

**INTERNATIONAL INDIAN SCHOOL BURAI DAH**  
**Worksheet for the Academic Year 2023-24**  
**CLASS:XII SUBJECT: Computer Science**  
**LESSON 10: Communication and Network Concepts**

1. What is name of first computer network?

- a. Internet b. NIC c. ARPANET d. NSFNET

Ans. C

2. Write the full form of ARPANET.?

Ans.- American Research Project Agency Network

3. What do you mean by computer network?

Ans.- A computer network is a collection of interconnected autonomous computing devices so as to exchange information or share resources.

4. What do you mean by internet?

Ans.- Network of networks is called internet. Or The internet is the world-wide network of computer networks.

5. Set of rules and regulations used while communication/transmission is \_\_\_\_\_

- a. Topology b. Gateway c. Protocol d. Bandwidth

Ans. C

6. Expand the following terms:

- i. HTTP – Hyper Text Transfer Protocol
- ii. FTP – File Transfer Protocol
- iii. TCP/IP – Transmission Communication Protocol/Internet Protocol
- iv. SLIP – Serial Line Internet Protocol
- v. PPP – Point to Point Protocol
- vi. IMAP – Internet Message Access Protocol
- vii. POP3 – Post of Protocol 3
- viii. SMTP – Simple Mail Transfer Protocol
- ix. IRC – Internet Relay Chat
- x. SIP – Session Initiation Protocol
- xi. VoIP – Voice over Internet Protocol

7. Name the protocols used in Email

- i. IMAP – Internet Message Access Protocol
- ii. POP3 – Post of Protocol 3
- iii. SMTP – Simple Mail Transfer Protocol
- iv. HTTP – Hyper Text Transfer Protocol

8. Name the protocol that is used to transfer files from one system to another.

Ans.- FTP – File Transfer Protocol

9. Which one is chat protocol

- a. HTTP b. IRC c. SMTP d. VoIP

Ans.- b

10. Write a short note on VoIP.

Ans.- VoIP is technology that enables voice communication over the internet through the compression of voice in data packets and vice versa, that can be transmitted over data networks.

**NETWORK CONCEPTS – BASICS**

1. Identify the Network that is limited to the proximity of an individual and covers a range from 10 to 20 meters.

• LAN (Local Area Network) • WAN (Wide Area Network) • PAN (Personal Area Network) • MAN (Metropolitan Area Network)

Ans. PAN (Personal Area Network)

2. TCP/IP stands for –

a) Transmission Communication Protocol / Internet Protocol b) Transmission Control Protocol / Internet Protocol c) Transport Control Protocol / Interwork Protocol d) Transport Control Protocol / Internet Protocol

Ans. b) Transmission Control Protocol / Internet Protocol

3. Which of the following is a fastest transmission media –

• Ethernet Cable • Fiber optics Cable • Coaxial Cable

Ans. Fiber optics Cable

4. Write the expanded names for the following abbreviated terms used in Networking and Communications: (i) MBPS (ii) WAN (iii) CDMA (iv) WLL

Ans. (i) MBPS - Mega Bytes per Second OR Mega Bits per second

(ii) WAN - Wide Area Network

(iii) CDMA - Code Division Multiple Access

(iv) WLL - Wireless in Local Loop

5. What is a computer Network?

Ans. Collection of two or more devices connected to each other to share resources.

6. What is NIC? Give other name of NIC.

Ans. Stands for Network Interface Card. It is used to connect a computer to a network. Also known as Network Adapter or Ethernet Card.

8. Which is the fastest network from the following?

• LAN (Local Area Network) • WAN (Wide Area Network) • MAN (Metropolitan Area Network)

Ans. LAN (Local Area Network)

9. The switching technique that splits a message into smaller pieces is known as \_\_\_\_\_?

Ans. Packet Switching

10. The switching technique that establishes a dedicated path between sender and receiver is known as \_\_\_\_\_?

Ans. Circuit Switching Topic

#### **TOPIC: Network Topologies:**

1 Which of the following is not a network topology :

Star, Mesh , Tree, Bug , Bus 1

Ans. Bug

2 Which type of Network is generally privately owned and links the devices in a single office building or Campus?

LAN, PAN, MAN, WAN

Ans. LAN

3 Uploading photo from mobile phone to Desktop computer is an example of \_\_\_\_\_ (LAN, PAN, MAN, WAN)

Ans. PAN

4 Data Communication systems spanning states, countries or the whole world is \_\_\_\_\_

(PAN, LAN, WAN, MAN)

Ans. WAN

5 Internet is an example of most common type of \_\_\_\_\_ network.

(LAN, PAN, MAN, WAN)

Ans. WAN

6 The network designed for customers who need a high speed connectivity is \_\_\_\_\_ (LAN, MAN, WAN, PAN)

Ans. MAN

7 Rearrange the following types of network PAN, MAN, LAN, WAN in descending order of their area coverage.

Ans. WAN-MAN-LAN-PAN

8 What is the possible maximum area covered by LAN

a. 100-500 meter, b. 1-5 KM, c. 1-10 KM, d. 1-2 KM

Ans. c. 1-10 KM

9 Which is used in LAN a) Wi-fi b) Wi-Max)

Ans. Wi-fi

10 The multipoint topology is a. Bus b. Star c. Mesh d. Ring

Ans. a. Bus

11 In mesh topology, the devices are connected via.

a. Multipoint link b. Point to point link c. No Link d. None of the above. Ans. b. Point to point link

12 The bus, ring and star topologies are mostly used in the

a. LAN, b. MAN, c. WAN, d. Internetwork Ans. a) LAN

13 The combination of two or more topologies are called a. Star Topology, b. Bus Topology, c. Ring Topology, d. Hybrid Ans. d. Hybrid

14 A term that refers to the way in which the nodes of a network are linked together

a. Network, b. Topology, c. Connection, d. Interconnectivity

Ans. b. Topology

15 The participating computers in a network are referred to as:

A Clients B Servers C Nodes D CPUs Ans. b) Nodes

16 A \_\_\_\_\_ WAN can be developed using leased private lines or any other transmission facility

A Hybrids B peer-to-peer C Two-tiered D Three-tiered Ans. B) Peer-to-Peer

17 Physical or logical arrangement of network is \_\_\_\_\_

A Topology B Routing C Networking D None of the mentioned

Ans. A) Topology

18 Data communication system spanning states, countries, or the whole world is \_\_\_\_\_

A LAN B WANC MAND None of the mentioned

Ans. b) WAN

19 Bus, ring and star topologies are mostly used in the

A LAN B MANC WAND Internetwork

Ans. a) LAN

20 Data communication system within a building or campus is \_\_\_\_\_

A LAN B WANC MAND None of the mentioned

Ans. A) LAN

21 A topology that involves Tokens.

A Star B Ring C Bus D Daisy Chaining

Ans. B) Ring

22 In which topology there is a central controller or hub?

A Star B Mesh C Ring D Bus

Ans. A) Star

23 In a \_\_\_\_\_ topology, a dedicated link connects a device to a central controller.

a) Ring, b) Bus c) Mesh d) Star

Ans. d) Star

24 In a \_\_\_\_\_ topology, a device (non-central controller) needs only one input / output port

a) Ring b) Bus c) Mesh d) Star

Ans. d) Star

25 A \_\_\_\_\_ Topology is a variation of a Star topology.

a) Ring b) Bus c) Mesh d) Tree

Ans. d) Tree

26 In a \_\_\_\_\_ topology, a secondary hub can connect to a central hub.

a) Ring b) Bus c) Mesh d) Tree

Ans. d) Tree

27 A bus topology has a \_\_\_\_\_ line configuration.

a) Point – to – Point b) Multipoint c) passive d) None of the Above

Ans. d) Multipoint

## **28 What is baud rate?**

Ans: It is a measure of the speed at which the data is being transferred in a communication channel. The rate indicates the number of electrical

oscillations per second that occurs within a data transmission. The higher the baud rate, the more bits per second that are transferred.

