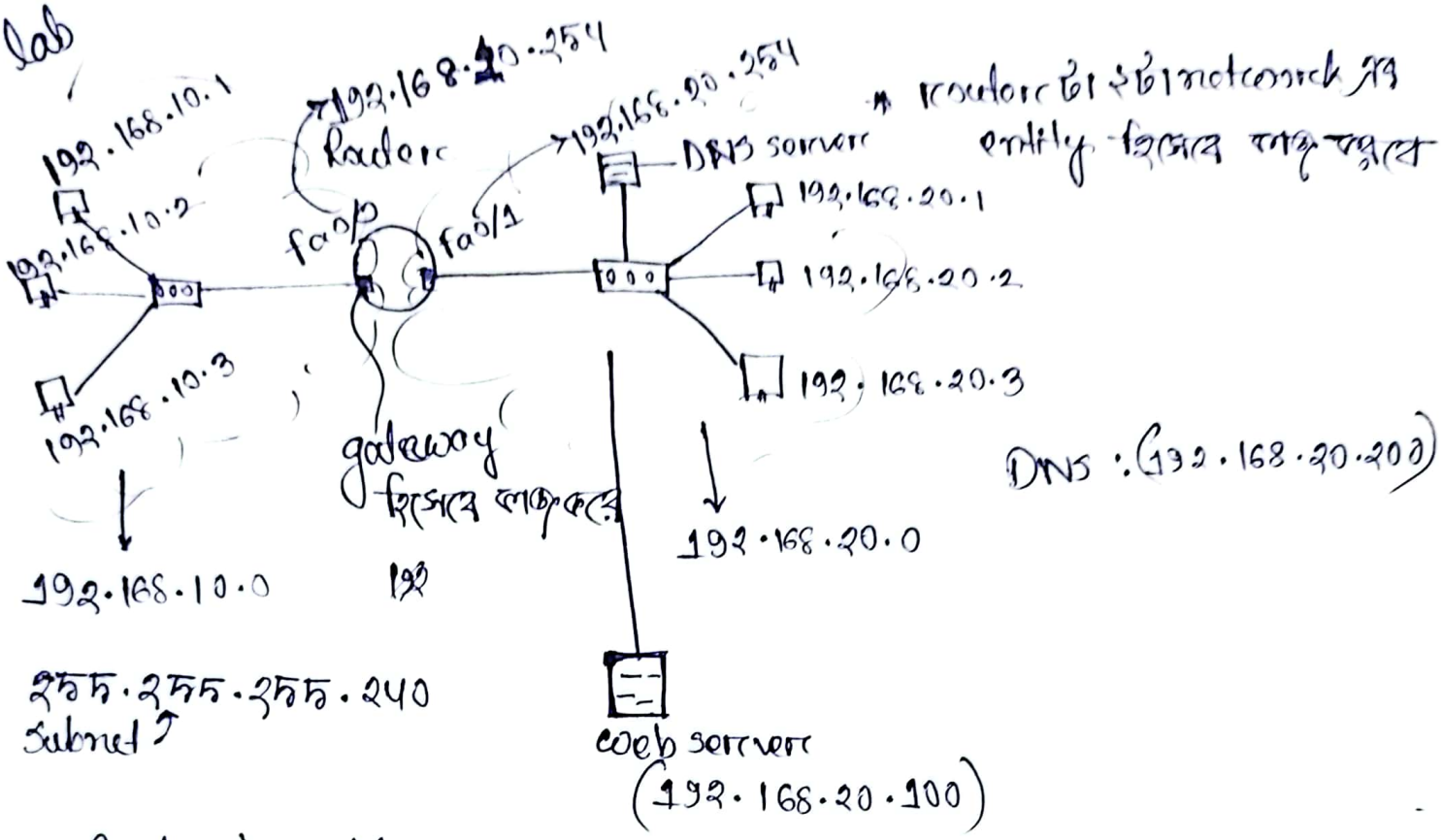
Logical design

- PC – end device = 6
- 2960 switch



TTL: Time to live – কতগুলো device ঘুরতে পারবে (Hop count)

lab



* router কে switch এর entity হিসাবে ব্যবহার করে

DNS : (192.168.20.200)

Router > enable

Router # ⟶ (previlege mode) config

Router (config) # fa Interface Δ fa 0/0

Router (config-if) #

ip Δ address Δ 192.168.10.254 Δ 255.255.255.0

Router (config-if) # no Δ shut

Router (config-if) # do Δ wr.

