1. What are the different types of networks?

Ans: 11 Types of Networks in Use Today

1. Personal Area Network (PAN)

The smallest and most basic type of network, a PAN is made up of a wireless modem, a computer or two, phones, printers, tablets, etc., and revolves around one person in one building. These types of networks are typically found in small offices or residences, and are managed by one person or organization from a single device.

2. Local Area Network (LAN)

We're confident that you've heard of these types of networks before – LANs are the most frequently discussed networks, one of the most common, one of the most original and one of the simplest types of networks. LANs connect groups of computers and low-voltage devices together across short distances (within a building or between a group of two or three buildings in close proximity to each other) to share information and resources. Enterprises typically manage and maintain LANs.

Using routers, LANs can connect to wide area networks (WANs, explained below) to rapidly and safely transfer data.

3. Wireless Local Area Network (WLAN)

Functioning like a LAN, WLANs make use of wireless network technology, such as Wi-Fi. Typically seen in the same types of applications as LANs, these types of networks don't require that devices rely on physical cables to connect to the network.

4. Campus Area Network (CAN)

Larger than LANs, but smaller than metropolitan area networks (MANs, explained below), these types of networks are typically seen in universities, large K-12 school districts or small businesses. They can be spread across several buildings that are fairly close to each other so users can share resources.

5. Metropolitan Area Network (MAN)

These types of networks are larger than LANs but smaller than WANs – and incorporate elements from both types of networks. MANs span an entire geographic area (typically a town or city, but sometimes a campus). Ownership and maintenance is handled by either a single person or company (a local council, a large company, etc.).

6. Wide Area Network (WAN)

Slightly more complex than a LAN, a WAN connects computers together across longer physical distances. This allows computers and low-voltage devices to be remotely connected to each other over one large network to communicate even when they're miles apart.

The Internet is the most basic example of a WAN, connecting all computers together around the world. Because of a WAN's vast reach, it is typically owned and maintained by multiple administrators or the public.

7. Storage-Area Network (SAN)

As a dedicated high-speed network that connects shared pools of storage devices to several servers, these types of networks don't rely on a LAN or WAN. Instead, they move storage resources away from the network and place them into their own high-performance network. SANs can be accessed in the same fashion as a drive attached to a server. Types of storage-area networks include converged, virtual and unified SANs.

8. System-Area Network (also known as SAN)

This term is fairly new within the past two decades. It is used to explain a relatively local network that is designed to provide high-speed connection in server-to-server applications (cluster environments), storage area networks (called "SANs" as well) and processor-to-processor applications. The computers connected on a SAN operate as a single system at very high speeds.

9. Passive Optical Local Area Network (POLAN)

As an alternative to traditional switch-based Ethernet LANs, POLAN technology can be integrated into structured cabling to overcome concerns about supporting traditional Ethernet protocols and network applications such as PoE (Power over Ethernet). A point-to-multipoint LAN architecture, POLAN uses optical splitters to split an optical signal from one strand of singlemode optical fiber into multiple signals to serve users and devices.

10. Enterprise Private Network (EPN)

These types of networks are built and owned by businesses that want to securely connect its various locations to share computer resources.

11. Virtual Private Network (VPN)

By extending a private network across the Internet, a VPN lets its users send and receive data as if their devices were connected to the private network – even if they're not. Through a virtual point-to-point connection, users can access a private network remotely.

2. Explain the Shielded twisted pair (STP) and Unshielded twisted pair(UTP)

Ans:

BASIS FOR COMPARISON	UTP	STP

BASIS FOR COMPARISON	UTP	STP
Basic	UTP (Unshielded twisted pair) is a cable with wires that are twisted together.	STP (Shielded twisted pair) is a twisted pair cable enclosed in foil or mesh shield.
Noise and crosstalk generation	High comparatively.	Less susceptible to noise and crosstalk.
Grounding cable	Not required	Necessarily required
Ease of	Easily installed	Installation of

BASIS FOR COMPARISON	UTP	STP
handling	as cables are smaller, lighter, and flexible.	cables is difficult comparatively.
Cost	Cheaper and does not require much maintenance.	Moderately expensive.
Data Rates	Slow comparatively.	Provides high data rates

3. What is difference between baseband and broadband transmission?

Ans: Baseband
Baseband transmissions typically use digital signaling over a single wire; the transmissions themselves take the form of either electrical pulses or light. The digital signal used in baseband transmission occupies the entire bandwidth of the network media to transmit a single data signal. Baseband communication is bidirectional, allowing

computers to both send and receive data using a single cable. However, the sending and receiving cannot occur on the same wire at the same time.

Ethernet networks use baseband transmissions; notice the word "base"—for example, 10BaseT or 10BaseFL.

Using baseband transmissions, it is possible to transmit multiple signals on a single cable by using a process known as *multiplexing*. Baseband uses Time-Division Multiplexing (TDM), which divides a single channel into time slots. The key thing about TDM is that it doesn't change how baseband transmission works, only the way data is placed on the cable.

Broadband
Whereas baseband uses digital signaling, broadband uses analog signals in the form of optical or electromagnetic waves over multiple transmission frequencies. For signals to be both sent and received, the transmission media must be split into two channels. Alternatively, two cables can be used: one to send and one to receive transmissions.

Multiple channels are created in a broadband system by using a multiplexing technique known as *Frequency-Division Multiplexing (FDM)*. FDM allows broadband media to accommodate traffic going in different directions on a single media at the same time.

