

BRAIN INTERNATIONAL SCHOOL

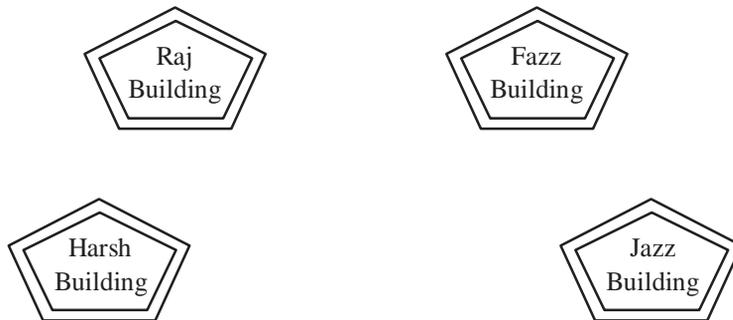
Computer Science Assignment

Class XII

April' 2021

Computer Network

1. Ravya Industries has set up its new centre at Kaka Nagar for its office and web based activities. The company compound has 4 buildings as shown in the diagram below:



Centre to centre distance between various buildings is as follows:

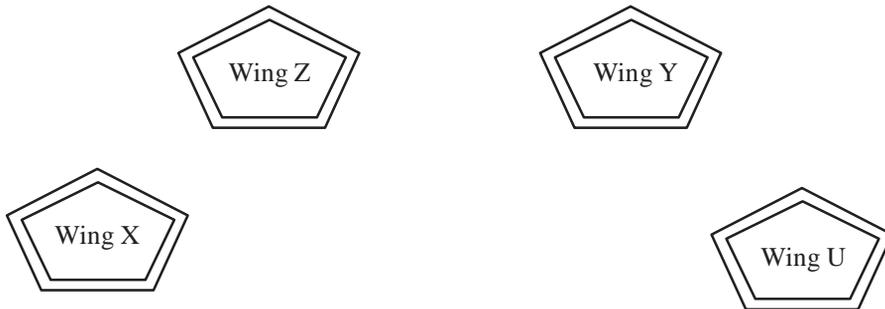
Harsh Building to Raj Building	50 m
Raj Building to Fazz Building	60 m
Fazz Building to Jazz Building	25 m
Jazz Building to Harsh Building	170 m
Harsh Building to Fazz Building	125 m
Raj Building to Jazz Building	90 m

Number of Computers in each of the building is as follows:

Harsh Building	15
Raj Building	150
Fazz Building	15
Jazz Building	25

- Suggest a cable layout of connections between the buildings.
- Suggest the most suitable place (*i.e.*, building) to house the server of this organization with a suitable reason.
- Suggest the placement of the following devices with justification:
 - Internet Connecting Device/Modem
 - Switch
- The organization is planning to link its sale counter situated in various parts of the same city, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

2. The Great Brain Organization has set up its new Branch at Srinagar for its office and web based activities. It has 4 Wings of buildings as shown in the diagram:



Center to center distance between various blocks

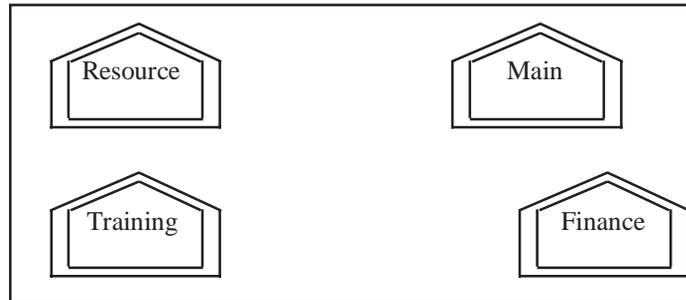
Wing X to Wing Z	50 m
Wing Z to Wing Y	70 m
Wing Y to Wing X	125 m
Wing Y to Wing U	80 m
Wing X to Wing U	175 m
Wing Z to Wing U	90 m

Number of Computers:

Wing X	50
Wing Z	30
Wing Y	150
Wing U	15

- (i) Suggest most suitable cable layout of connections between the Wings and topology.
- (ii) Suggest the most suitable place (*i.e.*, Wing) to house the server of this organization with a suitable reason, with justification.
- (iii) Suggest the placement of the following devices with justification:
 - (1) Repeater
 - (2) Hub/Switch
- (iv) The organization is planning to link its head office situated in Delhi with the offices at Srinagar. Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer.