**Q. 29 Explain the 80:20 rule.**

Ans: The 80:20 rule states that 80% of the traffic in any network segment should be local and only 20% of the traffic should leave that segment for efficient traffic management.

It simply means that we should install the server at the site/building containing the maximum number of computers.

**Q. 30 What is the Bandwidth of a channel?**

Ans: It is the difference between upper and lower frequency limits of the analog signal or the maximum amount of information that the channel can carry.

**Q. 31 What is the Data Transfer Rate (DTR)?**

Ans: It is the ratio of the total amount of digital data transferred between two points in some defined period of time and is measured in Bit Per Second (bps) or Bytes Per Second (Bps)

**Q.32 Differentiate between LAN and WAN.**

Ans. Local Area Network:- The local area network (LAN) is a network which is designed to operate over a small physical area such as an office, factory or a group of buildings up to a few kilometers in size. LANs use a transmission technology consisting of a cable. Traditional LANs technology transmits at speeds of 10 Mbps to 100 Mbps and makes very few errors. However, current LANs technology transmits at up to 10 Gbps. The personal computers and workstations in the offices are interconnected via LAN to share resources. The resources to be shared can be hardware like a printer, modem, disk or softwares or data, programs.

Wide Area Network:- A wide area network (WAN) is a telecommunications network that extends over a large geographical area across countries and continents. WANs are used to connect LANs and other types of networks together so that users and computers in one location can communicate with users and computers in other locations. They facilitate efficient exchange of information at high speed and low cost. A WAN uses common carriers like satellite systems, telephone lines etc. the best known example of WAN is Internet.

**33. Differentiate between Wired and wireless media/channel?**

Ans. Wired Network/ Media :- Wired or Guided media are also known as physical or conducted media. These media use various types of cables e.g. Twisted Pair Cable, Coaxial Cable and Fibre Optic Cable for transmitting data over various networks.

Wireless Network/ Media:- In a wireless network devices are connected without using a physical medium. Wireless communication uses radiowaves, microwaves, satellite and other short frequency waves like infrared to transmit data.

**34. Identify the Domain name and URL from the following:**

<http://www.income.in/home.aboutus.html>

Ans Domain name – income.in

URL – <http://www.income.in/home.aboutus.html>.

**35. Which protocol is used to creating a connection with a remote machine?**

Ans Telnet: It is an older internet utility that lets us log on to remote computer system. It also facilitates for terminal emulation purpose.

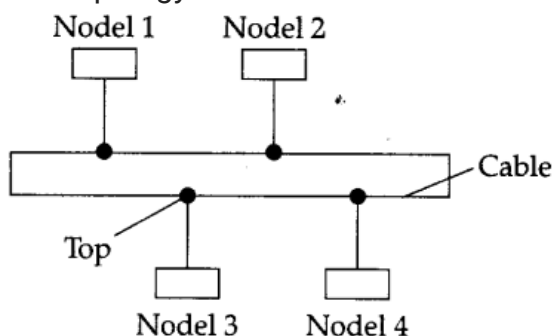
### 36. Difference between Packet switching and Message switching

Packet switching	Message switching
There is a tight upper limit on the block size. A fixed size of packet is specified.	In message switching there was no upper limit.
All the packets are stored in main memory in switching office.	In message switching packets are stored on disk. This increases the performance as access time is reduced.

### 37. Write one advantage of bus topology of network. Also illustrate how four (4) computers can be connected with each other using bus topology of network.

**Ans:** Advantage (benefits) of linear Bus topology is that the cable length required for this topology is the least compared to the other networks.

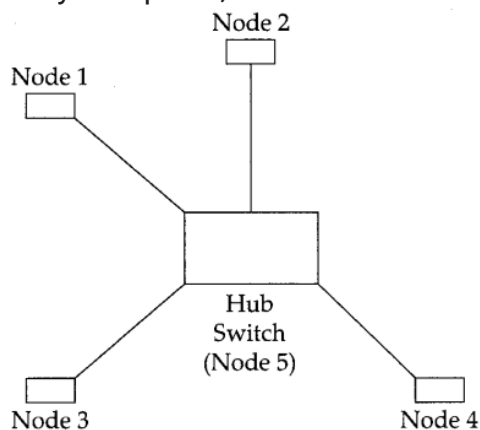
Bus Topology of Network:



### 38. Write one advantage of star topology network? Also, illustrate how five (5) computers can be connected to each other using star topology of network.

**Ans:** Advantage (benefits) of star topology:

Easy to replace, install or remove hosts or other devices.



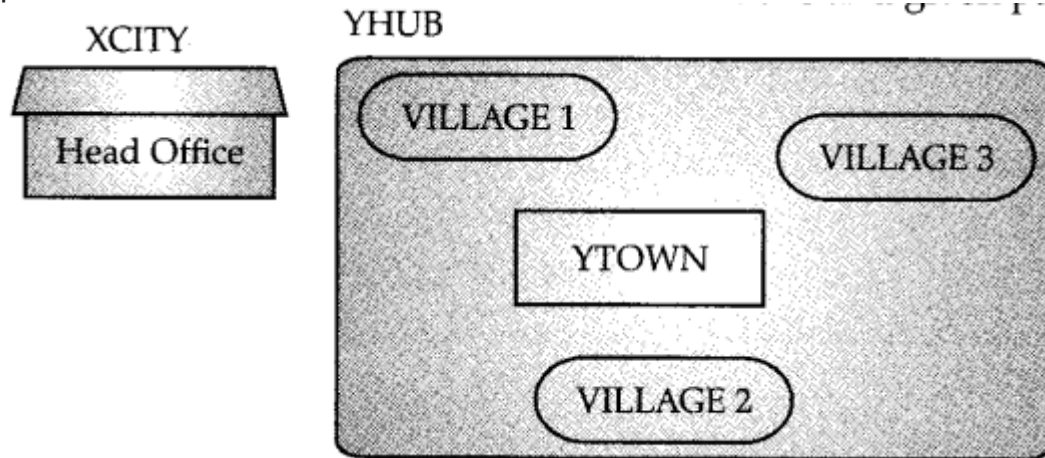
### 39. ABC International School is planning to connect all computers, each spread over a distance of 50 metres. Suggest an economic cable type having high speed data transfer to connect these computers.

**Ans:** Optical fibre cable.

**40.** Mahesh wants to transfer data within a city at very high speed. Write the wired transmission medium and type of network.

**Ans:**Wired transmission medium – Optical fibre cable Type of network – MAN.

**41.** As a network consultant, you have to suggest the best network related solution for their issues/problems raised in (i) to (iv) keeping in mind the distance between various locations and given parameters.



**Shortest distance between various locations:**

VILLAGE 1 To YTOWN	2 KM
VILLAGE 2 To YTOWN	1.2 KM
VILLAGE 3 To YTOWN	3 KM
VILLAGE 1 To VILLAGE 2	3.5 KM
VILLAGE 1 To VILLAGE 3	4.5 KM
VILLAGE 2 To VILLAGE 3	3.5 KM
CITY Head office to YHUB	30 KM

**Number of computers installed at various locations are as follows:**

YTOWN	100
VILLAGE 1	10
VILLAGE 2	15
VILLAGE 3	15
CITY OFFICE	5

**Note:**

- In Villages, there are community centres, in which one room has been given as training center to this organization to install computers.

- The organization has got financial support from the government and top IT companies.

1. Suggest the most appropriate location of the SERVER in the YHUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
2. Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.
3. Which hardware device will you suggest to connect all the computers within each location of YHUB?
4. Which server/protocol will be most helpful to conduct live interaction of Experts from Head office and people at YHUB locations?