4. What is the difference between a hub, modem, router and a switch?

Ans: Hubs, switches, and routers are all devices that let you connect one or more computers to other computers, networked devices, or even other networks. Each has two or more connectors called ports, into which you plug the cables to make the connection.

- Hubs are "dumb" devices that pass on anything received on one connection to all other connections.

- Switches are semi-intelligent devices that learn which devices are on which connection.
- Routers are essentially small computers that perform a variety of intelligent tasks.
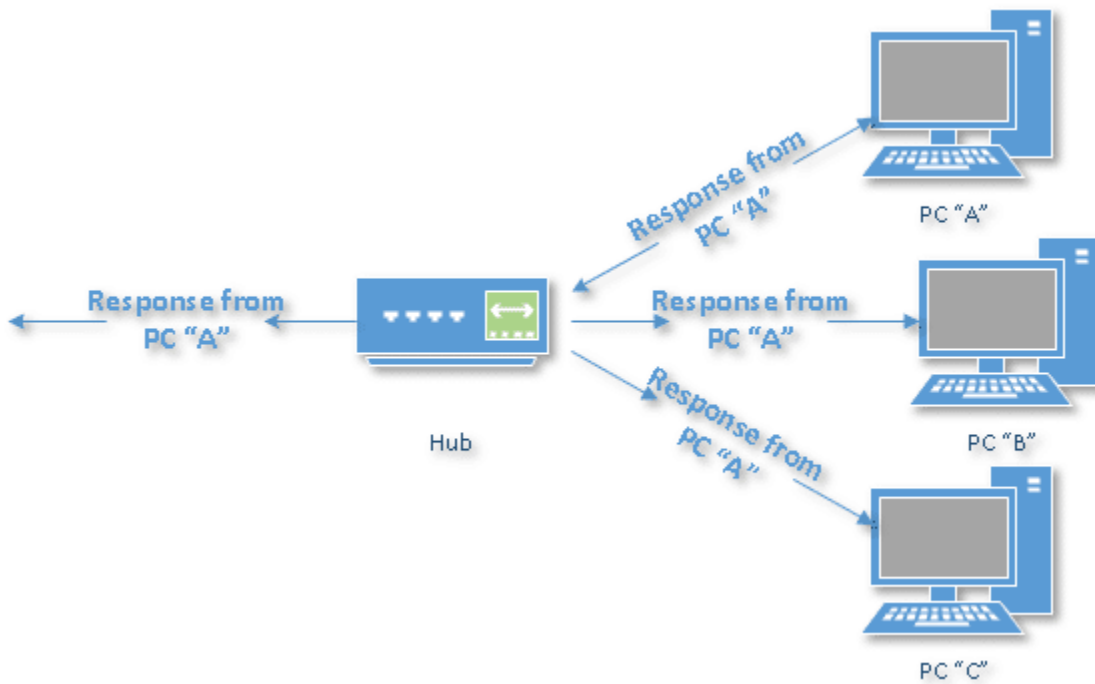
Hubs

A hub is the least expensive, least intelligent, and least complicated of the three. Its job is very simple: anything that comes in one port is sent out to the others. That's it.

If a message[1] comes in destined for computer "A", that message is sent out to all the other ports, regardless of which computer "A" is.
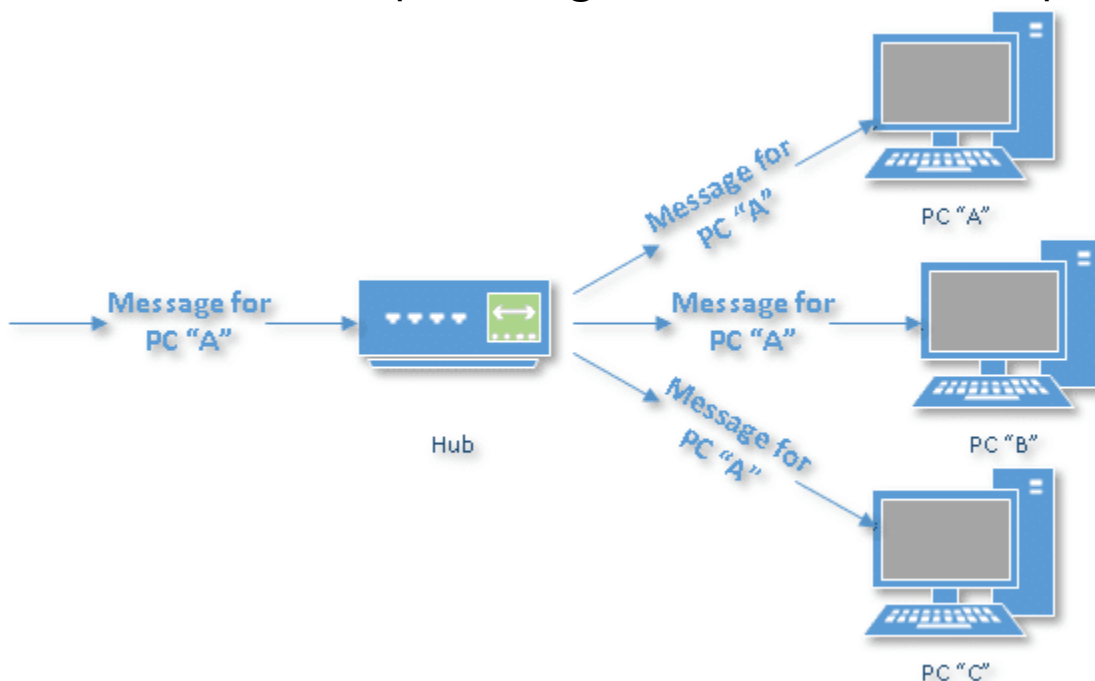
Incoming data passing through a hub.
When computer "A" responds, its response also goes out to every other port on the hub.