3. “Learn Together” is an educational NGO. It is setting up its new campus at Jabalpur for its web based activities. The campus has 4 compounds as shown in the diagram below:



Center to center distance between various Compounds as per architectural drawings (in Metre) is as follows:

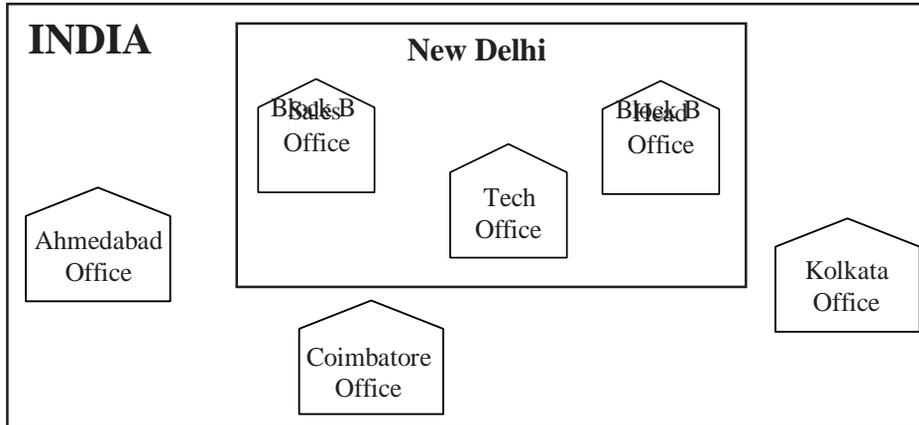
Main Compound to Resource Compound	110 m
Main Compound to Training Compound	115 m
Main Compound to Finance Compound	35 m
Resource Compound to Training Compound	25 m
Resource Compound to Finance Compound	135 m
Training Compound to Finance Compound	100 m

Expected Number of Computers in each Compound is as follows:

Main Compound	5
Resource Compound	15
Training Compound	150
Finance Compound	20

- Suggest a cable layout of connections between the compounds.
 - Suggest the most suitable place (*i.e.*, compound) to house the server for this NGO. Also, provide a suitable reason for your suggestion.
 - Suggest the placement of the following devices with justification:
 - Repeater
 - Hub/Switch
 - The NGO is planning to connect its International office in Mumbai, which out of the following wired communication links, will you suggest for very high speed connectivity?
 - Telephone Analog Line
 - Optical Fiber
 - Ethernet Cable
4. Hindustan Connecting World Association is planning to start its offices in four major cities in India to provide regional IT infrastructure support in the field of Education & Culture. The company has planned to set up its head office in New Delhi at three locations and has named its New Delhi offices as “Sales Office”, “Head office” and “Tech Office”. The company’s regional offices are located at “Coimbatore”, “Kolkata” and “Ahmedabad”.

A rough layout of the same is as follows:



Approximate distance between these offices as per the network survey team is as follows:

Place From	Place To	Distance
Head Office	Sales Office	10 KM
Head Office	Tech Office	70 Meter
Head Office	Kolkata Office	1291 KM
Head Office	Ahmedabad Office	790 KM
Head Office	Coimbatore Office	1952 KM

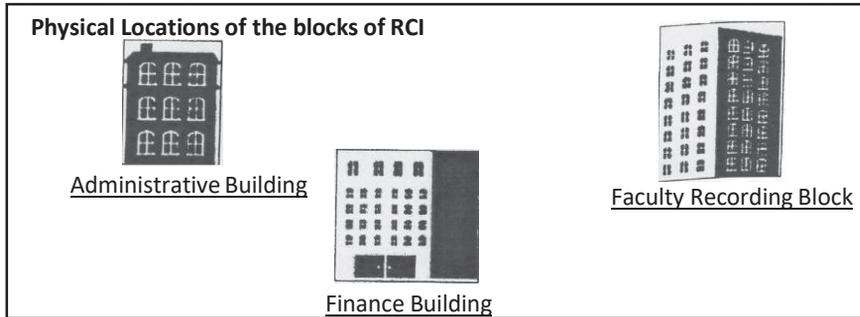
In continuation of the above, the company experts have planned to install the following number of computers in each of their offices:

Head Office	100
Sales Office	20
Tech Office	50
Kolkata Office	50
Ahmedabad Office	50
Coimbatore Office	50

- (v) Suggest network type (out of LAN, MAN, WAN) for connecting each of the following set of their offices:
- Head Office and Tech Office
 - Head Office and Coimbatore Office
- (vi) Which device will you suggest to be procured by the company for connecting all the computers within each of their offices out of the following devices?
- Modem
 - Telephone
 - Switch/Hub
- (vii) Which of the following communication medium, will you suggest to be procured by the company for connecting their local offices in New Delhi for very effective and fast communication?
- Ethernet Cable
 - Optical Fiber
 - Telephone Cable
- (viii) Suggest a cable/wiring layout for connecting the company's local offices located in New Delhi.

