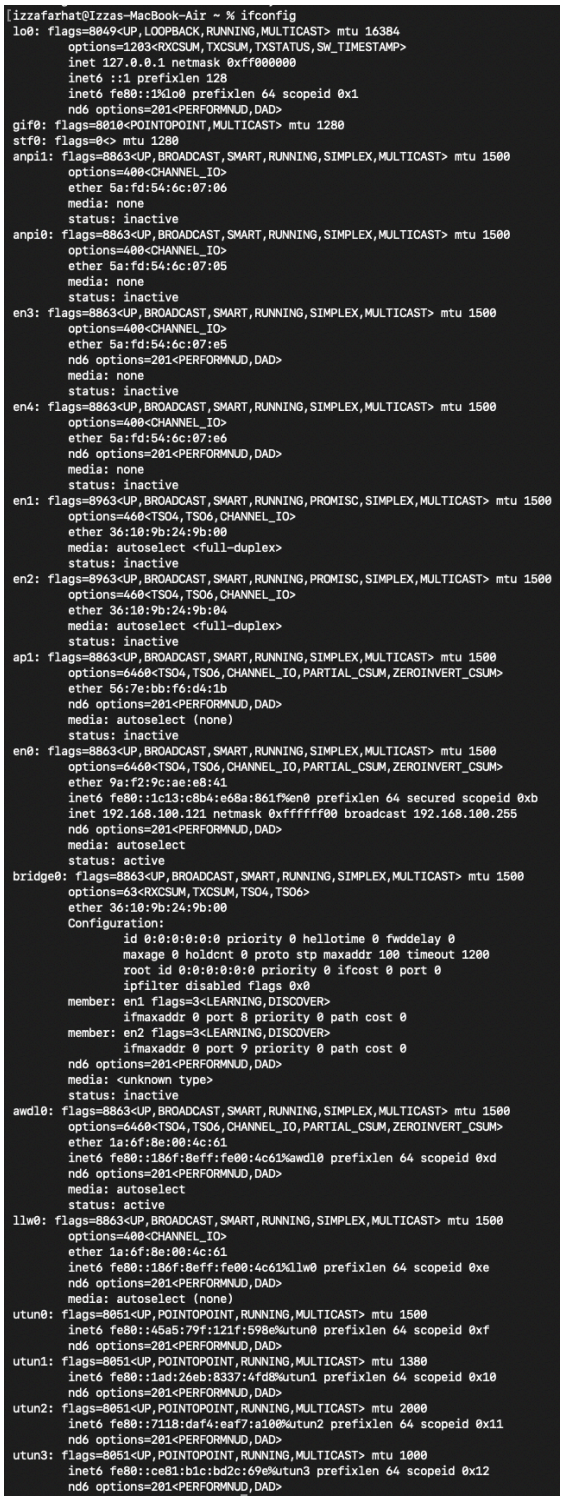
Tasks

(Attach screenshot of command prompt/terminal where you are using it.)