42. Indian School, in Mumbai is starting up the network between its different wings. There are four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below:

SENIOR

JUNIOR

ADMIN

HOSTEL

The distance between various buildings is as follows:

ADMIN TO SENIOR	200m
ADMIN TO JUNIOR	150m
ADMIN TO HOSTEL	50m
SENIOR TO JUNIOR	250m
SENIOR TO HOSTEL	350m
JUNIOR TO HOSTEL	350m

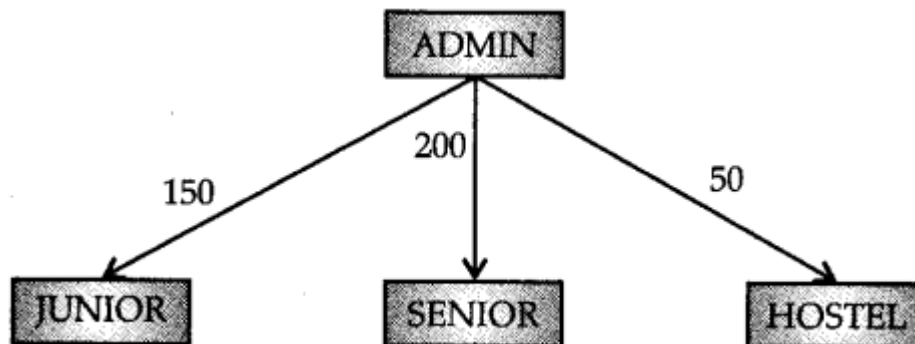
Number of Computers in Each Building :

SENIOR	130
JUNIOR	80
ADMIN	160
HOSTEL	50

1. Suggest the cable layout of connections between the buildings.
2. Suggest the most suitable place (i.e., building) to house the server of this school, provide a suitable reason.
3. Suggest the placement of the following devices with justification.
  - Repeater

- Hub/Switch
- 4. The organisation also has inquiry office in another city about 50-60 km away in hilly region. Suggest the suitable transmission media to interconnect to school and inquiry office out of the following :
  - Fiber optic cable
  - Microwave
  - Radiowave

**Answer:**



- 1.
2. Server can be placed in the ADMIN building as it has the maximum number of computer.
3. Repeater can be placed between ADMIN and SENIOR building as the distance is more than 110 m.
4. Radiowaves can be used in hilly regions as they can travel through obstacles.

**43.** Vidya Senior Secondary Public School in Nainital is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTEL(H).

**Distance between various wings are given below:**

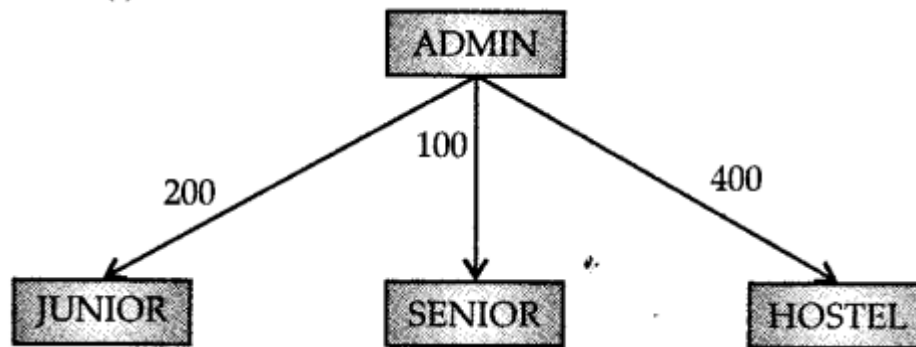
Wing A to Wing S	100 m
Wing A to Wing J	200 m
Wing A to Wing H	400 m
Wing S to Wing J	300 m
Wing S to Wing H	100 m
Wing J to Wing H	450 m

Wing	Number of Computers
Wing A	20
Wing S	150
Wing J	50
Wing H	25



1. Suggest a suitable Topology for networking the computers of all wings.
2. Name the most suitable wing where the Server should be installed. Justify your answer.
3. Suggest where all should Hub(s)/Switch(es) be placed in the network.
4. Which communication medium would you suggest to connect this school with its main branch in Delhi ?

**Answer:**



- 1.
2. Server should be in Wing S as it has the maximum number of computers. 1
3. All Wings need hub/switch as it has more than one computer.
4. Since the distance is more, wireless transmission would be better. Radiowaves are reliable and can travel through obstacles.

**44.** Which out of three type of networks LAN, MAN and WAN, is to be used when an institute connects computers of two adjacent computer laboratories ?

1. What is the difference between HTTP and FTP?
2. What is the major difference between Message Switching and Packet Switching in networking?
3. What is the basic difference between DNS and URL?
4. Give two applications of web 2.0.
5. Categorise the following under client side and Server-Side script category?
  - JSP
  - ASP
  - VBScript
  - Java Script

**Answer:**

- (i) LAN (The range is upto one KM)
- (ii)

HTTP	FTP
<ul style="list-style-type: none"> <li>● Stands for Hyper Text Transfer protocol</li> <li>● It is used to transfer web pages on www.</li> </ul>	<ul style="list-style-type: none"> <li>● It stands for file transfer protocol.</li> <li>● It is used to write data over server.</li> </ul>

(iii)

Message Switching	Packet Switching
(i) It communicate among two processes (ii) physical links are allocated dynamically	(i) It share the data in many computers (ii) Virtual links are made simultaneously.

(iv)

DNS	URL
<ul style="list-style-type: none"> <li>● It stands for Domain Name Server.</li> <li>● It is the Avatar or webId for any person website over internet.</li> </ul>	<ul style="list-style-type: none"> <li>● It stands for Universal Resource locator.</li> <li>● It is the unique IP address provided to any group, person or company.</li> </ul>

(v) Application of web 2.0

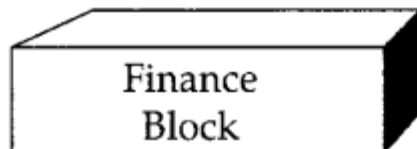
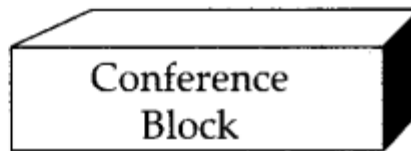
1. web hosting
2. web browsing
3. web Indexing
4. web searching

(vi) Client side Script

1. JSP
  2. Java Script
- Server Side Scripts
3. ASP
  4. VB Script

**46:**Trine Tech Corporation (TTC) is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Hyderabad. As a network adviser, you have to understand their requirement and suggest them the best available solutions. Their queries are mentioned as (i) to (iv) below.

### Physical Locations of the blocked of TTC



### Block to Block distances (in Mtrs.)

Block (From)	Block (To)	Distance
Human Resource	Conference	110
Human Resource	Finance	40
Conference	Finance	80

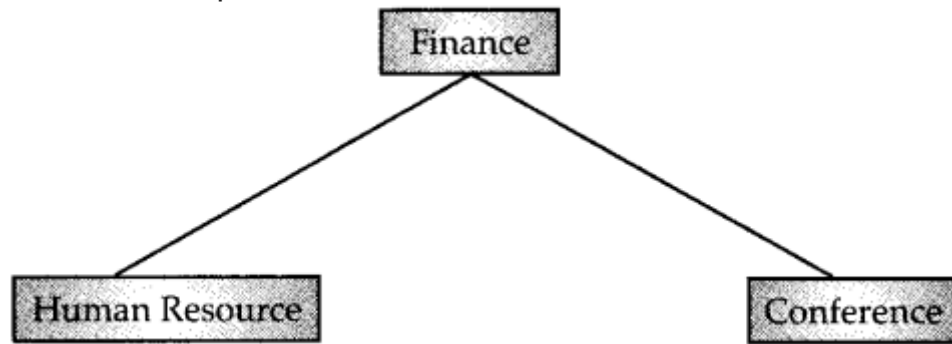
### Expected number of computers to be installed in each block.