Router (config-if) # exit

Router (config-if) # interface Δ fa 0/1

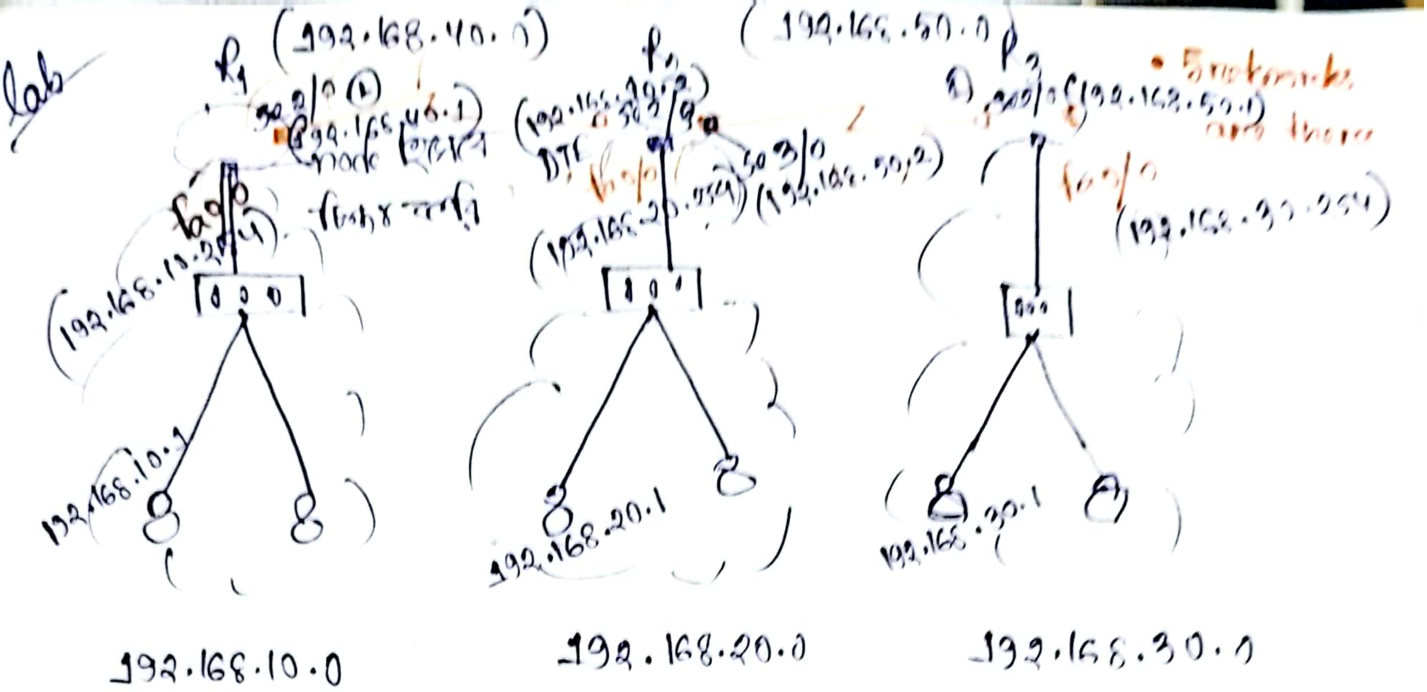
Router (config-if) #

ip Δ address Δ 192.168.20.254 Δ 255.25.255.0

Router (config-if) # no Δ shut

Router (config-if) # do Δ wr

lab



Router to Router — serial connection (much faster)
— different ports .

switch এর সাথে Router – Ethernet

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① DCE : Data communication Equipment

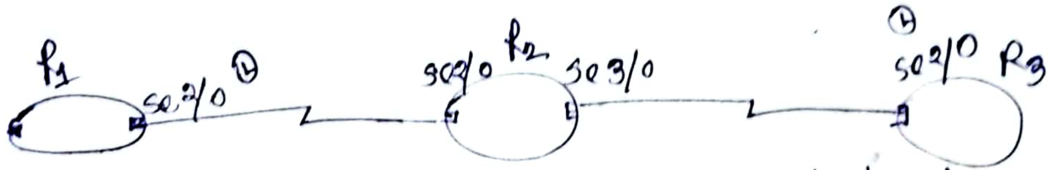
DTE : Data Terminal Equipment

Config of R1 — shortcut

Router 1

CLI → no

. . . .



