Tasks

(**Only attach** a screenshot of the command prompt/terminal for every question.)

1) Find the IP address of the computer you are using and the IP address version.

Command: __**ipconfig**_____
IP Address: _____**192.168.100.9**_____
IP Address version: _____**v4**_____

```
C:\Users\Kinza>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::c7fc:481:9048:7539%18
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 11:

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

Wireless LAN adapter Local Area Connection* 12:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::7bee:8fce:3aea:afbd%14
   IPv4 Address. . . . . . . . . . . : 192.168.100.9
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::1%14
                                       192.168.100.1
```

2) Find the subnet mask of the computer you currently use, MAC address, the gateway, and whether DHCP is turned on.

Command: _____**ipconfig/all**_____
Subnet Mask, MAC address, gateway, DHCP status: **255.255.255.0, A4-42-3B-0F-7B-34, Yes**

```
C:\Users\Kinza>ipconfig/all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-LKI25JK
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek PCIe GbE Family Controller
   Physical Address. . . . . . . . . : 60-18-95-1E-52-69
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

   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::c7fc:481:9048:7539%18(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.56.1(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :
   DHCPv6 IAID . . . . . . . . . . . : 688521255
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-28-13-A5-E2-60-18-95-1E-52-69
   DNS Servers . . . . . . . . . . . : fec0:0:0:ffff::1%1
                                       fec0:0:0:ffff::2%1
                                       fec0:0:0:ffff::3%1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

```
Wireless LAN adapter Local Area Connection* 11:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #3
   Physical Address. . . . . . . . . : A4-42-3B-0F-7B-35
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 12:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #4
   Physical Address. . . . . . . . . : A6-42-3B-0F-7B-34
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Intel(R) Wireless-AC 9462
   Physical Address. . . . . . . . . : A4-42-3B-0F-7B-34
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::7bee:8fce:3aea:afbd%14(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.100.9(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Sunday, August 31, 2025 12:25:52 PM
   Lease Expires . . . . . . . . . . : Monday, September 1, 2025 7:04:16 PM
   Default Gateway . . . . . . . . . : fe80::1%14
                                       192.168.100.1
   DHCP Server . . . . . . . . . . . : 192.168.100.1
   DHCPv6 IAID . . . . . . . . . . . : 111428155
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-28-13-A5-E2-60-18-95-1E-52-69
   DNS Servers . . . . . . . . . . . : 192.168.100.1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

3) Display the hostname of the computer and which protocol needs to be installed to access this command.

Command: _____**hostname**_____
Hostname: _____**DESKTOP-LKI25JK**_____
Protocol Name: _____**TCP/IP**_____

```
C:\Users\Kinza>hostname
DESKTOP-LKI25JK
```

4) Check any one port on TCP and show the results, whether it's found or not.

Command: _____**netstat -an | findstr ":80"**_____

```
C:\Users\Kinza>netstat -an | findstr ":80"
  TCP    0.0.0.0:8080           0.0.0.0:0              LISTENING
  TCP    [::]:8080              [::]:0                 LISTENING
```

5) Display the number of datagrams sent and received.

Command: ____**netstat -s**_____

```
C:\Users\Kinza>netstat -s

IPv4 Statistics

  Packets Received                   = 14926633
  Received Header Errors             = 0
  Received Address Errors            = 715
  Datagrams Forwarded                = 0
  Unknown Protocols Received         = 0
  Received Packets Discarded         = 28505
  Received Packets Delivered         = 15611175
  Output Requests                    = 8606668
  Routing Discards                   = 0
  Discarded Output Packets           = 2692
  Output Packet No Route             = 720
  Reassembly Required                = 0
  Reassembly Successful              = 0
  Reassembly Failures                = 0
  Datagrams Successfully Fragmented  = 0
  Datagrams Failing Fragmentation    = 0
  Fragments Created                  = 0
```

```
IPv6 Statistics

  Packets Received                    = 1611621
  Received Header Errors              = 0
  Received Address Errors             = 16758
  Datagrams Forwarded                 = 0
  Unknown Protocols Received          = 0
  Received Packets Discarded          = 14607
  Received Packets Delivered          = 1723311
  Output Requests                     = 961233
  Routing Discards                    = 0
  Discarded Output Packets            = 781
  Output Packet No Route              = 109
  Reassembly Required                 = 0
  Reassembly Successful               = 0
  Reassembly Failures                 = 0
  Datagrams Successfully Fragmented   = 0
  Datagrams Failing Fragmentation     = 0
  Fragments Created                   = 0
```

```
ICMPv6 Statistics

                          Received    Sent
  Messages                1677        2495
  Errors                  0           0
  Destination Unreachable 173         323
  Packet Too Big          0           0
  Time Exceeded           0           0
  Parameter Problems      0           0
  Echos                   0           0
  Echo Replies            0           0
  MLD Queries             0           0
  MLD Reports             0           0
  MLD Dones               0           0
  Router Solicitations    0           265
  Router Advertisements   802         0
  Neighbor Solicitations  300         1335
  Neighbor Advertisements 402         572
  Redirects               0           0
  Router Renumberings     0           0
```

```
TCP Statistics for IPv4

  Active Opens                            = 85764
  Passive Opens                           = 5764
  Failed Connection Attempts              = 6573
  Reset Connections                       = 8687
  Current Connections                     = 15
  Segments Received                       = 11215661
  Segments Sent                           = 6708801
  Segments Retransmitted                  = 35038

TCP Statistics for IPv6

  Active Opens                            = 4043
  Passive Opens                           = 149
  Failed Connection Attempts              = 1091
  Reset Connections                       = 463
  Current Connections                     = 8
  Segments Received                       = 1327143
  Segments Sent                           = 730745
  Segments Retransmitted                  = 1916
```

```
UDP Statistics for IPv4

  Datagrams Received    = 4392634
  No Ports              = 5218
  Receive Errors        = 24165
  Datagrams Sent        = 1796386

UDP Statistics for IPv6

  Datagrams Received    = 407250
  No Ports              = 568
  Receive Errors        = 13930
  Datagrams Sent        = 211745
```