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

Command: _____ifconfig_____

IP Address: _____192.168.100.121_____

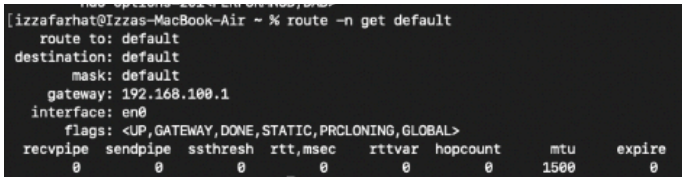


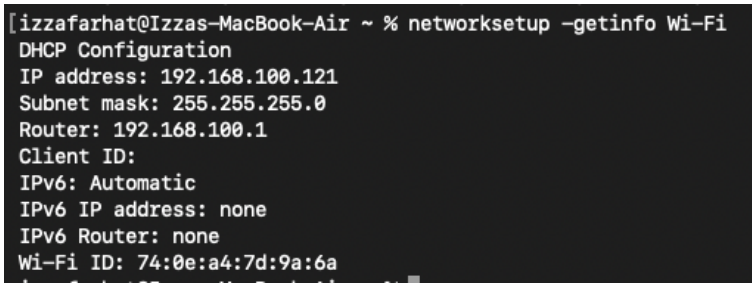
```
[izzafarhat@Izzas-MacBook-Air ~ % ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
        options=1203<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP>
        inet 127.0.0.1 netmask 0xff000000
        inet6 ::1 prefixlen 128
        inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
        nd6 options=201<PERFORMNUD,DAD>
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
anpi1: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 5a:fd:54:6c:07:06
        media: none
        status: inactive
anpi0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 5a:fd:54:6c:07:05
        media: none
        status: inactive
en3: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 5a:fd:54:6c:07:e5
        nd6 options=201<PERFORMNUD,DAD>
        media: none
        status: inactive
en4: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 5a:fd:54:6c:07:e6
        nd6 options=201<PERFORMNUD,DAD>
        media: none
        status: inactive
en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
        options=460<TSO4,TSO6,CHANNEL_IO>
        ether 36:10:9b:24:9b:00
        media: autoselect <full-duplex>
        status: inactive
en2: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
        options=460<TSO4,TSO6,CHANNEL_IO>
        ether 36:10:9b:24:9b:04
        media: autoselect <full-duplex>
        status: inactive
ap1: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether 56:7e:bb:f6:d4:1b
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect (none)
        status: inactive
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether 9a:f2:9c:ae:e8:41
        inet6 fe80::1c13:c8b4:e68a:861f%en0 prefixlen 64 secured scopeid 0xb
        inet 192.168.100.121 netmask 0xffffff00 broadcast 192.168.100.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
bridge0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=63<RXCSUM,TXCSUM,TSO4,TSO6>
        ether 36:10:9b:24:9b:00
        Configuration:
                id 0:0:0:0:0:0 priority 0 hellotime 0 fwddelay 0
                maxage 0 holdcnt 0 proto stp maxaddr 100 timeout 1200
                root id 0:0:0:0:0:0 priority 0 ifcost 0 port 0
                ipfilter disabled flags 0x0
        member: en1 flags=3<LEARNING,DISCOVER>
                ifmaxaddr 0 port 8 priority 0 path cost 0
        member: en2 flags=3<LEARNING,DISCOVER>
                ifmaxaddr 0 port 9 priority 0 path cost 0
        nd6 options=201<PERFORMNUD,DAD>
        media: <unknown type>
        status: inactive
awdl0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=6460<TSO4,TSO6,CHANNEL_IO,PARTIAL_CSUM,ZEROINVERT_CSUM>
        ether 1a:6f:8e:00:4c:61
        inet6 fe80::186f:8eff:fe00:4c61%awdl0 prefixlen 64 scopeid 0xd
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
llw0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether 1a:6f:8e:00:4c:61
        inet6 fe80::186f:8eff:fe00:4c61%llw0 prefixlen 64 scopeid 0xe
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect (none)
utun0: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1500
        inet6 fe80::45a5:79f:121f:598e%utun0 prefixlen 64 scopeid 0xf
        nd6 options=201<PERFORMNUD,DAD>
utun1: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1380
        inet6 fe80::1ad:26eb:8337:4fd8%utun1 prefixlen 64 scopeid 0x10
        nd6 options=201<PERFORMNUD,DAD>
utun2: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 2000
        inet6 fe80::7118:daf4:eaf7:a100%utun2 prefixlen 64 scopeid 0x11
        nd6 options=201<PERFORMNUD,DAD>
utun3: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1000
        inet6 fe80::ce81:b1c:bd2c:69e%utun3 prefixlen 64 scopeid 0x12
        nd6 options=201<PERFORMNUD,DAD>
```

2) Find the IP address of the computer you are currently using, plus MAC address, the gateway, plus whether DHCP is turned on.

Command: _____ifconfig, route -n get default, networksetup -getinfo Wi-Fi_____

IP Address: _____192.168.100.121, 74:0e:a4:7d:9a:6a, 192.168.100.1, Enabled DHCP _____

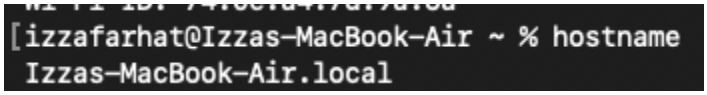




3) Display the host name of the computer.