Block	Computers
Human Resource	25
Finance	120
Conference	90

1. What will be the most appropriate block, where TTC should plan to install their server?
2. Draw a block to cable layout to connect all the buildings in the most appropriate manner for efficient communication.
3. What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office:
  - Satellite Link
  - Infrared
  - Ethernet Cable
4. Which of the following device will be suggested by you to connect each computer in each of the buildings:
  - Switch
  - Modem
  - Gateway

**Answer:**

1. Finance block because it has maximum number of computers.

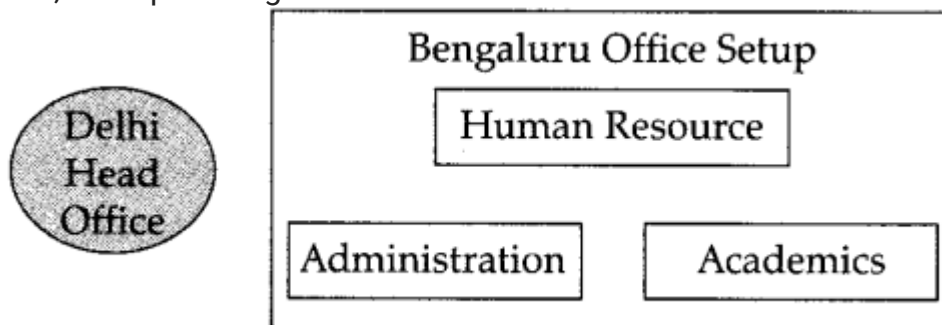


- 2.
3. Satellite link
4. Switch

**47:** G.R.K International Inc. is planning to connect its Bengaluru Office Setup with its Head Office in Delhi. The Bengaluru Office G.R.K. international Inc. is spread across an area of approx. 1 square kilometer, consisting of 3 blocks – Human Resources, Academics and Administration.

You as a network expert have to suggest answers to the four queries (i) to (iv) raised by them.

Notes : Keep the distance between blocks and number of computers in each block in mind, while providing them the solutions.



#### Shortest distances between various blocks:

Human Resources to Administration	100 m
Human Resources to Academics	65 m
Academics to Administration	110 m
Delhi Head Office to Bengaluru Office Setup	2350 km

**Number of computers installed at various blocks are as follows:**

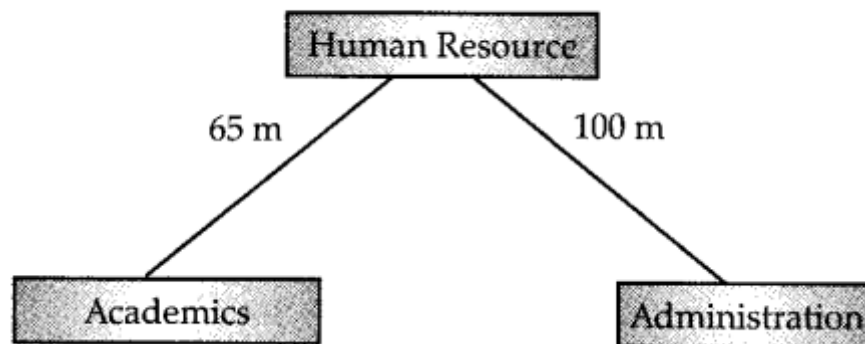
BLOCK	No. of Computers
Human Resources	155
Administration	20
Academics	100
Delhi Head Office	20

1. Suggest the most suitable block in the Bengaluru Office Setup, to host the server.  
Give a suitable reason with your suggestion.
2. Suggest the cable layout among the various blocks within the Bengaluru Office Setup for connecting the Blocks.
3. Suggest a suitable networking device to be installed in each of the blocks essentially required for connecting computers inside the blocks with fast and efficient connectivity.
4. Suggest the most suitable media to provide secure, fast and reliable data connectivity between Delhi Head Office and the Bengaluru Office Setup.

**Answer:**

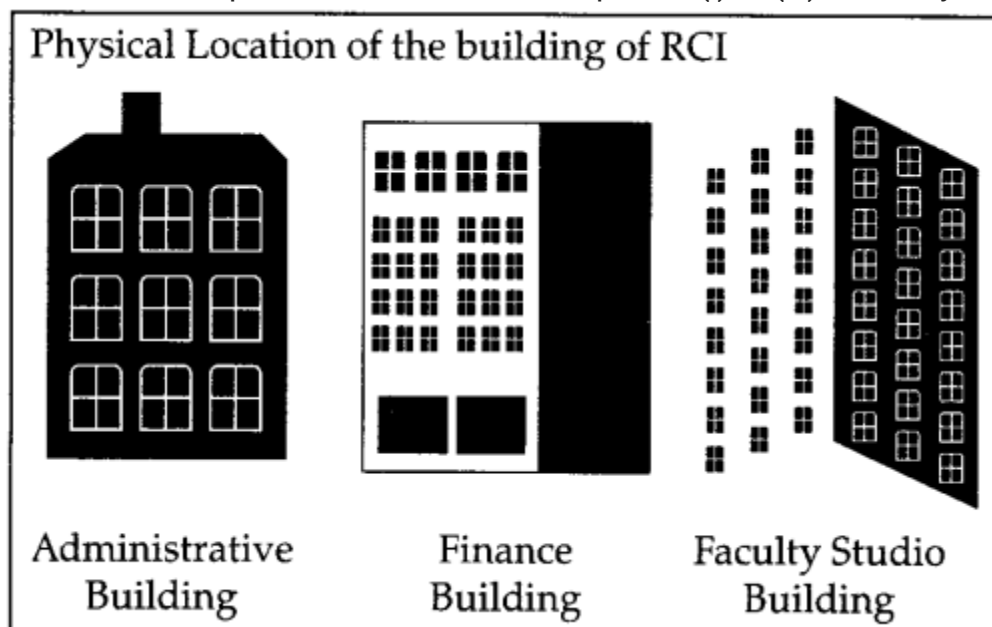
1. Human Resources because it has maximum number of computers.

(ii)



- 2.
3. Switch 1
4. Satellite link

**48:** Rovenza Communications International (RCI) is an online corporate training provider company for IT related courses. The company is setting up their new campus in Kolkata. You as a network expert have to study the physical locations of various blocks and the number of computers to be installed. In the planning phase, provide the best possible answers for the queries (i) to (iv) raised by them.



**Block to Block Distances(in Mtrs.)**

From	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio Building	120
Finance Building	Faculty Studio Building	70

**Expected computers to be installed in each block**

Buildings	Computers
Administrative Building	20
Finance Building	40
Faculty Studio Building	120

1. Suggest the most appropriate block, where RCI should plan to install the server.
2. Suggest the most appropriate block to block cable layout to connect all three blocks for efficient communication.
3. Which type of network out of the following is formed by connecting the computers of these three blocks?
  - LAN
  - MAN
  - WAN
4. Which wireless channel out of the following should be opted by RCI to connect to students from all over the world?
  - Infrared
  - Microwave
  - Satellite
5. Write two advantages of using open source software over proprietary software.
6. Which of the following crime(s) does not come under cybercrime?
  - Copying some important data from a computer without taking permission from the owner of-the data.
  - Stealing keyboard and mouse from a shop.
  - Getting into unknown person's social networking account and start messaging on his behalf.

**Answer:**

1. Faculty Recording Block.
2. Star topology
3. LAN
4. Satellite connection
5. Advantages of open source over proprietary software:

- Open source software's source code is available, can be modified copied & distributed while proprietary software can't be change.
  - Open source is free while proprietary a paid.
6. (c) Stealing keyboard & mouse from a shop.4

**49:**Identify the type of topology on the basis of the following:

- Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.
- It has a single common data path connecting all the nodes.

**Answer:**

1. Star Topology
2. Bus Topology

(ii) Expand the following

1. VOIP
2. SMTP

**Answer:**

1. Voice Over Internet Protocol
2. Simple Mail Transder Protocol

(iii) Who is a hacker?

**Answer:**

A computer enthusiast, who uses his computer programming skill to intentionally access a computer without authorization is known as hacker. A hacker accesses the computer without the intention of destroying data or maliciously harming the computer.

(iv) The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points. 140.179.220.200

What is it? What is its importance?