Also, suggest an effective method/technology for connecting the company's regional offices- "Kolkata", "Coimbatore" and "Ahmedabad".

5. Expertia Professional Global (EPG) is an online corporatetraining provider company for IT related courses. The company is setting up its 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 answers for the queries (i) to (iv) raised by them.



Building to Building distances (in Mtrs.)

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

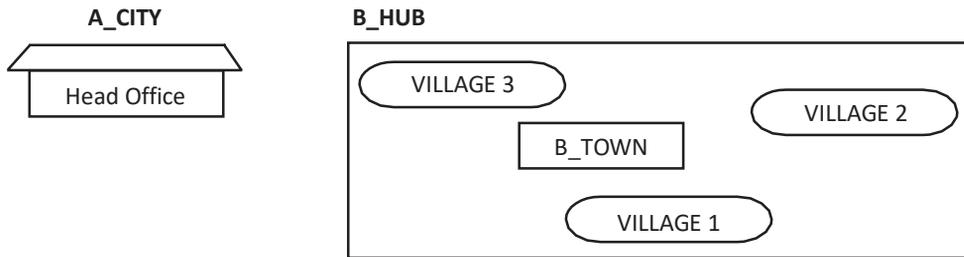
Expected number of computers to be installed in each Building:

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

- (ix) Suggest the most appropriate building, where EPG should plan to install the server.
- (x) Suggest the most appropriate building to setup cable layout to connect all three buildings for efficient communication.
- (xi) Which type of network out of the following is formed by connecting the computers of these three buildings?
- LAN
 - MAN
 - WAN
- (xii) Which wireless channel out of the following should be opted by EPS to connect the students from all over the world?
- Infrared
 - Microwave
 - Satellite

6. Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at

7. Uplifting Skills Hub India is a knowledge and skill community which has as aim to uplift the standard of knowledge and skills in the society. It is planning to setup its training centers 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, a town and 3 villages as follows.



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 1 to B_TOWN	2 KM
VILLAGE 2 to B_TOWN	1.0 KM
VILLAGE 3 to B_TOWN	1.5 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	2.5 KM
A_CITY Head Office to B_HUB	25 KM

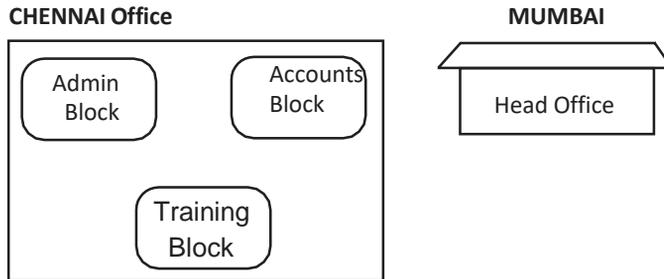
Number of computers installed at various locations are as follows:

B_TOWN	120
VILLAGE 1	15
VILLAGE 2	10
VILLAGE 3	15
A_CITY Head Office	6

Note:

- In Villages, there are community centers, 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.
- (xvii) Suggest the most appropriate location of the SERVER in the B_HUB (out of the 4 locations), to get the best and effective connectivity. Justify your answers.
- (xviii) Suggest the best wired medium and draw the cable layout (location to location) efficiently connecting various locations within the B_HUB.
- (xix) Which hardware device will you suggest to connect all the computers within each location of B_HUB?
- (xx) Which server/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB?

8. Hi Standard Technologies Ltd. is a Mumbai based organization which is expanding its office set-up to Chennai. At Chennai office compound, they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has number of computers, which are required to be connected in a network for communication, data and resource sharing. As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised in (i) to (iv), keeping in mind the distances between various blocks/locations and other given parameters.