Returned response passing through a hub.

Every computer connected to the hub "sees" everything every other computer on the hub does. It's up to the computers themselves to decide if a message is for them and whether or not it should be paid attention to. The hub itself is blissfully ignorant of the data being transmitted.

For many years, hubs were quick and easy ways to connect computers in small networks. In recent years, hubs aren't as common, and switches have come into greater use.
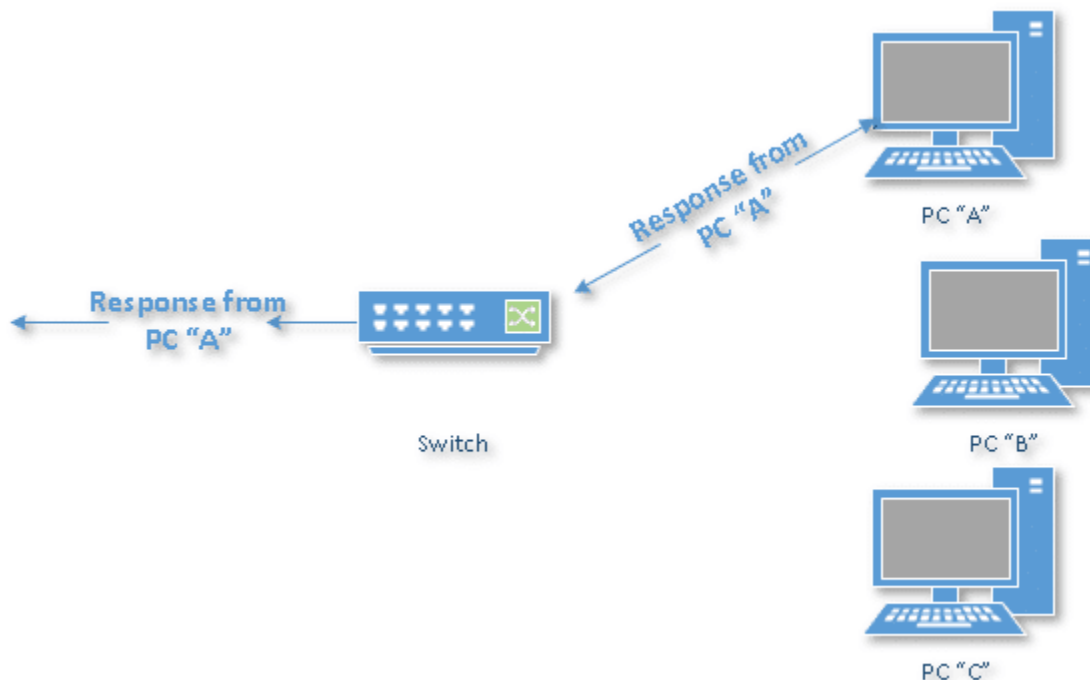
Switches

A switch does what a hub does, but more efficiently. By paying attention to the traffic that comes across it, it learns which computers are connected to which port.