**Answer:**

It is an IP Address. It is used to identify the computers on a network.

(v) Daniel has to share the data among various computes of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.

**Answer:**

MAN

(vi)Rehaana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:





Distances between various buildings are as follows :

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packging Unit	125 m
Store to Research Lab	180 m

**Number of Computers:**

Accounts	25
Reserach Lab	100
Store	15
Packging Unit	60

As a network expert, provide the best possible answer for the following queries:

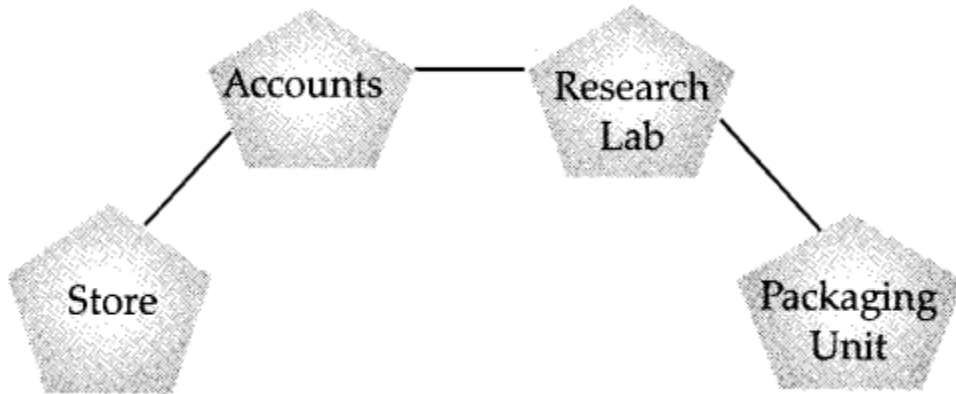
1. Suggest a cable layout of connections between the buildings.
2. Suggest the most suitable place (i.e. building) to house the server of this organization.
3. Suggest the placement of the following device with justification:
4. Repeater (b) Hub/Switch
5. Suggest a system (hardware/software) to prevent unauthorized access to or from the network.

**Answer:**

1. Layout 1

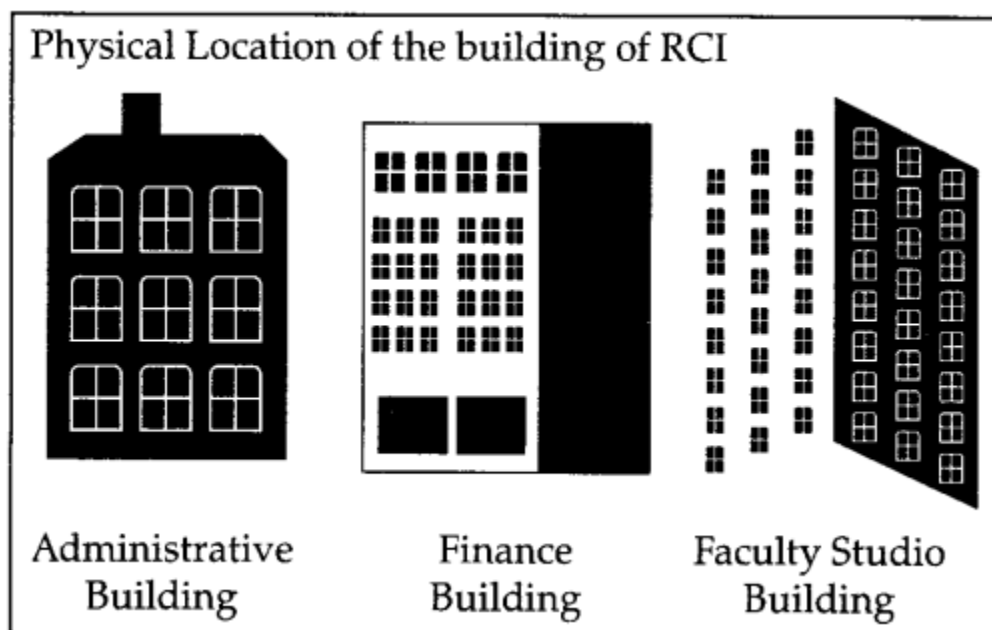


2. The most suitable place / building to house the server of this organization would be building Research Lab, as this building contains the maximum number of computers.
3. Since the cabling distance between Accounts to Store is quite large, so a repeater would ideally be needed along their path to avoid loss of signals during the course of data flow in this route.
4. Firewall.



**50:**What is the difference between domain name and IP address?

1. Write two advantages of using an optical fibre cable over an Ethernet cable to connect two service stations, which are 190 m away from each other.
2. Expertfa Profsssional Global (EPG) is an online, corporate training provider company for IT related courses. The company is setting up their new campus in Mumbai. You as a network expert have to study the physical locations of various buildings and the number of computers to be installed. In the planning phase, provide the best possible answer for the



**Building to Building distances (in Mtrs.)**

From	To	Distance
Administrative Building	Finance Building	60
Administrative Building	Faculty Studio Building	120
Finance Building	Faculty Studio Building	70

Buildings	Computers
Administrative Building	20
Finance Building	40
Faculty Studio Building	120

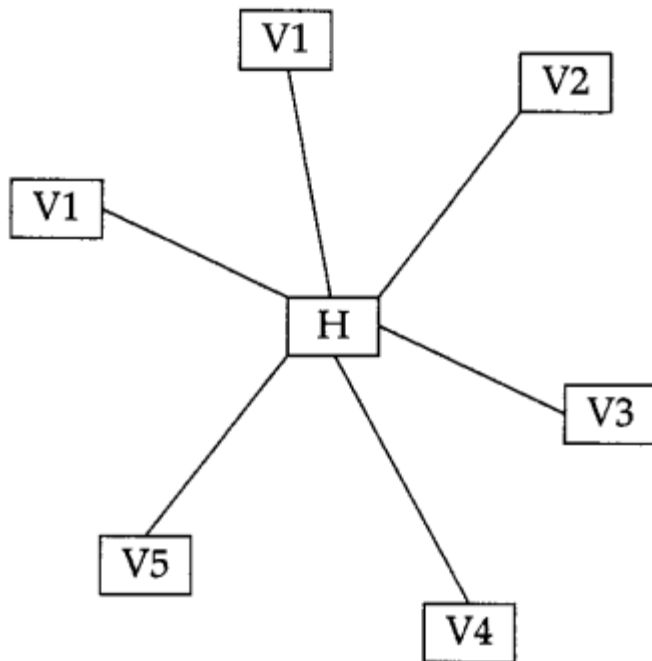
1. Suggest the most appropriate building, where EPG should plan to install the server.
2. Suggest the most appropriate building to building cable layout to connect all three buildings for efficient communication.
3. Which type of network out of the following is formed by connecting the computers of these three buildings?
  - LAN
  - MAN
  - WAN
4. Which wireless channel out of the following should be opted by EPG to connect to students of all over the world?
  - Infrared
  - Microwave
  - Satellite

### Answer:

1. Domain Name is alphanumeric address of a resource over network IP address is a Numeric Address of a resource in a Network.  
**Example:**  
 Domain Name 1  
 www.Gabsclasses.com  
 IP Address  
 102.112.0.153
2. Optical fibre Advantages:
  - Faster Communication.
  - Free from electrical & Noise interference.
3. (a) Faculty Studio Building  
 (b) Bus Topology

- (c) LAN
- (d) Satellite

**51:** To provide telemedicine facility in a hilly state, a computer network is to be setup to connect hospitals in 6 small villages (V1, V2, ..., V6) to the base hospital (H) in the state capital. This is shown in the following diagram.



No village is more than 20 km away from the state capital.

Imagine yourself as a computer consultant for this project and answer the following questions with justification:

1. Out of the following what kind of link should be provided to setup this network: Microwave link, Radio Link, Wired Link ?
2. What kind of network will be formed; LAN, MAN, or WAN ?
3. Many times doctors at village hospital will have to consult senior doctors at the base hospital. For this purpose, how should they contact them: using email, sms, telephone, or video conference ?

