ASSIGNMENT-1:

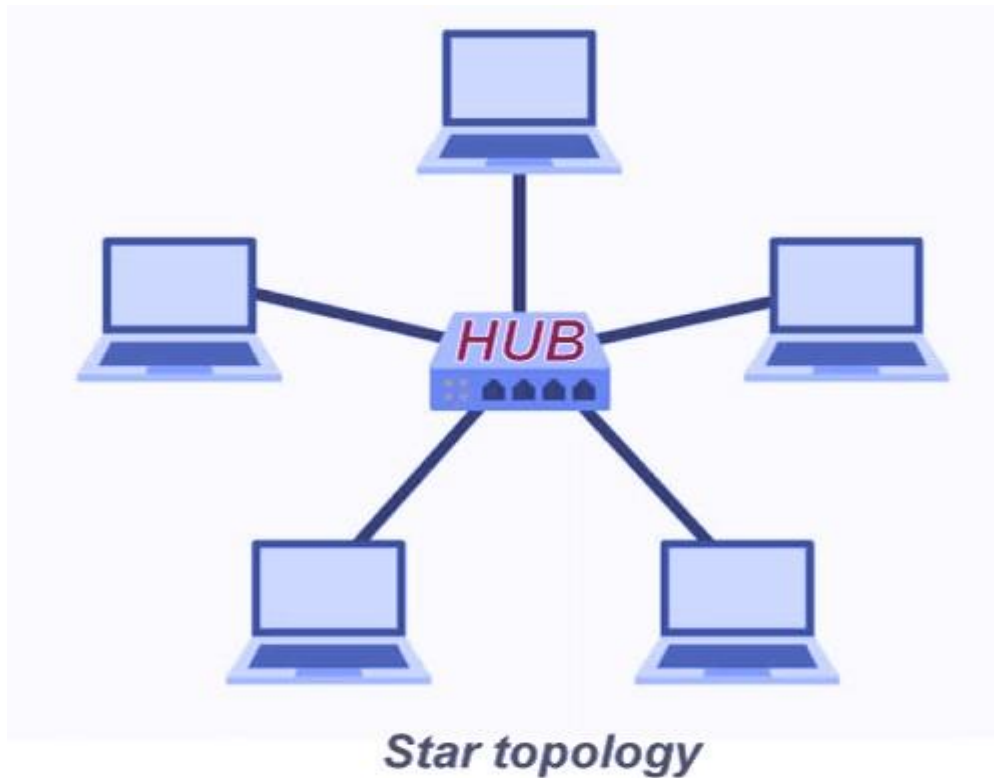## TOPOLOGIES:

It refers to the physical or logical arrangements of devices in a network. There are different types of topologies, they are:

1) STAR TOPOLOGY
2) MESH TOPOLOGY
3) BUS TOPOLOGY
4) RING TOPOLOGY
5) HYBRID TOPOLOGY

STAR TOPOLOGY:

It is a network topology in which all devices all connected to a central device called a hub.

Star topology

ADVANTAGES:

During transmission if any device fails or gets disconnected it will not result in the complete failure of the system.
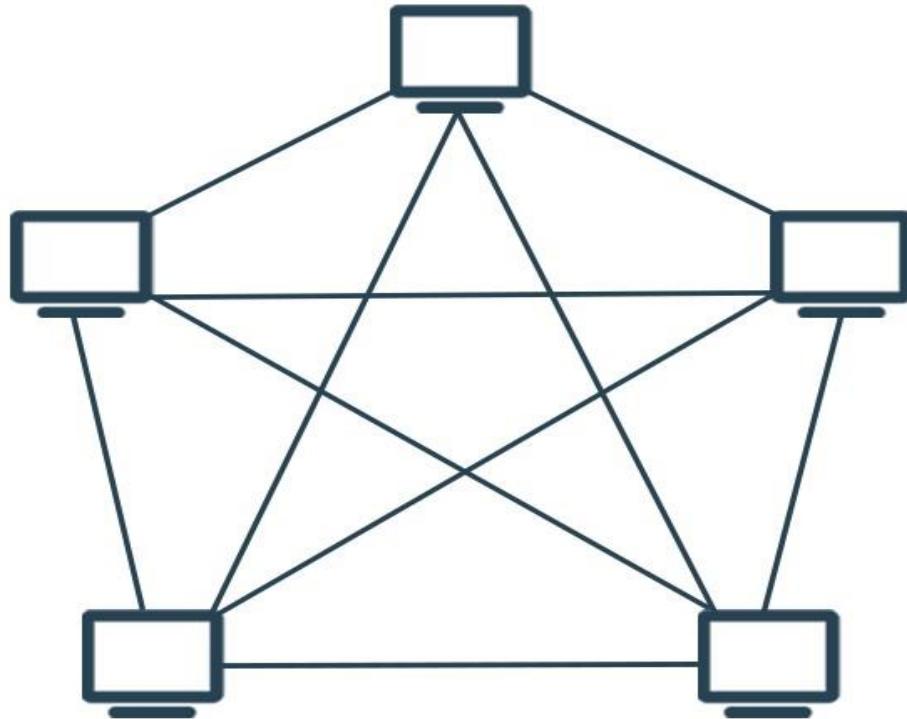
DISADVANTAGES:

If the central device which is hub fails, then it results in the failure of total system.

MESH TOPOLGY:

It is a network topology in which each node has a connection to every other node.

MESH TOPOLOGY

ADVANTAGES:

During transmission if a connection between a node is disconnected the data will not be lost because it can reach its destination by travelling the other connections.

DISADVANTAGES:

It is expensive due to its large number of connections and also it is complex to manage.

BUS TOPOLOGY:

It is a network topology in which all the devices are connected to a single cable.
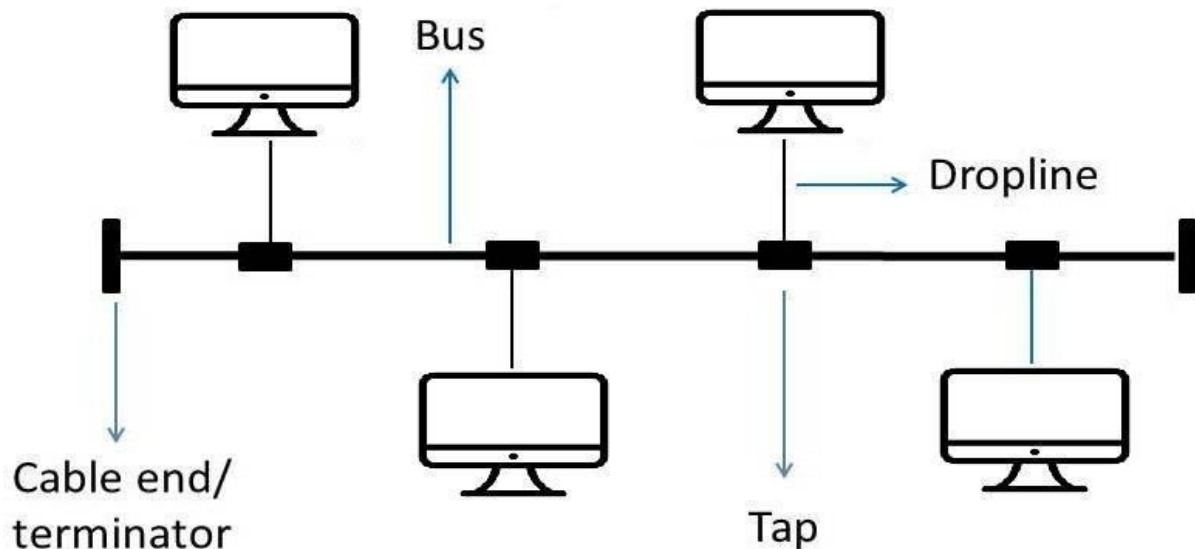
ADVANTAGES:

It is easy to connect or remove a device without effecting other device.

It is more efficient compared to other topologies.