Initially, a switch knows nothing, and simply sends on incoming messages to all ports.
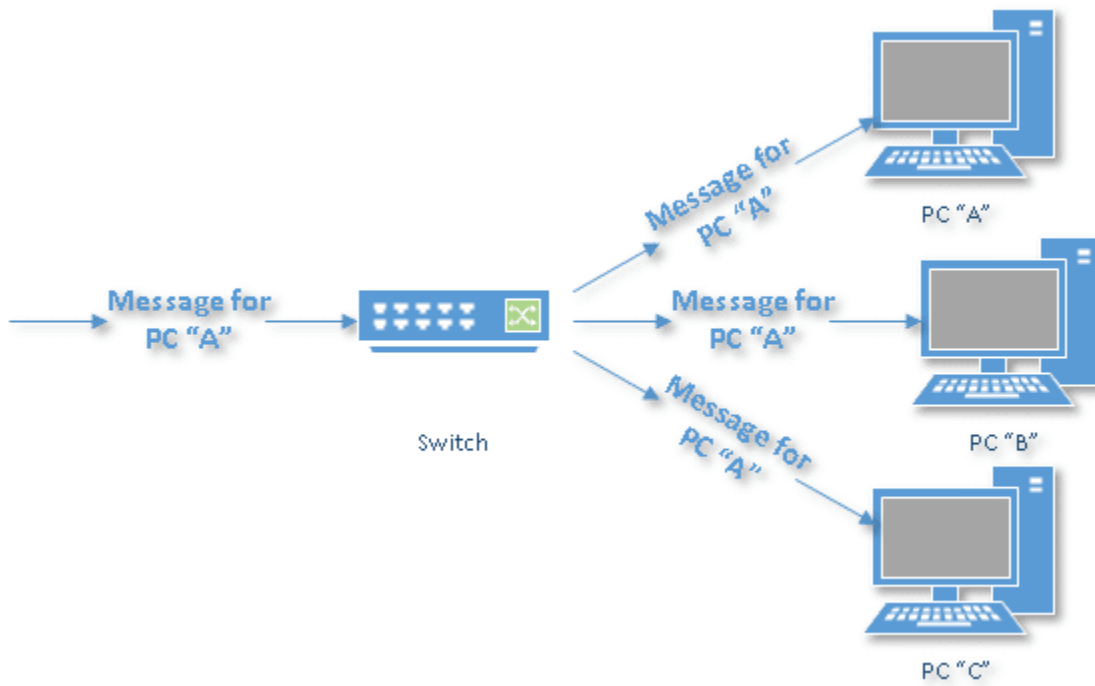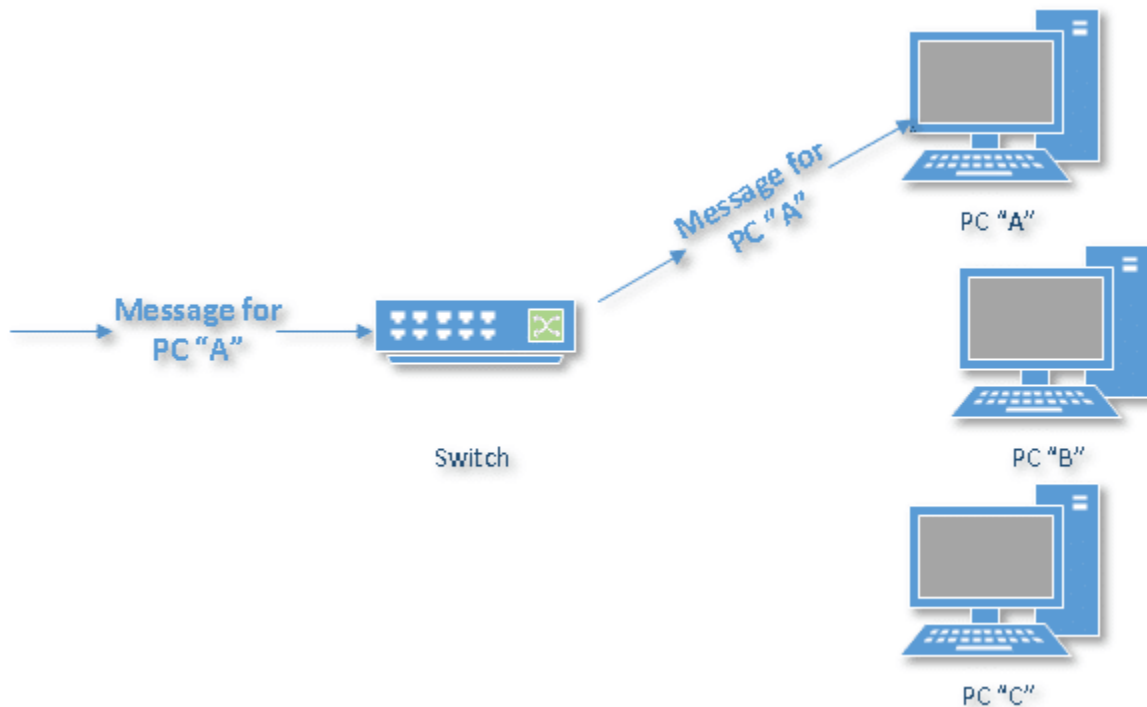
Incoming data passing through a switch.

Just by accepting that first message, however, the switch has learned something: it knows on which connection the *sender* of the message is located. Thus, when machine "A" responds to the message, the switch only needs to send that message out to the one connection.

Returned response passing through a switch.

By processing the response, the switch has learned something else: it now knows on which connection machine "A" is located. That means

subsequent messages destined for machine "A" need only be sent to that one port.

Second incoming message passing through a switch.