6) Find the path of routers of two websites (of your own choice). What is its IP address? How many hops are involved in the path?

Command: ___**tracert websitename, maximum 30 hops involved**_____

```
C:\Users\Kinza>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.227.35]
over a maximum of 30 hops:

  1     1 ms     1 ms     1 ms  192.168.100.1
  2     6 ms     4 ms     5 ms  100.88.0.1
  3     *        *        *     Request timed out.
  4     5 ms     3 ms     3 ms  192.168.28.1
  5     7 ms     5 ms     5 ms  10.180.78.241
  6     6 ms     5 ms     5 ms  10.181.73.137
  7     6 ms     3 ms     3 ms  221.132.113.200
  8     5 ms     4 ms     5 ms  110.93.252.190
  9    14 ms    11 ms    11 ms  110.93.252.136
 10    17 ms    16 ms    17 ms  ae7.pr04.mct1.tfbnw.net [157.240.81.186]
 11    21 ms    16 ms    16 ms  po204.asw01.mct1.tfbnw.net [129.134.38.198]
 12    18 ms    15 ms    17 ms  psw01.mct1.tfbnw.net [129.134.90.6]
 13    24 ms    22 ms    22 ms  msw1aj.01.mct1.tfbnw.net [129.134.91.14]
 14    20 ms    16 ms    16 ms  edge-star-mini-shv-01-mct1.facebook.com [157.240.227.35]

Trace complete.
```

```
C:\Users\Kinza>tracert www.google.com

Tracing route to www.google.com [142.250.202.36]
over a maximum of 30 hops:

  1     2 ms   283 ms     3 ms  192.168.100.1
  2     9 ms     9 ms     9 ms  100.88.0.1
  3     *        *        *     Request timed out.
  4     6 ms     *        9 ms  192.168.28.1
  5     9 ms    10 ms    10 ms  10.180.78.241
  6     4 ms     4 ms     4 ms  10.181.73.137
  7     4 ms     4 ms     5 ms  221.132.113.200
  8    24 ms    32 ms    29 ms  110.93.252.198
  9     6 ms    10 ms     6 ms  110.93.252.246
 10    21 ms    17 ms    17 ms  110.93.192.207
 11    22 ms    23 ms    23 ms  172.253.51.55
 12    25 ms    23 ms    22 ms  192.178.98.162
 13    20 ms    19 ms    20 ms  142.251.77.211
 14    22 ms    18 ms    19 ms  192.178.105.71
 15    19 ms    18 ms    18 ms  192.178.87.251
 16    20 ms   305 ms    23 ms  lcmcta-ah-in-f4.1e100.net [142.250.202.36]

Trace complete.
```

7) A ping to 8.8.4.4 works but a ping to the machine's name "coffee machine" fails. What could be wrong?

Reason:
The system can reach external IPs, so the network is fine, but the hostname "coffee machine" cannot be resolved to an IP address due to DNS or local name resolution issues.