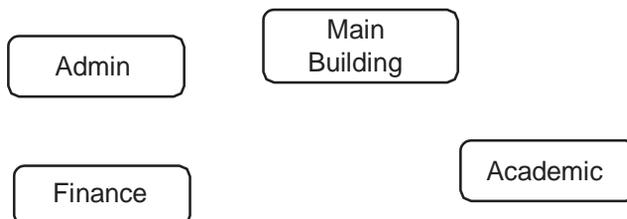
Shortest distances between various blocks/locations:

Admin Block to Accounts Block	300 metres
Accounts Block to Training Block	150 metres
Admin Block to Training Block	200 metres
MUMBAI Head Office to CHENNAI Office	1300 metres

Number of Computers installed at various blocks are as follows:

Training Block	150
Accounts Block	30
Admin Block	40

- (xxi) Suggest the most appropriate block/location to house the SERVER in the CHENNAI Office (out of 3 blocks) to get the best and effective connectivity. Justify your answer.
- (xxii) Suggest the best wired medium and draw the cable layout (Block to Block) efficiently connect various locations within the CHENNAI office compound.
- (xxiii) Suggest a device/software and its placement that would provide data security for the entire network of the CHENNAI office?
- (xxiv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the CHENNAI office.
9. Sanskar University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office & web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions in the campus & other details which are given below:



The distances between various buildings of university are given as:-

Building 1	Building 2	Distance (in mtrs.)
Main	Admin	50
Main	Finance	100
Main	Academic	70
Admin	Finance	50
Finance	Academic	70
Admin	Academic	60

Number of computers:-

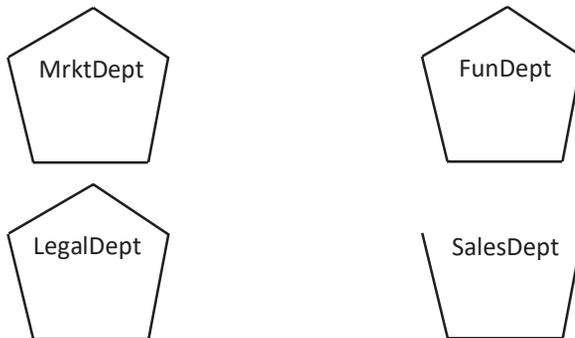
Building	No. of Computers
Main	150
Admin	75
Finance	50
Academic	60

As a network expert, you are required to give best possible solutions for the given queries of the university administration:-

- (a) Suggest cable layout for the connections between the various buildings.
- (b) Suggest the most suitable building to house the server of the network of the university.
- (c) Suggest the placement of following devices with justification:
 1. Switch/Hub
 2. Repeater
- (d) Suggest the technology out of the following for setting-up very fast Internet connectivity among buildings of the university
 1. Optical Fibre
 2. Coaxial cable
 3. Ethernet Cable

10. Ravya Industries has set up its new centre at Kaka Nagar for its office and web based activities. The company compound has 4 buildings. The organization is planning to link its sale counter situated in various parts of the same city. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.
11. Raj Kamal International School is planning to connect all computers, each spread over distance within 45 metres. Suggest an economical cable type having high speed data transfer, which can be used to connect these computers.
12. Ms. Rani Sen, General Manager of Global Nations Corporate, recently discovered that the communication between her company's accounts office and HR office is extremely slow and signals drop quite frequently. These offices are 125 metres away from each other and connected by an Ethernet cable.
 - a. Suggest her a device which can be installed in between the offices for smooth communication.

- b. What type of network is formed by having this kind of connectivity out of LAN, MAN and WAN?
13. Which wireless communication channel is most appropriate in each of the following situations?
- Communication in a hilly area.
 - Very fast communication between two offices in two different countries.
14. Why a switch is called an intelligent hub?
15. Identify the following device:
- A device that is used to connect different types of networks. It performs the necessary translation so that connected networks can communicate properly.
 - A device that converts data from digital bit stream into an analog signal and vice versa.
16. Write one advantage and one disadvantage of using optical fiber cable.
17. SunRise Pvt. Ltd. is setting up the network in the Ahmadabad. There are four departments named as MrktDept, FunDept, LegalDept, SalesDept.



Distance between various buildings is given as follows:

MrktDept to FunDept	80 m
MrktDept to LegalDept	180m
MrktDept to SalesDept	100 m
LegalDept to SalesDept	150 m
LegalDept to FunDept	100 m
FunDept to SalesDept	50 m

Number of Computers in the buildings:

MrktDept	20
LegalDept	10
FunDept	08
SalesDept	42

- Suggest a cable layout of connections between the Departments and specify topology.
 - Suggest the most suitable building to place the server with a suitable reason.
 - Suggest the placement of i) modem ii) Hub /Switch in the network.
- d. The organization is planning to link its sale counter situated in various part of the same city/which type of network out of LAN, WAN, MAN will be formed? Justify.