Switches learn the location of the devices they are connected to almost instantaneously. The result is, most network traffic only goes where it needs to, rather than to every port. On busy networks, this can make the network *significantly* faster.
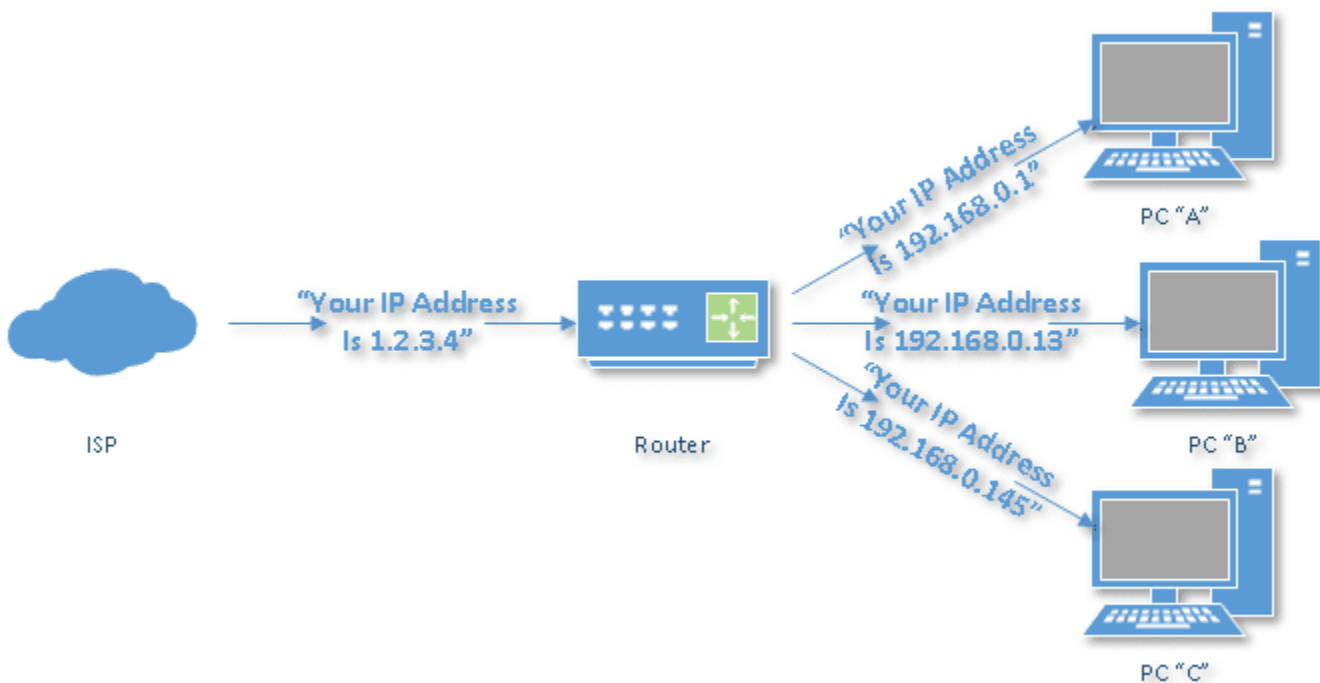
Routers

A router is the smartest and most complicated of the three. Routers come in all shapes and sizes, from small, four-port broadband routers to large industrial-strength devices that drive the internet itself.

One way to think of a router is as a computer[2] that can be programmed to understand, manipulate, and act on the data it handles.

A router operates as a switch for basic routing: it learns the location of the computers sending traffic, and routes information only to the necessary connections.

Consumer-grade routers perform (at minimum) two additional and important tasks: DHCP and NAT.

DHCP — Dynamic Host Configuration Protocol — is how dynamic IP addresses are assigned. When it first connects to the network, a device asks for an IP address to be assigned to it, and a DHCP server responds with an IP address assignment. A router connected to your ISP-provided internet connection will ask your ISP's server for an IP address; this will be your IP address on the internet. Your local computers, on the other hand, will ask the router for an IP address, and these addresses are local to your network.


IP address assignments to and through a router.

NAT — Network Address Translation- – is the way the router *translates* the IP addresses of packets that cross the internet/local network boundary. When computer "A" sends a packet, the IP address that it's "from" is that of computer "A" — 192.168.0.1, in the example above. When the router passes that on to the internet, it replaces the local IP address with the internet IP address assigned by the ISP — 1.2.3.4, in the example. It also keeps track, so if there's a response the router knows to do the translation in reverse, replacing

the internet IP address with the local IP address for machine "A", and then sending that response packet on to machine "A".

A side effect of NAT is that machines on the internet cannot *initiate* communications to local machines; they can only respond to communications initiated by them. This means that the router also acts as an effective <u>firewall</u>.
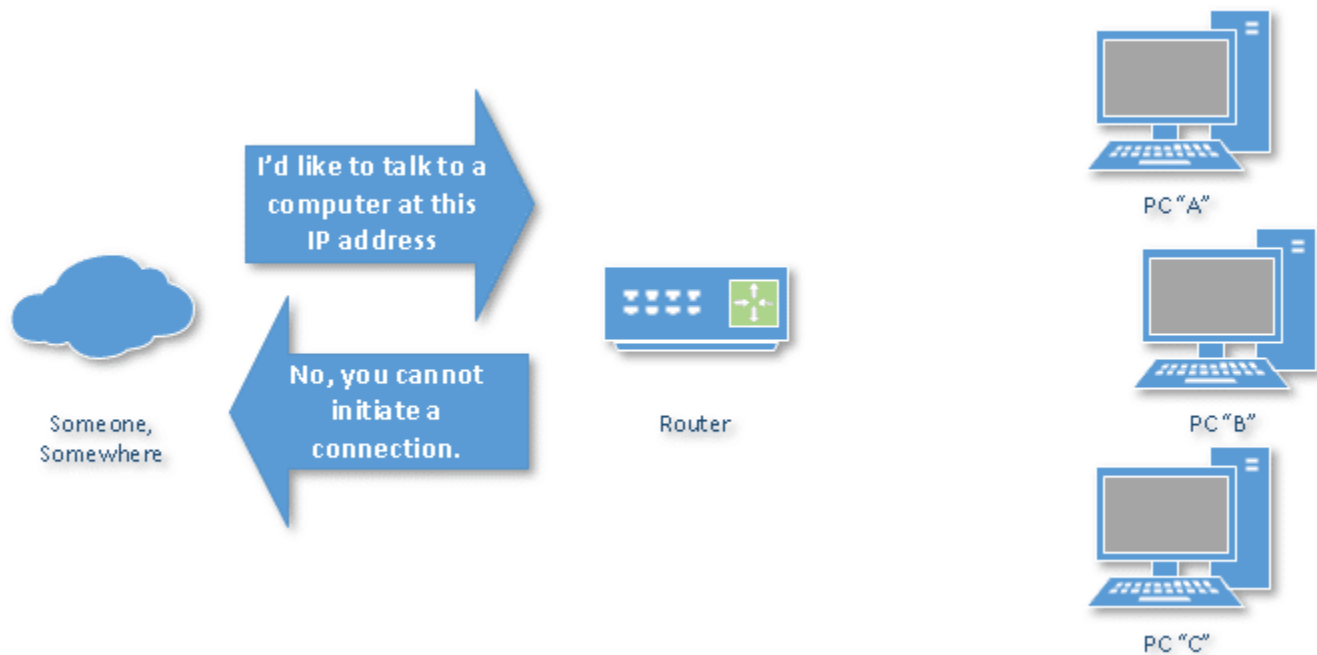
Router acting as a firewall blocking outside access.