DISADVANTAGES:

It is not a recommended topology for large networks. Also if the main cable is damaged then the whole system fails.

RING TOPOLOGY:

It is a network topology in which the devices are connected in a circular format and in a such a way that every device is only connected to two devices.
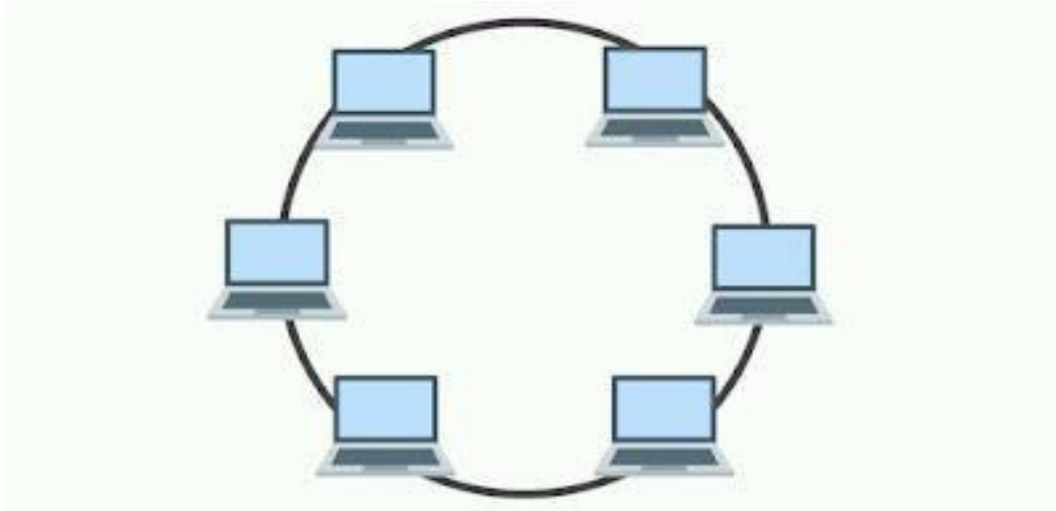
ADVANTAGES:

Here the data flow is in only one direction so it reduces the packet collisions.

The speed to transfer data is also very high.

DISADVANTAGES:

Since it is uni-directional a data packet must be passed to every device.

Addition and removal of a device in this system is very difficult.

HYBRID TOPOLOGY:

It is a network topology which is formed by combining two or more topologies.
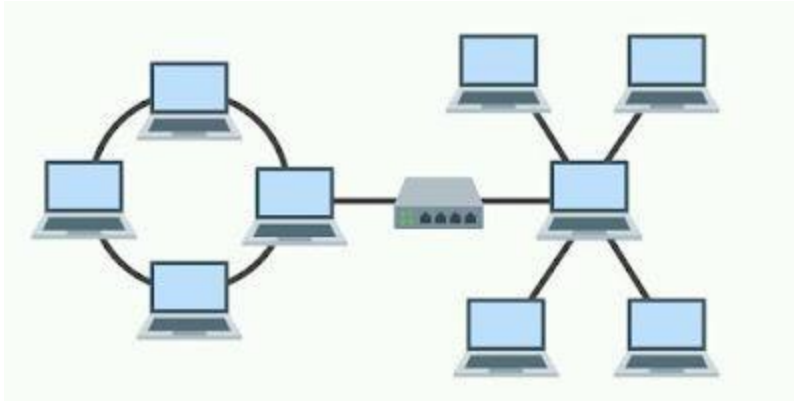
ADVANTAGES:

It is more efficient for long distance systems for example an organization having a large geographical area can use this system.

The overall performance and speed is greater in this topology.

DISADVATAGES:

The design and set up of this system is quite complex. And it is not cost effective.