(b) Out of SMTP and POP3 which protocol is used to receive emails ?

(c) What are cookies in the context of computer networks?

(d) Rajeshwari is trying for on-line subscription to a magazine. For this she has filled in a form on the magazine's web site. When she clicks submit button she gets a message that she has left e-mail field empty and she must fill it. For such checking which type of script is generally executed client side script or server-side script ?

(e) Mention any one difference between free-ware and free software.

**Answer:**

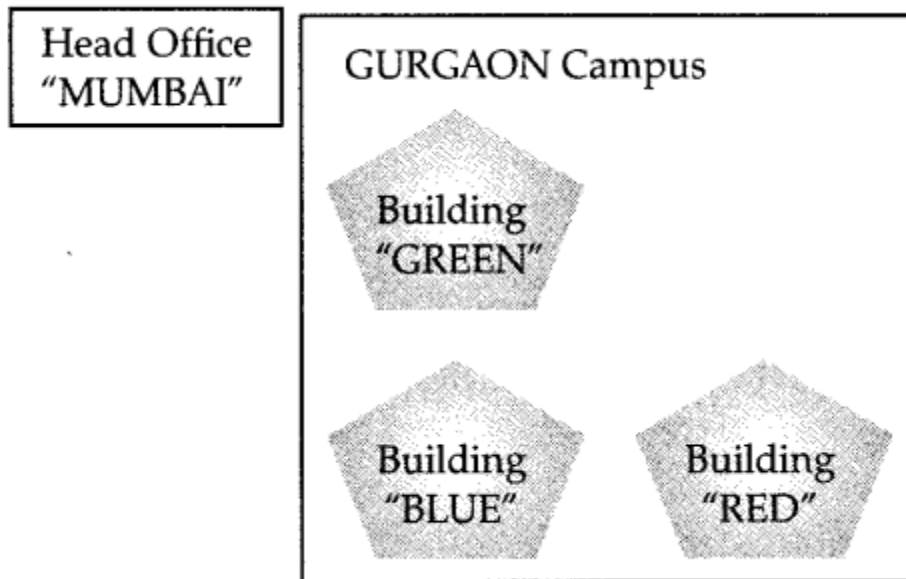
(a)

1. Radio Link
2. MAN

### 3. e-mail

- (b) POP3
- (c) Cookies are files that store user information that is used to identify the user when he logs into the system.
- (d) Server-side script
- (e) Freeware is a software that has the user to get unlimited usage for. Free software may be free for a certain period only.

**52:** Workalot Consultants are setting up a secured network for their office campus at Gurgaon for their day-to-day office and web-based activities. They are planning to have connectivity between three buildings and the head office situated in Mumbai. Answer the questions (i) to (iv) after going through the building positions in the campus and other details, which are given below :



**Distances between various buildings:**

Building "GREEN" to Building "RED"	110 m
Building "GREEN" to Building "BLUE"	45 m
Building "BLUE" to Building "RED"	65 m
Gurgaon Campus to Head Office	1760 km

**Number of computers**

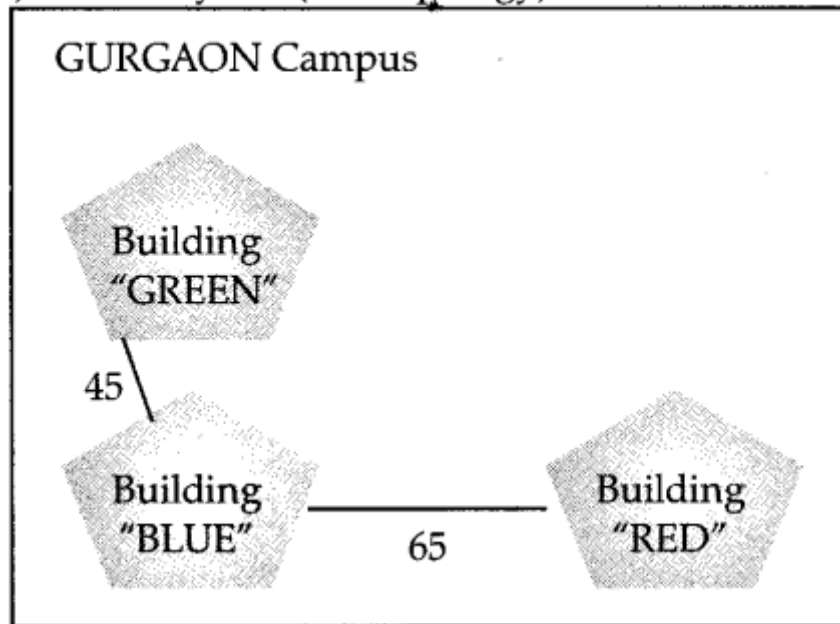
Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

1. Suggest the most suitable place (i.e., building) to house the server of this organization. Also give a reason to justify your suggested location.
2. Suggest a cable layout of connections between the buildings inside the campus.
3. Suggest the placement of the following devices with justification:
  - Repeater.
  - Switch.
4. The organization is planning to provide a high speed link with its head office situated in Mumbai using a wired connection. Which of the following cables will be most suitable for this job ?
  - Optical Fiber
  - Co-axial Cable
  - Ethernet Cable

**Answer:**

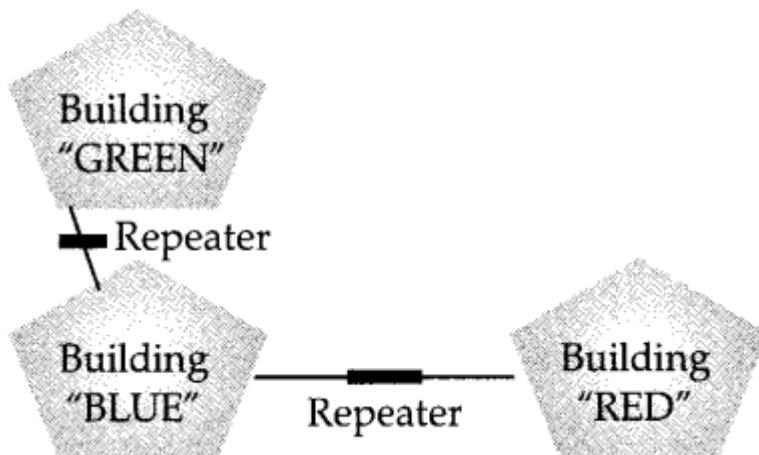
1. The most suitable place to install server is building "RED" because this building have maximum computer which reduce communication delay.

(ii) Cable layout. (Bus topology).

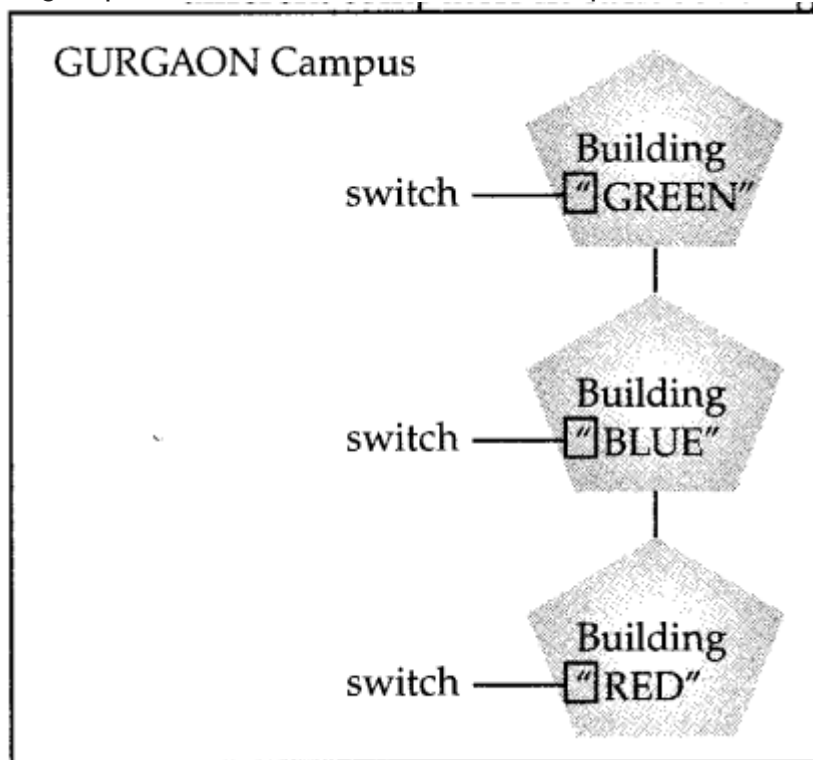


2. (a) Since the cabling distance between buildings GREEN, BLUE and RED are quite large, so a repeater each, would ideally be need along their path to avoid loss of signals during the course of data flow in there routes.