<u>Malware</u> that spreads by trying to independently connect to your computer over the network cannot do so.

All routers include some kind of user interface for configuring how the router treats traffic. Really large routers include the equivalent of a full-blown programming language to describe how they should operate, as well as the ability to communicate with other routers to describe or determine the best way to get network traffic from point A to point B.

Your modem is a box that connects your home network to the wider Internet. A router is a box that lets all of your wired and wireless devices use that Internet connection at once and also allows them to talk to one another without having to do so over the Internet. Often, your Internet service provider will give you one box that serves as both modem and router, but they're still different technologies; not all modems include routers and not all routers have modems. You need

both, integrated or not, in order to provide an Internet connection for all the devices in your home.

We recommend using a separate modem and router, if you can. Since modem technology changes slowly, you can usually use a modem for years, until it breaks, but you might need to replace a router because you want better coverage, because you've added more devices to your network and your old router isn't keeping up, or because you want to take advantage of the latest improvements in Wi-Fi technology. You can often save money on your monthly Internet bill if you buy your own modem and router instead of using the ones your ISP provides, though this is usually true only if you have cable Internet, not DSL or fiber, and the situation is more complicated if you get phone service from your ISP as well.

5. When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well?

Ans: The Media Access Control address (MAC address) for any network adapter is hard coded into the card itself. Each manufacturer of network adapters has a group of characters assigned that refer specifically to that company. I believe that is the first 1/2 of the MAC address which is 12 hexadecimal characters long. But the MAC address is part and parcel of the network adapter, just as your internal organs are part of you. When you move to a new house, you take your liver with you. In the same way, when you move a NIC to a different computer, it takes its MAC address with it.

6. When troubleshooting computer network problems, what common hardware-related problems can occur?

Ans: We have to check the LAN DRIVER Has been installed.

Most of the time, the troubleshootings comes from cables (Optical fibers included).

7. In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program?

Ans: The best solution is to install anti-virus on all the computers in the network. This will protect each device from the other in case some malicious user tries to insert a virus into the servers or legitimate users.

8. Define Static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.

Ans: Difference between Static and Dynamic IP address:

S.NO	STATIC IP ADDRESS	DYNAMIC IP ADDRESS
1.	It is provided by ISP(Internet Service Provider).	While it is provided by DHCP (Dynamic Host Configuration Protocol).
2.	Static ip address does not change any time, it means if a static ip address is provided then it can't be	While dynamic ip address change any time.

S.NO	STATIC IP ADDRESS	DYNAMIC IP ADDRESS
	changed or modified.	
3.	Static ip address is less secure.	While in dynamic ip address, there is low amount of risk than static ip address's risk.
4.	Static ip address is difficult to designate.	While dynamic ip address is easy to designate.
5.	The device designed by static ip address can be trace.	But the device designed by dynamic ip address can't be trace.
6.	Static ip address is	While dynamic ip

S.NO	STATIC IP ADDRESS	DYNAMIC IP ADDRESS
	more stable than dynamic ip address.	address is less stable than static ip address.
7.	The cost to maintain the static ip address is higher than dynamic ip address.	While the maintaining cost of dynamic ip address is less than static ip address.
8.	It is used where computational data is less confidential.	While it is used where data is more confidential and needs more security.

9. Discuss TCP/IP model in detail.

Ans: TCP/IP means Transmission Control Protocol and Internet Protocol. It is the network model used in the current Internet architecture as well. **Protocols** are set of rules which govern every possible communication over a network. These protocols describe the movement of data between the source and destination or the internet. They also offer simple naming and addressing schemes.

10. What is a Web Browser (Browser)? Give some example of browsers.

Ans: A web browser is a type of software that allows you to find and view websites on the Internet. Even if you didn't know it, you're using a web browser right now to read this page! There are many different web browsers, but some of the most common ones include Google Chrome, Internet Explorer, Safari, Microsoft Edge, and Mozilla Firefox.

11. What is a search engine? Give example.

Ans: A search engine is a web-based tool that enables users to locate information on the World Wide Web. Popular examples of search engines are Google, Yahoo!, and MSN Search. Search engines utilize automated software applications (referred to as robots, bots, or spiders) that travel along the Web, following links from page to page, site to site. The information gathered by the spiders is used to create a searchable index of the Web.

12. What is the Internet & WWW? What are the uses of internet in our daily life?

Ans: *The Internet* is a global network of networks while *the Web*, also referred formally as World Wide Web (www) is collection of information which is accessed via *the Internet.* Another way to look at this difference is; *the Internet* is infrastructure while *the Web* is service on top of that infrastructure. Alternatively, *the Internet* can be viewed as a big book-store while *the Web* can be viewed as collection of books on that store. At a high level, we can even think of *the Internet* as hardware and *the Web* as software!