MAC-ADDRESS:

```
Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Ethernet Connection (17) I219-LM
   Physical Address. . . . . . . . . : CC-96-E5-4A-07-A5
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e68a:b43f:8a23:8257%17(Preferred)
   IPv4 Address. . . . . . . . . . . : 172.17.253.250(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Lease Obtained. . . . . . . . . . : 28 November 2024 11:55:44
   Lease Expires . . . . . . . . . . : 28 November 2024 16:56:15
   Default Gateway . . . . . . . . . : 172.17.240.1
   DHCP Server . . . . . . . . . . . : 192.168.23.41
   DHCPv6 IAID . . . . . . . . . . . : 114071269
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C7-25-CC-96-E5-4A-07-A5
   DNS Servers . . . . . . . . . . . : 192.168.23.21
                                       192.168.23.22
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

IP-ADDRESS:

```
Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Ethernet Connection (17) I219-LM
   Physical Address. . . . . . . . . : CC-96-E5-4A-07-A5
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e68a:b43f:8a23:8257%17(Preferred)
   IPv4 Address. . . . . . . . . . . : 172.17.253.250(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Lease Obtained. . . . . . . . . . : 28 November 2024 11:55:44
   Lease Expires . . . . . . . . . . : 28 November 2024 16:56:15
   Default Gateway . . . . . . . . . : 172.17.240.1
   DHCP Server . . . . . . . . . . . : 192.168.23.41
   DHCPv6 IAID . . . . . . . . . . . : 114071269
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C7-25-CC-96-E5-4A-07-A5
   DNS Servers . . . . . . . . . . . : 192.168.23.21
                                       192.168.23.22
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

SUBNET MASK:

```
Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Ethernet Connection (17) I219-LM
   Physical Address. . . . . . . . . : CC-96-E5-4A-07-A5
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::e68a:b43f:8a23:8257%17(Preferred)
   IPv4 Address. . . . . . . . . . . : 172.17.253.250(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Lease Obtained. . . . . . . . . . : 28 November 2024 11:55:44
   Lease Expires . . . . . . . . . . : 28 November 2024 16:56:15
   Default Gateway . . . . . . . . . : 172.17.240.1
   DHCP Server . . . . . . . . . . . : 192.168.23.41
   DHCPv6 IAID . . . . . . . . . . . : 114071269
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C7-25-CC-96-E5-4A-07-A5
   DNS Servers . . . . . . . . . . . : 192.168.23.21
                                       192.168.23.22
   NetBIOS over Tcpip. . . . . . . . : Enabled
```
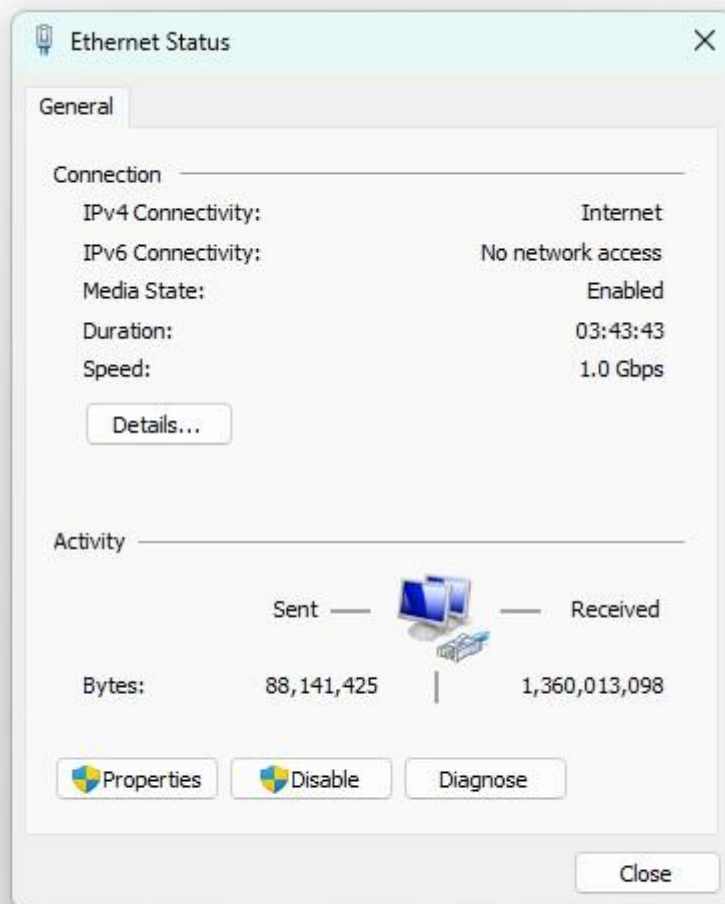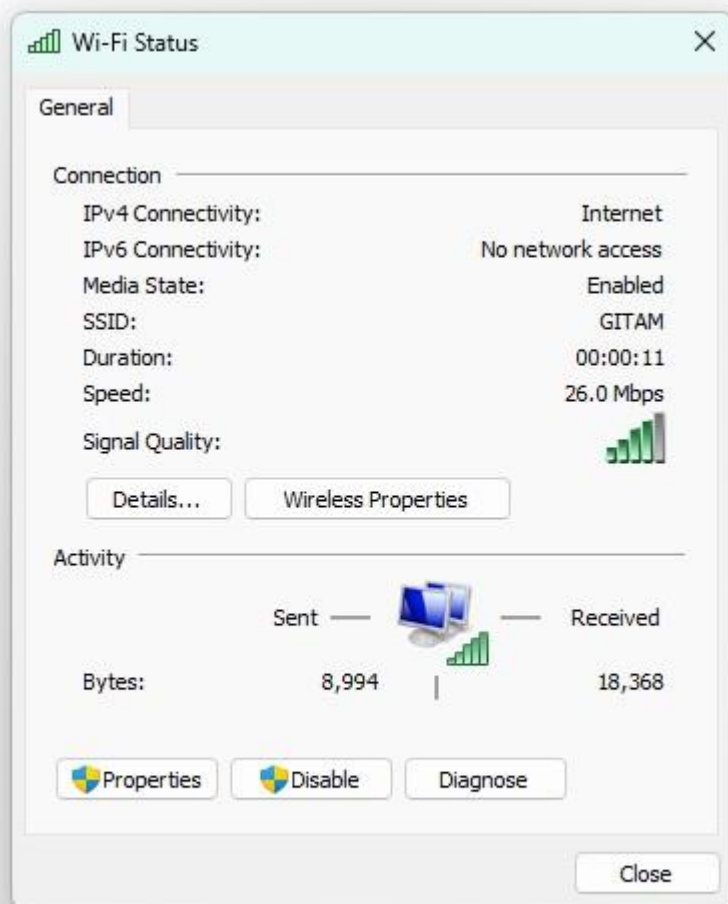
SPEED OF WIRED LAN:

SPEED OF WIRELESS LAN:

ipconfig:

```
C:\Users\CSE-214-16>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Link-local IPv6 Address . . . . . : fe80::6d5f:5723:d3e0:f6a2%12
   IPv4 Address. . . . . . . . . . . : 172.17.252.78
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . : 172.17.240.1

Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::c322:a679:6c0b:9c9f%18
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : gitam.edu

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
```

Ipconfig/all:

```
Windows IP Configuration

   Host Name . . . . . . . . . . . . : ICTCSE-L214-16
   Primary Dns Suffix  . . . . . . . : gitam.edu
   Node Type . . . . . . . . . . . . : Mixed
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : gitam.edu

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Ethernet Connection (17) I219-LM
   Physical Address. . . . . . . . . : CC-96-E5-4A-08-36
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::6d5f:5723:d3e0:f6a2%12(Preferred)
   IPv4 Address. . . . . . . . . . . : 172.17.252.78(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Lease Obtained. . . . . . . . . . : 05 December 2024 12:10:49
   Lease Expires . . . . . . . . . . : 05 December 2024 16:11:09
   Default Gateway . . . . . . . . . : 172.17.240.1
   DHCP Server . . . . . . . . . . . : 192.168.23.41
   DHCPv6 IAID . . . . . . . . . . . : 214734565
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C5-92-CC-96-E5-4A-08-36
   DNS Servers . . . . . . . . . . . : 192.168.23.21
                                       192.168.23.22
   NetBIOS over Tcpip. . . . . . . . : Enabled

Ethernet adapter Ethernet 2:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : VirtualBox Host-Only Ethernet Adapter
   Physical Address. . . . . . . . . : 0A-00-27-00-00-12
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::c322:a679:6c0b:9c9f%18(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.56.1(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
   DHCPv6 IAID . . . . . . . . . . . : 688521255
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3D-C5-92-CC-96-E5-4A-08-36
   NetBIOS over Tcpip. . . . . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
```

```
   NetBIOS over Tcpip. . . . . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : A0-02-A5-8E-2D-F9
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : A2-02-A5-8E-2D-F8
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : gitam.edu
   Description . . . . . . . . . . . : Intel(R) Wi-Fi 6E AX210 160MHz
   Physical Address. . . . . . . . . : A0-02-A5-8E-2D-F8
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Bluetooth Device (Personal Area Network)
   Physical Address. . . . . . . . . : A0-02-A5-8E-2D-FC
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```

arp –a:

```
C:\Users\CSE-214-16>arp -a

Interface: 172.17.252.78 --- 0xc
  Internet Address      Physical Address      Type
  172.17.240.1          6c-03-b5-61-79-d0     dynamic
  172.17.248.13         4c-d7-17-8f-26-d0     dynamic
  172.17.248.38         4c-d7-17-8f-23-dd     dynamic
  172.17.248.86         4c-d7-17-8e-d4-77     dynamic
  172.17.248.125        4c-d7-17-8f-22-f0     dynamic
  172.17.249.143        00-be-43-8f-b6-84     dynamic
  172.17.249.251        e4-54-e8-a7-59-09     dynamic
  172.17.250.18         cc-47-40-83-1f-af     dynamic
  172.17.250.90         4c-d7-17-8e-d4-5f     dynamic
  172.17.250.93         4c-d7-17-8e-d2-6f     dynamic
  172.17.250.134        4c-d7-17-8f-24-09     dynamic
  172.17.255.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.56.1 --- 0x12
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
```

netstat:

```
C:\Users\CSE-214-16>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:9608         ICTCSE-L214-16:65028   ESTABLISHED
  TCP    127.0.0.1:49679        ICTCSE-L214-16:49680   ESTABLISHED
  TCP    127.0.0.1:49680        ICTCSE-L214-16:49679   ESTABLISHED
  TCP    127.0.0.1:65028        ICTCSE-L214-16:9608    ESTABLISHED
  TCP    172.17.252.78:49408    20.198.119.84:https    ESTABLISHED
  TCP    172.17.252.78:64692    13.67.10.228:8883      ESTABLISHED
  TCP    172.17.252.78:64915    13.107.246.254:https   CLOSE_WAIT
  TCP    172.17.252.78:64925    150.171.85.254:https   CLOSE_WAIT
  TCP    172.17.252.78:64939    cdn-185-199-108-154:https   ESTABLISHED
  TCP    172.17.252.78:64946    cdn-185-199-108-154:https   ESTABLISHED
  TCP    172.17.252.78:64964    cdn-185-199-111-154:https   ESTABLISHED
  TCP    172.17.252.78:64977    cdn-185-199-109-133:https   ESTABLISHED
  TCP    172.17.252.78:64978    lb-140-82-112-26-iad:https   ESTABLISHED
  TCP    172.17.252.78:65010    192.168.63.82:8027     ESTABLISHED
  TCP    172.17.252.78:65014    a184-26-54-147:https   CLOSE_WAIT
  TCP    172.17.252.78:65016    a184-26-54-154:https   CLOSE_WAIT
  TCP    172.17.252.78:65019    13.107.213.254:https   CLOSE_WAIT
  TCP    172.17.252.78:65020    117.18.232.200:https   ESTABLISHED
  TCP    172.17.252.78:65021    13.107.246.254:https   CLOSE_WAIT
  TCP    172.17.252.78:65023    152.195.38.76:http     TIME_WAIT
  TCP    172.17.252.78:65024    152.195.38.76:http     TIME_WAIT
  TCP    172.17.252.78:65034    gu-vsp-dhcp:epmap      TIME_WAIT
  TCP    172.17.252.78:65035    gu-vsp-dhcp:49674      TIME_WAIT