8) If the order of the wires on both ends of the RJ45 connector is different, which type of cable is used? (Name)

Answer:
_____**Crossover Cable**_____

9) Can you connect a Router Ethernet port to PC NIC using a straight-through cable? (Yes/No)

Answer: **A straight-through Ethernet cable is used to connect different types of devices. Since a router's Ethernet port and a PC's NIC (Network Interface Card) are different devices, yes we can connect them using a straight-through cable.**

10) Can you connect a Switch to Router using a crossover cable? (Yes/No)

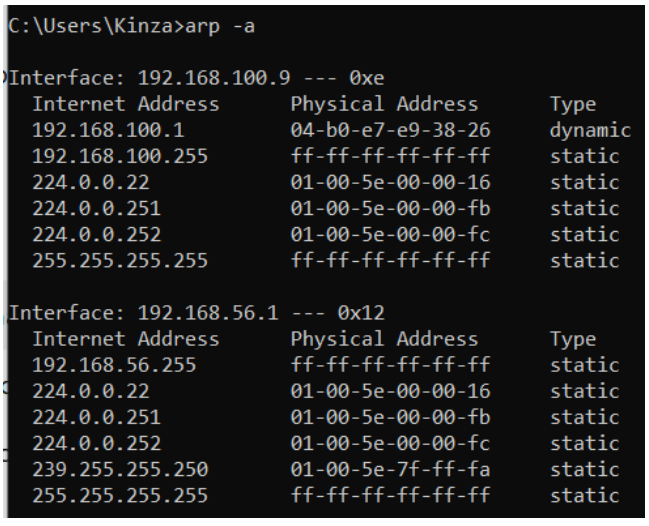
Answer: **Yes Though typically, a straight-through cable is used.**

11) Can you connect a Switch to Hub using a straight-through cable? (Yes/No)

Answer:
No

12) Find all other hosts available on the network.

Command: __**arp -a**_____



```
C:\Users\Kinza>arp -a

Interface: 192.168.100.9 --- 0xe
  Internet Address      Physical Address      Type
  192.168.100.1         04-b0-e7-e9-38-26     dynamic
  192.168.100.255       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
  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
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

13) Displays the owning process ID associated with each connection.

Command: ____**netstat -ano**_____

```
C:\Users\Kinza>netstat -ano

Active Connections

  Proto  Local Address          Foreign Address        State           PID
  TCP    0.0.0.0:135            0.0.0.0:0              LISTENING       1324
  TCP    0.0.0.0:445            0.0.0.0:0              LISTENING       4
  TCP    0.0.0.0:1521           0.0.0.0:0              LISTENING       4768
  TCP    0.0.0.0:3306           0.0.0.0:0              LISTENING       5564
  TCP    0.0.0.0:5040           0.0.0.0:0              LISTENING       11076
  TCP    0.0.0.0:6646           0.0.0.0:0              LISTENING       6756
  TCP    0.0.0.0:8080           0.0.0.0:0              LISTENING       4768
  TCP    0.0.0.0:33060          0.0.0.0:0              LISTENING       5564
  TCP    0.0.0.0:49664          0.0.0.0:0              LISTENING       860
  TCP    0.0.0.0:49665          0.0.0.0:0              LISTENING       1012
  TCP    0.0.0.0:49666          0.0.0.0:0              LISTENING       1740
  TCP    0.0.0.0:49667          0.0.0.0:0              LISTENING       2328
  TCP    0.0.0.0:49668          0.0.0.0:0              LISTENING       4016
  TCP    0.0.0.0:49676          0.0.0.0:0              LISTENING       712
  TCP    0.0.0.0:49678          0.0.0.0:0              LISTENING       4684
  TCP    127.0.0.1:8884         0.0.0.0:0              LISTENING       4
  TCP    127.0.0.1:49670        0.0.0.0:0              LISTENING       4768
  TCP    127.0.0.1:49672        127.0.0.1:49673        ESTABLISHED     5564
  TCP    127.0.0.1:49673        127.0.0.1:49672        ESTABLISHED     5564
  TCP    127.0.0.1:49674        127.0.0.1:49675        ESTABLISHED     5564
  TCP    127.0.0.1:49675        127.0.0.1:49674        ESTABLISHED     5564
  TCP    192.168.56.1:139       0.0.0.0:0              LISTENING       4
  TCP    192.168.100.9:139      0.0.0.0:0              LISTENING       4
  TCP    192.168.100.9:49530    4.213.25.242:443       ESTABLISHED     5092
  TCP    192.168.100.9:50902    150.171.27.12:443      TIME_WAIT       0
  TCP    192.168.100.9:52080    20.44.8.230:443        ESTABLISHED     10712
  TCP    192.168.100.9:57311    4.213.25.242:443       ESTABLISHED     2548
  TCP    192.168.100.9:57312    104.16.103.112:443     ESTABLISHED     29948
  TCP    192.168.100.9:57314    104.18.39.21:443       ESTABLISHED     29948
  TCP    192.168.100.9:57321    173.194.76.188:5228    ESTABLISHED     29948
  TCP    192.168.100.9:57322    104.16.102.112:443     ESTABLISHED     29948
  TCP    192.168.100.9:57324    52.230.60.54:443       TIME_WAIT       0
  TCP    192.168.100.9:57325    20.44.229.112:443      ESTABLISHED     29776
  TCP    192.168.100.9:57327    20.44.229.112:443      ESTABLISHED     29776
  TCP    [::]:135               [::]:0                 LISTENING       1324
  TCP    [::]:445               [::]:0                 LISTENING       4
  TCP    [::]:1521              [::]:0                 LISTENING       4768
  TCP    [::]:3306              [::]:0                 LISTENING       5564
  TCP    [::]:8080              [::]:0                 LISTENING       4768
```