1. Online Booking

Online booking is an astonishing tool on the internet. By this, we can book a train ticket, flight ticket (International and domestic), and you can book a taxi which will pick-up you from your doorstep.

In the present climate, you do not have to wait in queue for hours for ticket booking at the ticket counter. Now, while sitting at home you can book tickets online with the help of the laptop, tab, or Smartphone provided you should have an internet connection.

2. Constructive Communication

It's an amazing tool of the internet by which you can communicate with your friend or family members at thousands of mile away from you.

By this, people from the various parts of the world can work as a team and can buildup a strong relationship and understating.

By this, a sole person can handle its business from the thousands of miles away.

Some communication websites are Internet Relay Chat, Instant Messaging Services, Smart Phone Messaging Apps, Internet Phone Calling, etc.

3. Uses of the internet in Effective Education

The Internet plays a vital role in an effective education.

Internet reduces the cost of education and increases its accessibility to the ordinary person.

Now students can be continuously in touch with their teachers.

The internet increased the quality of the education because here students can learn by the help of videos, infographics, images, etc.

Moreover, if they are not getting satisfied with one result (search), they can go through other one and so on, because they have a large number of options available on the internet.

By the help of e-learning, you can attend classes online at your home.

Now universities are uploading all their study material on the internet so that their students can excess it from their home also.

At some places, students do not have to go through a written exam; educational institutes conduct online exams, by which transparency increases and wastage of paper decreases ultimately it also helpful in environment point of view.

4. Online Banking

Online banking makes life human being secure and comfortable.

Now, anybody does not have to carry hard cash in pocket or suitcase from one place to other because now most of the rights of your bank account are in your hand. You can excess and manage your account while sitting at home or traveling in abroad.

By the help of online banking, you can transfer your account from one branch to other; you can generate pin of your ATM, you can pay your tax online with the help of the internet, you can transfer thousands of dollars instantly, pay EMI online, Create virtual credit card, pay bills, etc.

You can order your debit or credit card by the help of internet banking they will deliver you at your doorstep.

If you have any issue with your account, you can raise an online complain.

Also, read; World Wide Web: The Definitive Guide

5. Uses of the Internet in Research

Before doing research on anything you have to go through thousands of books for references. The Internet can perform this work exceptionally well.

If you like any book then you can order its hard or soft copy.

You can learn about the success and failed research of your stream in the past and get good out of them.

Everything is just a click away from you.

Some websites like Wikipedia, encyclopedia the Britannica are the amazing website on which you will gain knowledgeable information.

Uses of the internet in education and research have become extremely helpful for students.

6. Job Searching

Internet helps a lot in finding a job according to your interest.

Post your resume on some famous websites so that recruiter can contact you.

Subscribe some websites and they will send you the notification of vacancy opening in any Institutes or an organization.

On social networking sites also you can get know the job opening in any field. A famous job-related website is Linkedin, here most of the members are professionals. You have to make an account you will gather information.

Even on Linkedin, you can also promote your business.

On the internet, you can fill-up form online and see your results.

Many organizations conduct an interview online, so by the help of the internet, you can give an interview online while sitting at your home.

7. Online Dating

Online dating is an amazing platform on the internet in relation point of view.

Here you can meet your soul-mate. You can talk to a stranger and you like then you can share contact with each other.

Here you can also make friends only for fun.

Some online dating sites are Match.com, EliteSingles, eharmony, etc.

8. Mail

Mail is a valuable service on the internet in the business point of view. By mail, you can inform your customers about the launch of recent products.

If you have a special message for your employee, you can send them just with a single click.

By the help of electronic mail, the owner can deliver business routine work to their employees. The owner can get an output of employees through the mail.

He can inform their employees about the future plan of the company.

9. Social Networking

Social networking sits helps a lot in connecting the world together.

On social networking sites, you will get each and everything from informative stuff to entertainment.

On these platforms, you can post and share your idea with your friends without paying a single penny.

You can promote your product or blog free of cost on social networking sites.

Social networking is the combination of the many applications and websites including Facebook, WhatsApp, Twitter, Pinterest, Reddit Instagram, etc.

Facebook is the most leading social networking site on the internet.

On these platforms, you can make new friends across the world like on twitter you can follow any celebrity and whenever they will post anything you will get a notification.

10. Entertainment stuff

Internet is a great source of entertainment. Here you can watch online movies of your choice. You can download movies, can watch sports live.

Here you can book your cinema online.

You will get here a collection of old and new songs of all types. You can watch them online or you can download.

Some popular music websites are Pandora, Yahoo! Music, Google Play, SoundCloud, etc.

Nowadays YouTube entertains a lot, here you can watch new songs, prank, comedy, roasting videos.

11. Use of the Internet for Online Shopping

Nowadays whatever you want; you have to just place an order on the online shopping websites, they will deliver your order, to your home.

Here you will get many varieties and reasonable price.

If you want to give a gift to your far friend or family member then online shopping would the best option for you.

You can order anything like grocery, clothing, machines, books, etc whatever you want just place an order and get at your home.

There is a number of websites on which you can place your favorite orders out of them some are www.amazon.com, www.flipkart.com, etc.