C:\Users\CSE-214-16>ping  172.17.252.78

Pinging 172.17.252.78 with 32 bytes of data:
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.252.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

ping 172.17.252.78:

```
C:\Users\CSE-214-16>ping  172.17.252.78

Pinging 172.17.252.78 with 32 bytes of data:
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128
Reply from 172.17.252.78: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.252.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

ping www.google.com:

```
C:\Users\CSE-214-16>ping www.google.com

Pinging www.google.com [172.217.160.132] with 32 bytes of data:
Reply from 172.217.160.132: bytes=32 time=13ms TTL=57
Reply from 172.217.160.132: bytes=32 time=14ms TTL=57
Reply from 172.217.160.132: bytes=32 time=14ms TTL=57
Reply from 172.217.160.132: bytes=32 time=14ms TTL=57

Ping statistics for 172.217.160.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 13ms, Maximum = 14ms, Average = 13ms
```

tracert www.google.com:

```
C:\Users\CSE-214-16>tracert www.google.com

Tracing route to www.google.com [172.217.31.196]
over a maximum of 30 hops:

  1     1 ms    <1 ms    <1 ms   172.17.240.1
  2    <1 ms    <1 ms    <1 ms   192.168.158.21
  3    <1 ms    <1 ms    <1 ms   192.168.158.22
  4    <1 ms    <1 ms    <1 ms   103.23.29.65
  5     4 ms     *        *      123.108.200.109
  6    19 ms    16 ms    16 ms   103.40.48.10
  7    16 ms    16 ms    16 ms   103.40.48.161
  8    14 ms    14 ms    14 ms   216.239.43.131
  9    15 ms    15 ms    15 ms   74.125.253.13
 10    14 ms    14 ms    14 ms   maa03s28-in-f4.1e100.net [172.217.31.196]

Trace complete.
```

Getmac /v /fo List:

```
C:\Users\CSE-214-16>Getmac /v /fo List

Connection Name:  Wi-Fi
Network Adapter:  Intel(R) Wi-Fi 6E AX210 160MHz
Physical Address: A0-02-A5-8E-2D-F8
Transport Name:   Media disconnected

Connection Name:  Ethernet
Network Adapter:  Intel(R) Ethernet Connection (17) I219-LM
Physical Address: CC-96-E5-4A-08-36
Transport Name:   \Device\Tcpip_{8B20501F-0E0D-4455-A649-7D921FDA5F63}

Connection Name:  Bluetooth Network Connection
Network Adapter:  Bluetooth Device (Personal Area Network)
Physical Address: A0-02-A5-8E-2D-FC
Transport Name:   Media disconnected

Connection Name:  Ethernet 2
Network Adapter:  VirtualBox Host-Only Ethernet Adapter
Physical Address: 0A-00-27-00-00-12
Transport Name:   \Device\Tcpip_{D82CBAA2-74D1-494E-A4A8-AEEA00D711F8}
```

FUNCTIONS OF ALL THE COMMANDS:

1**) Ipconfig** :- gives the basic IP configuration of your system

2**) ipconfig /all** :- Displays detailed IP configuration information for all network interfaces, including the MAC address and more.

3) **arp –a** :- Displays the ARP (Address Resolution Protocol) table, which shows IP addresses mapped to MAC addresses

4**) netstat** :- Displays active network connections, routing tables, and network interface statistics.

5**) ping 172.17.252.78**:- Sends ICMP(INTERNET CONTROL MESSAGE PROTOCOL) echo requests to the specified IP address(**172.17.252.78).**

6) **ping www.google.com** :- Sends ICMP(INTERNET CONTROL MESSAGE PROTOCOL)   echo requests to a remote website(google).

7**) tracert www.google.com** :- Traces the route that packets take from your machine to a remote destination.(google).

8)**Getmac /v /fo list** :- Displays the MAC (Media Access Control) address and detailed information about the network interfaces on your computer.