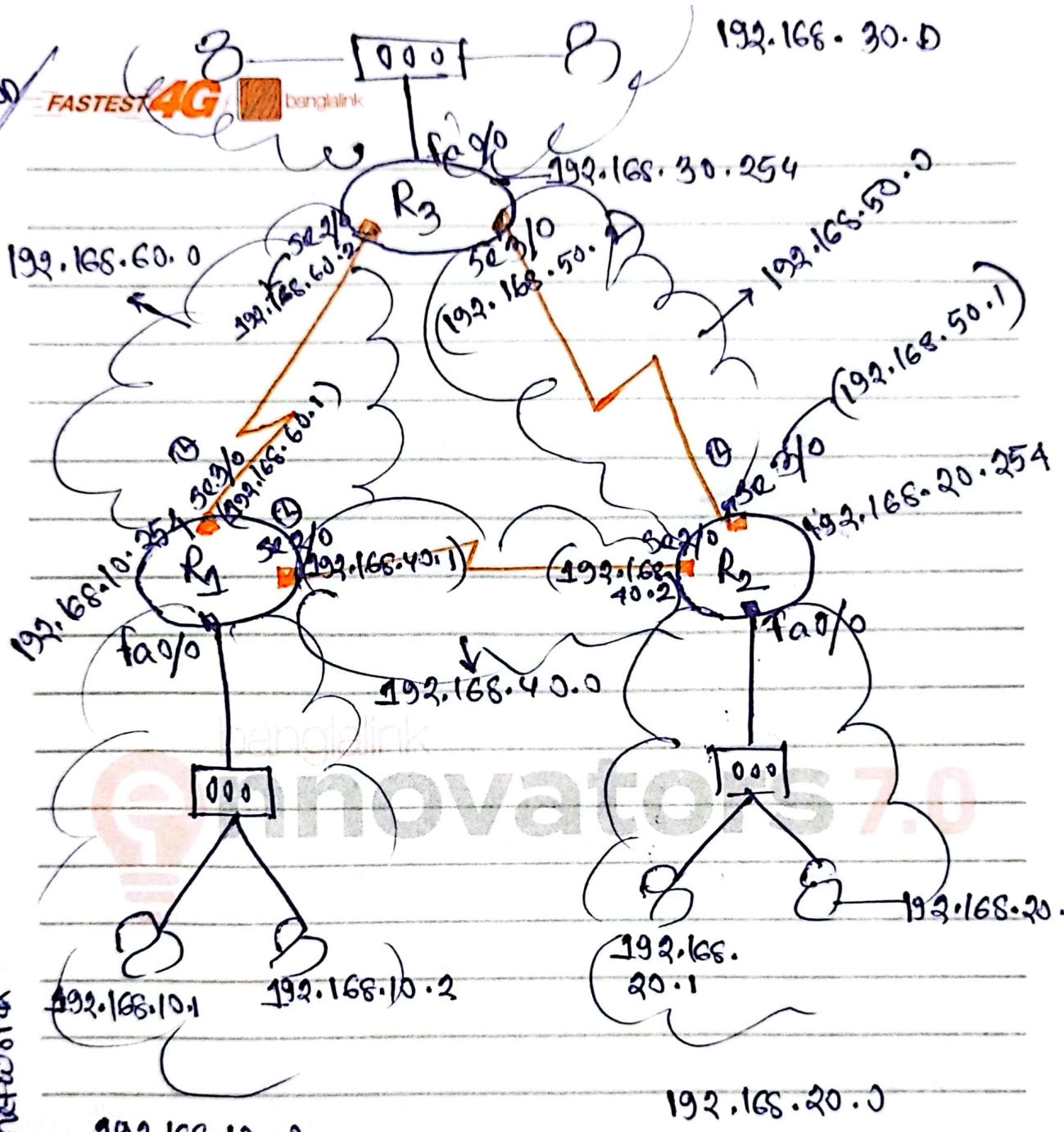
subnet mask

ip ∆ route ∆ 192.168.20.0 ∆ 255.255.255.0 ∆ 192.168.40.2

Destination network from R1 — Next hop to go to Destination network

20.0 তে যাওয়ার জন্য next hop বলে দিতে হবে

lab



(dynamic) routing

Dynamic

Link-State Routing algo

OSPF (open shortest path first)

Process ID

#router Δ OSPF Δ 1

255.255.255.255

(-) 255.255.255.0 (subnet mask)

0.0.0.255

wild card Mask IP

lab

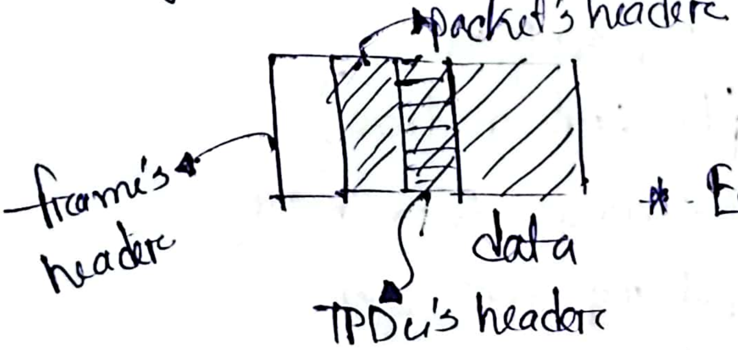
lab exam → 29-05-24 (wednesday) 20-05-24

- 3/4 টা ques
  - TTL কী?
  - subnet mask?
  - straight through cable straight?
- open book (notes দেখা যাবে) Design

(Network protocol analyzer) Wire Shark (sniffing tool) → real packet capture করে দেখাতে পারি এর ভিতর কি কি আছে?