On the internet, there are those websites also available where you can sell and purchase an old product. Out of them, some websites are olx.com, ebay.com, etc.

12. Forums and Q & A Sites

On the internet, there are large numbers of forums and Q&A (Question and Answer) websites where you can ask any type of question and a bunch of genius across the world will answer you.

You can participate in any discussion also and if you know the answer to any question, you can answer those.

These things are worthwhile in research and survey also.

On these platforms, you can advertise your product and can increase traffic on your blog.

Some of the forum and Q&A sites are Quora, Answers.Com, Yahoo Answers, Reddit, etc.

13. Google Map

It is the boon of the internet to the travelers.

You have to just put your destination in the Google map; it will indicate you the most suitable routes available for you after analyzing lots of things including traffic, distance, restaurants, ATM, etc.

You can know here the ETA, distance between two places; you can share your location, etc. It will direct you verbally while driving.

Now, you do not have to ask someone about the route.

If sometimes you forget the route or stuck in the traffic jam then simply leave it on the Google map and follow the route; it will get you out from there.

14. Uses of the internet in Internet Marketing

You know that you can earn thousands of dollars per month on the internet. A lot of people are earning with their skills.

Here, you can do blogging, YouTube video uploading, digital marketing, SEO, infographics, etc.

You can work as a freelancer, and sell your services. There is a significant number of websites where you can gather a reasonable amount including Fiverr, Upwork, Freelancer, Guru, etc.

You can capture images and sell on the internet. You could upload video clips and infographics on some websites on the internet; customers will pay you an appropriate amount online.

Some image selling websites are Adobe Stock, Shutterstock, Alamy, etc.

15. Advertising Product

Currently, everything is on the internet, so most of the people spend much time on the internet; that's why the internet becomes an excellent platform for advertising.

You can advertise your product in the form of banners, pop-ups, videos, e-mail marketing, etc.

If you want to promote your product, you have to register on the advertising websites some most popular are Google AdWords, Media.net, Adsterra, etc.

Here you can customize your ads according to distance, keywords, price, etc.

Free: If you do not have money for paid advertisement, you can promote your product free of cost on social media, provided you have to make friend circle. For illustration facebook, Instagram, Twitter, etc.

16. Video Conference

It is a marvelous thing for those persons who are far away from their loveable family or business.

In this way, a person can reduce travel time and expenses.

Presently with the help of video conference, businessmen can brief all their members who are working in the various corners of the world. They can describe them their future and current plan face to face by the help of video conferencing, it will increase productivity and believe between the clients.

Here, all member of a single-family can talk to each other at the same time; despite they may be at distinct locations.

Some video conferencing applications are Google Duo, FreeConference, skype, etc.

17. Order Food and Medicine Online

If you do not want to prepare food, just order on the food delivering websites and, you will get your favorite food at your home within a few minutes.

It makes the life of a human being much leisure.

Most famous food delivery websites are Zomato, FoodPanda, UberEats, etc.

Nowadays you can also order medicines online. Medicine delivery websites are also trusted and reviewed by famous doctors of the country.

18. Real-Time Updates

Oh! What's going on around the world? Stay connected with internet.

Downloads some news applications in your Smartphone and set your priorities that which type of news you want to hear from them.

They will deliver you information related to your interest like politics, economics, geology, science, fun, technology, astrophysics, marketing, etc.

Subscribe some important news websites or news channel they will keep you currently updated. You can watch live news channel on the internet like on YouTube.

You can read daily electronic newspapers and magazines and keep yourself real-time updated.

19. Uses of the Internet for playing Online Games

13. What is an Internet Service Provider? Give some example of ISP in India.

Ans: A company that provides subscribers with access to the Internet. BSNL, Airtel, Vodafone etc are some examples of ISP in India.

14. Discuss the difference between MAC address, IP address and Port address.

Ans:

S.NO	MAC ADDRESS	IP ADDRESS
1.	MAC Address stands for Media Access Control Address.	IP Address stands for Internet Protocol Address.
2.	MAC Address is a six byte hexadecimal address.	IP Address is either four byte (IPv4) or six byte (IPv6) address.
3.	A device attached with MAC Address can retrieve by ARP protocol.	A device attached with IP Address can retrieve by RARP protocol.
4.	NIC Card's Manufacturer	Internet Service Provider provides IP

	provides the MAC Address.	Address.
5.	MAC Address is used to ensure the physical address of computer.	IP Address is the logical address of the computer.
6.	MAC Address operates in the data link layer.	IP Address operates in the network layer.
7.	MAC Address helps in simply identifying the device.	IP Address identifies the connection of the device on the network.
8.	MAC Address of computer cannot be changed with time and environment.	IP Address modifies with the time and environment.

| | MAC Address can't be found easily by | IP Address can be |
| 9. | third party. | found by third party. |

Port Address Translation (PAT) is an extension of Network **Address** Translation (NAT) that permits multiple devices on a LAN to be mapped to a single public IP **address** to conserve IP **addresses**.

15. How do we view my Internet browser's history?

Ans: If you are using Windows, Linux, or macOS, there are quick shortcut key combinations that allow you to view your history.

Windows and Linux users: Ctrl+H

Apple users: Command + Shift + H

Once one of the above shortcut keys is pressed, a history section similar to the example below should appear. In the following screenshot, browsing history is being viewed in Google Chrome.