GURGAON Campus

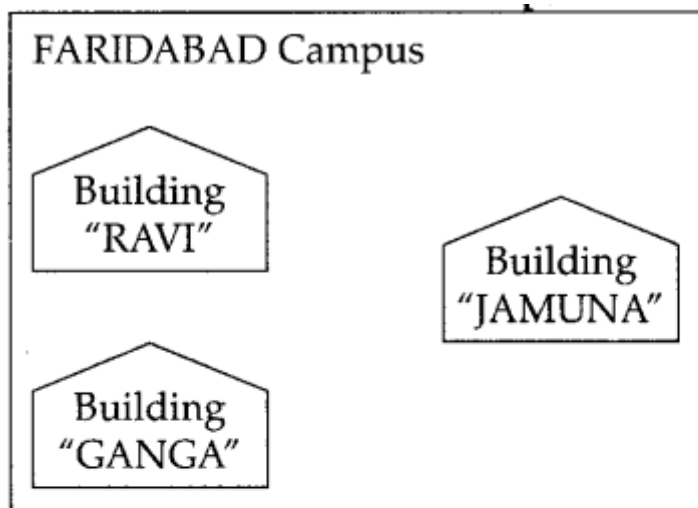


(b) In the layout a switch each, would be needed in all the buildings, to interconnect the group of cables from the different computers in each building.



(iv) Optical fiber

**53:** Granuda Consultants are setting up a secured network for their office campus at Faridabad for their day to day office and web based activities. They are planning to have connectivity between 3 building and the head office situated in Kolkata. Answer the questions (i) to (iv) after going through the building positions in the campus and other details, which are given below:



**Distances between various buildings:**

Building "RAVI" to Building "JAMUNA"	120 m
Building "RAVI" to Building "GANGA"	50 m
Building "GANGA" to Building "JAMUNA"	65 m
Faridabad Campus to Head Office	1460 km

**Number of Computers:**

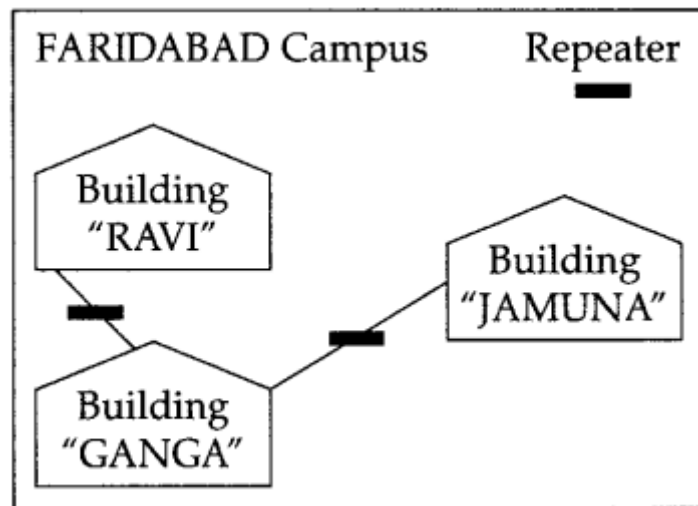
Building "RAVI"	25
Building "JAMUNA"	150
Building "GANGA"	51
Head Office	10

1. Suggest the most suitable place (i.e., block) to house the server of this organization. Also give a reason to justify your suggested location.
2. Suggest a cable layout of connections between the buildings inside the campus.
3. Suggest the placement of the following devices with justification:
  - Repeater
  - Switch
4. The organization is planning to provide a high speed link with its head office situated in the KOLKATA using a wired connection. Which of the following cable will be most suitable for this job?
  - Optical Fibre
  - Co-axial Cable
  - Ethernet Cable

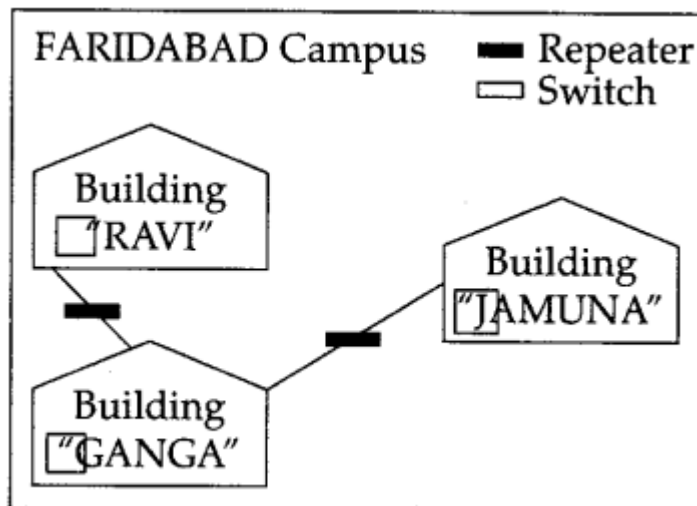
**Answer:**



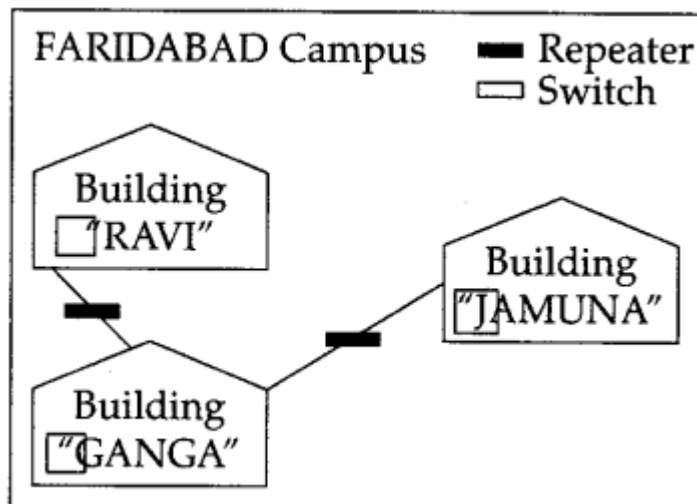
1. The most suitable place to install server is building "JAMUNA" because this building has maximum computers which reduce the communication delay.
2. Cable layout. (Bus topology).



3. (a) Since the cabling distance between buildings GANGA and JAMUNA are quite large, so a repeater each, would ideally be needed along their path to avoid loss of signals during the course of data flow in these routes.



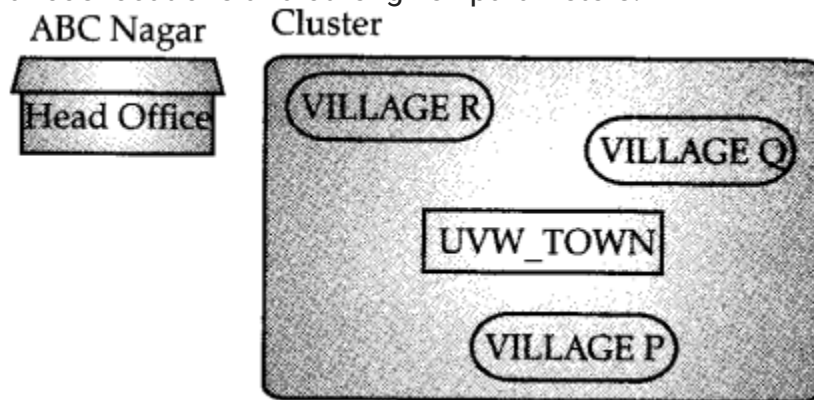
- (b) In the layout a switch in each building, to interconnect the group of cables from the different computers in each building.