```
UDP    0.0.0.0:500            *:*                                    4220
UDP    0.0.0.0:4500           *:*                                    4220
UDP    0.0.0.0:5050           *:*                                    11076
UDP    0.0.0.0:5353           *:*                                    29948
UDP    0.0.0.0:5353           *:*                                    6776
UDP    0.0.0.0:5353           *:*                                    29948
UDP    0.0.0.0:5353           *:*                                    2736
UDP    0.0.0.0:5353           *:*                                    6776
UDP    0.0.0.0:5353           *:*                                    29948
UDP    0.0.0.0:5353           *:*                                    29948
UDP    0.0.0.0:5353           *:*                                    6776
UDP    0.0.0.0:5353           *:*                                    6776
UDP    0.0.0.0:5355           *:*                                    2736
UDP    0.0.0.0:6646           *:*                                    6756
UDP    0.0.0.0:49664          *:*                                    29948
UDP    0.0.0.0:52907          *:*                                    29948
UDP    0.0.0.0:58180          *:*                                    29948
UDP    0.0.0.0:60118          *:*                                    29948
UDP    127.0.0.1:1900         *:*                                    6688
UDP    127.0.0.1:57489        *:*                                    5152
UDP    127.0.0.1:58314        *:*                                    6688
UDP    192.168.56.1:137       *:*                                    4
UDP    192.168.56.1:138       *:*                                    4
UDP    192.168.56.1:1900      *:*                                    6688
UDP    192.168.56.1:58312     *:*                                    6688
UDP    192.168.100.9:137      *:*                                    4
UDP    192.168.100.9:138      *:*                                    4
UDP    192.168.100.9:1900     *:*                                    6688
UDP    192.168.100.9:58313    *:*                                    6688
UDP    [::]:500               *:*                                    4220
UDP    [::]:4500              *:*                                    4220
UDP    [::]:5353              *:*                                    29948
UDP    [::]:5353              *:*                                    29948
UDP    [::]:5353              *:*                                    6776
UDP    [::]:5353              *:*                                    6776
UDP    [::]:5353              *:*                                    2736
UDP    [::]:5355              *:*                                    2736
UDP    [::1]:1900             *:*                                    6688
UDP    [::1]:58311            *:*                                    6688
UDP    [::1]:65091            *:*                                    4684
UDP    [fe80::7bee:8fce:3aea:afbd%14]:1900  *:*                                    6688
UDP    [fe80::7bee:8fce:3aea:afbd%14]:58310  *:*                                    6688
UDP    [fe80::c7fc:481:9048:7539%18]:1900  *:*                                    6688
UDP    [fe80::c7fc:481:9048:7539%18]:58309  *:*                                    6688
```

14) Check for basic IP connectivity between two computers by name and IP address. How can basic IP connectivity be checked? What are the reasons why there is no connectivity?

Command: ____**ping <Ip address> or ping hostname**_____

Basic connectivity is verified if we receive reply messages.
If we get "Request timed out" or "Destination host unreachable", one of the issues is likely causing the problem.

Possible reasons why there is no connectivity:

1. **Incorrect IP address or hostname.**
2. **Target device is turned off or disconnected from the network.**
3. **Firewall or security software blocking ICMP packets.**
4. **Network cable/Wi-Fi issues.**
5. **DNS server problem (when using hostname).**
6. **Different subnets without proper routing.**

```
C:\Users\Kinza>hostname
DESKTOP-LKI25JK

C:\Users\Kinza>ping DESKTOP-LKI25JK

Pinging DESKTOP-LKI25JK [fe80::7bee:8fce:3aea:afbd%14] with 32 bytes of data:
Reply from fe80::7bee:8fce:3aea:afbd%14: time<1ms
Reply from fe80::7bee:8fce:3aea:afbd%14: time<1ms
Reply from fe80::7bee:8fce:3aea:afbd%14: time<1ms
Reply from fe80::7bee:8fce:3aea:afbd%14: time<1ms

Ping statistics for fe80::7bee:8fce:3aea:afbd%14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```