(ARP = Address resolution protocol)

(Ethernet = 1460 Bytes)



* Epoch time = second wise specifically বলছে

Ethernet II

01-00-5e-00-00-fb (company: 01-00-5e; serial #: 00-00-fb)

48 Bits (MAC) — physical address

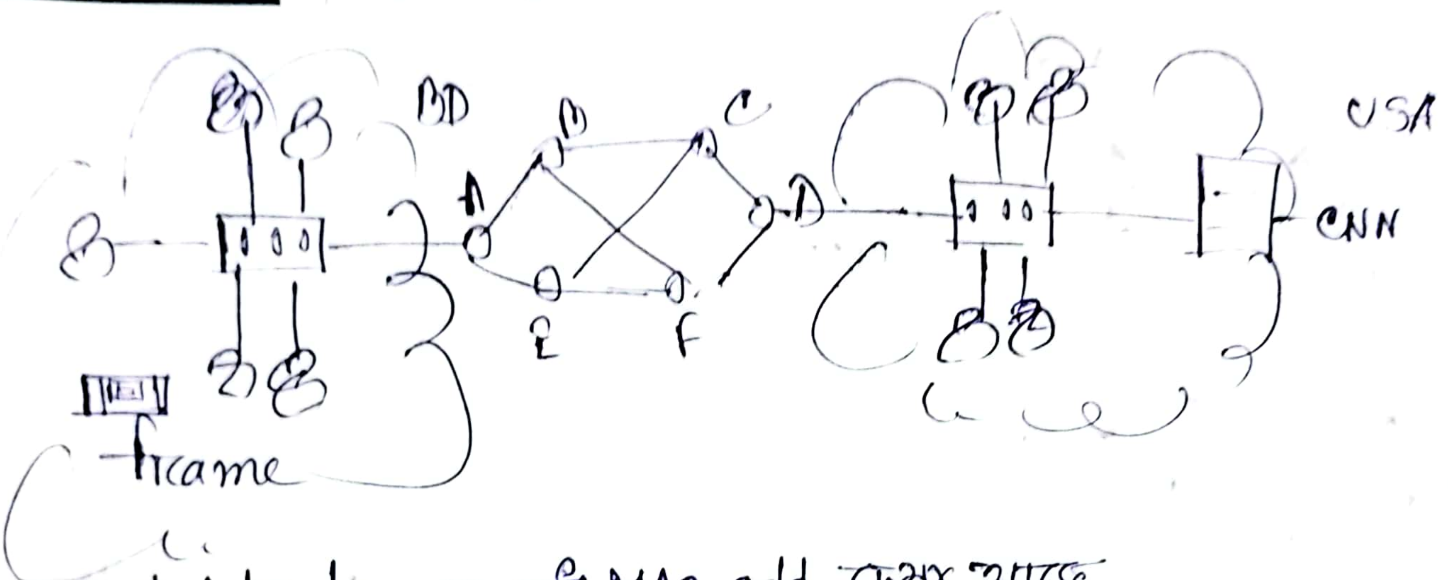
My PC (MAC) : 40-8D-5C-78-35-7C

My PC (IPV4): 192.168.15.52 My Gateway: 192.168.15.250

your PC (MAC): 1C-1B-0D-DD-5D-E6

your IP : 192.168.15.30

MAC address দিয়ে source to Dest communicate করে



— packet header-এর মধ্যে MAC add দেওয়া থাকে

— adjacent device এর মধ্যে error free communication পাঠানোর কাজ datalink layer-এর

— পরবর্তী device এ যাবে MAC এর মাধ্যমে (physical address)

— frame এর MAC always change হবে কিন্তু

— packet " শুধুমাত্র Dest এর চেঞ্জ হবে

icmp = internet control massage protocol

IPV4 = 45 — [4 bit দিয়ে 20 byte বুঝানো তাই 8 bit দিয়ে 45]

IHL = 20 bytes —— 32 এর জন্য 5

(00 3C → 12×1 = 12, 3×16 = 48 → 60 bytes)

Total length = 16 bit

frame = 74 bytes, packet = 60 bytes

identification :

DM = 0

MF = 0

fragment offset (16 byte) : 0

TTL : 128

protocol : ICMP(1)

header checksum

source add : ~~Maruf~~ My
192.168.15.50

dest : Maruf
192.168.15.52