#### 4. Optical fiber

**54:** India Skills Hub is a skill development community which has an aim to promote the standard of skills in the society. It is planning to set up its training centres in multiple towns and villages Pan India with its head offices in the nearest cities. They have created a model of their network with a city ABC Nagar, a town (UVW town) and 3 villages.

As a network consultant, you have to suggest the best network related solutions for their issues/ problems raised in (i) to (iv), keeping in mind the distances between various locations and other given parameters.



Shortest distances between various locations :

VILLAGE P TO UVW_TOWN	1.5 KM
VILLAGE Q TO UVW_TOWN	2.0 KM
VILLAGE R TO UVW_TOWN	1.0 KM
VILLAGE P TO VILLAGE Q	2.5 KM
VILLAGE P TO VILLAGE R	4.0 KM
VILLAGE Q TO VILLAGE R	2.3 KM
ABC Nagar Head Office to Cluster	28 KM

Number of computers installed at various locations are as follow :

UVW_TOWN	150
VILLAGE P	10
VILLAGE Q	15
VILLAGE R	20
ABC Nagar Head Office	5

**Note:**

– In Villagers, there are community centers, in which one room has been given as

training entrer to this organization to install computers.

– The organization has got financial support from the government and top Multinational Organizations.

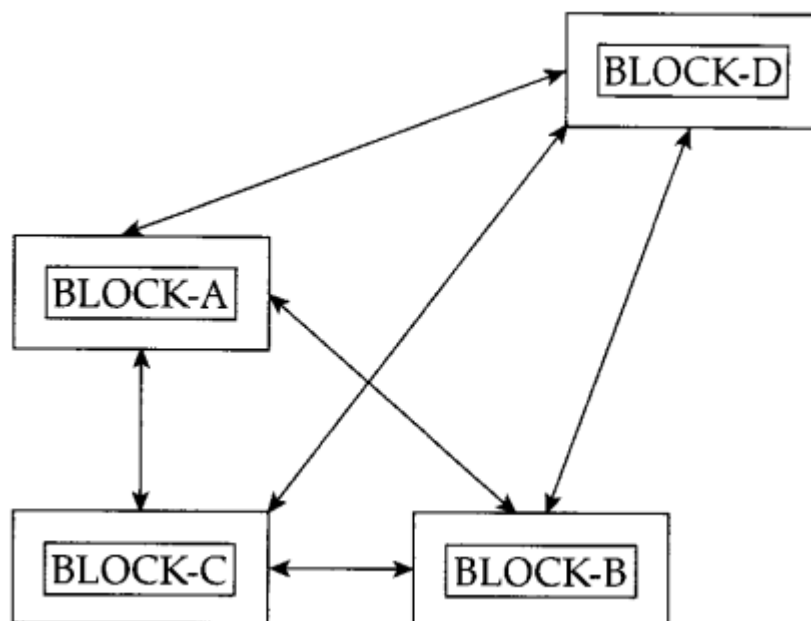
1. Suggest the most appropriate location of the SERVER in the Cluster (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
2. Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the Cluster.
3. Which hardware device will you suggest to connect all the computers within each location of
4. Which service/protocol will be most helpful to conduct live interactions of Expersts from Head Office and people at all locations of Cluster?

**Answer:**

1. Best location for the server is UVW-TOWN, because it is approximately equidistant from the village P, Q and R.
2. For connectivity between UVW-TOWN to head office is optic Fiber and to connect the villages, P, Q and R with server at UVW- TOWN is co-axial cable.
3. The villages R Q and R can be connected with server at UVW-TOWN by a Hub and the head office is connected by a Bus topology.
4. Between head office and UVWTOWN we recommend for Bus topology, so HTTP protocol and other terminal can be connected by UDP or FTP protocols.

**55:** Mudra publishing is a group of companies engaged in publishing IT related books located in the hilly area of Shimla. The companies are located in four different, blocks whose layout is shown in the following figure. Answer the questions (i) to (iv) with the relevant justifi-cations.

**Mudra publishing**



**Distance between various Blocks :**

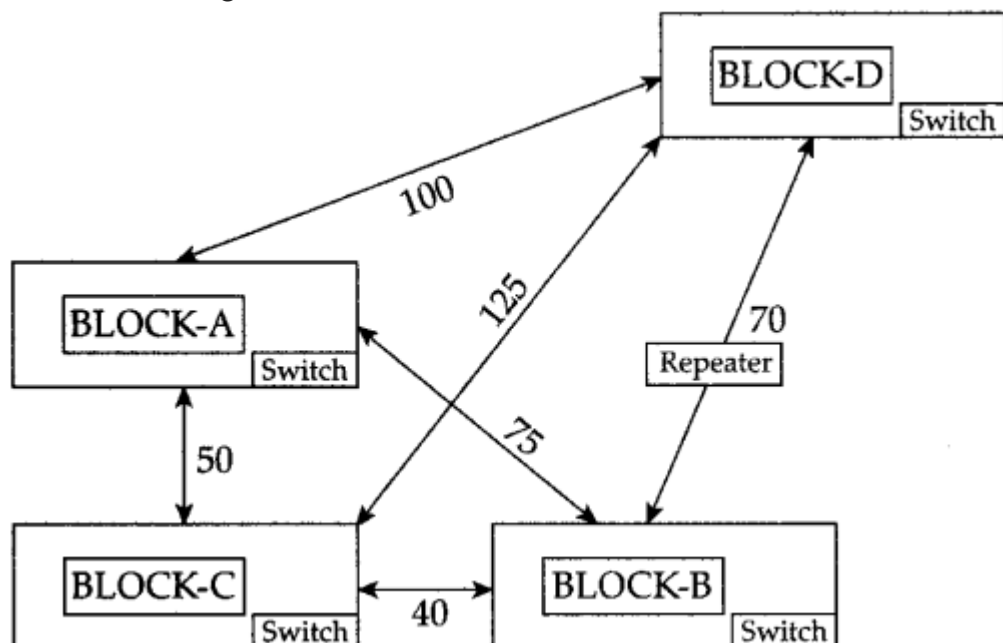
1. Block A to Block C is 50 m
  2. Block A to Block D is 100 m
  3. Block B to Block C is 40 m
  4. Block B to Block D is 70 m
  5. Block C to Block D is 125 m
- Number of Computers
6. Block A is 25
  7. Block B is 50
  8. Block C is 20
  9. Block D is 120

1. Suggest a suitable network topology between the blocks.
2. Which is the most suitable block to house the server of this organization?
3. Suggest the placement of the following devices with justification
  - Repeater
  - Switch
4. The organization is planning to link the whole blocks to its marketing Office in Delhi. Since cable connection is not possible from Shimla, suggest a way to connect it with high speed.

**Answer:**

1. Suitable topology is bus topology.
2. The most suitable block for hosting server is BLOCK-D because this block has maximum number of computers.

**Mudra Publishing**



3. Switch is a device used to segment network into different sub-networks so switch will exist in all the blocks. Since distance between BLOCK-D and BLOCK-C is large so repeater will be install between BLOCK-D and BLOCK-C.
4. The most economic way to connect it with a reasonable high speed would be the use radiowave transmission, as they are easy to install,

can travel long distance and penetrate buildings easily, so they are used for communication, both indoors and outdoors. Radiowaves also have the advantage of being omni-directional. They can travel in all the directions from the source, so that the transmitter and receiver do not have to be carefully aligned physically.

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