Command: _____hostname_____

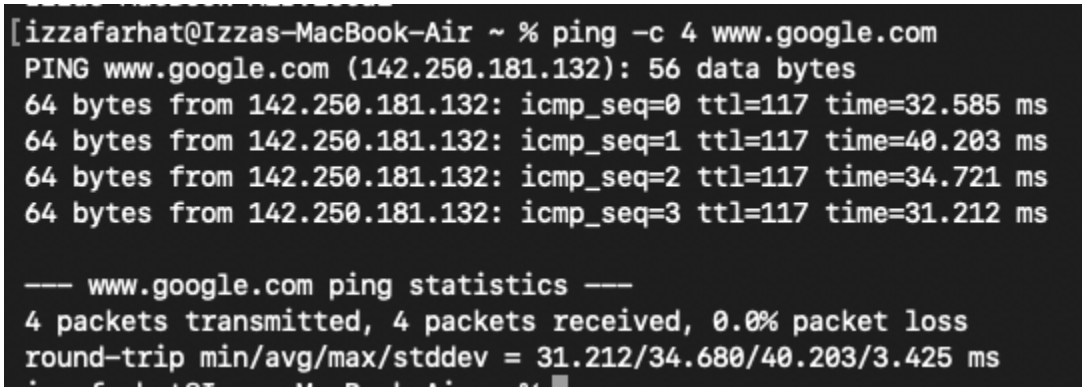
IP Address: _____Izzas-MacBook-Air_____



4) 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 -c 4 www.google.com_____

Reason: Network misconfiguration (wrong IP or gateway), DNS issues (unable to resolve the hostname), Firewall settings blocking ICMP requests, or Physical disconnection.



5) Find out which ports on your host are connected to applications. Connect the browser to some external web page before running the appropriate command.

Command: _____lsof -i -P_____

Reason: reveals active connections (both TCP and UDP), including their ports, processes, and statuses (e.g., LISTEN, ESTABLISHED).

```
[izzafarhat@Izzas-MacBook-Air ~ % lsof -i -P
COMMAND   PID       USER   FD   TYPE             DEVICE SIZE/OFF NODE NAME
rapportd  414 izzafarhat   13u  IPv4 0xab72f71f239f09eb      0t0  TCP *:49528 (LISTEN)
rapportd  414 izzafarhat   14u  IPv6 0xac18ac24bf3a8a5a      0t0  TCP *:49528 (LISTEN)
identitys 424 izzafarhat   21u  IPv4 0x1105303d51d3a13d      0t0  UDP *:*
identitys 424 izzafarhat   26u  IPv4 0xbc6ce6065abf9e58      0t0  UDP *:*
sharingd  452 izzafarhat    4u  IPv4 0xe484cd2e5b1f0c95      0t0  UDP *:*
sharingd  452 izzafarhat   10u  IPv6  0x727b8f28642ad1f      0t0  UDP *:57839
replicato 466 izzafarhat    8u  IPv6 0x20283e7c33d601cc      0t0  UDP *:53123
Google    561 izzafarhat   19u  IPv4 0x76a08170b0637d68      0t0  UDP 192.168.100.121:49486->par21s11-in-f14.1e100.net:443
Google    561 izzafarhat   20u  IPv4 0xf2142546801eab94      0t0  TCP 192.168.100.121:49529->104.18.32.47:443 (ESTABLISHED)
Google    561 izzafarhat   21u  IPv4 0x6adc919d7fdeb4eb      0t0  TCP 192.168.100.121:49527->ra-in-f188.1e100.net:5228 (ESTABLISHED)
Google    561 izzafarhat   22u  IPv4 0x6eff89083f5275d4      0t0  UDP 192.168.100.121:65351->fjr01s02-in-f14.1e100.net:443
Google    561 izzafarhat   27u  IPv4 0x781720c94d81af27      0t0  TCP 192.168.100.121:49530->172.64.155.209:443 (ESTABLISHED)
Google    561 izzafarhat   28u  IPv4 0x6945a8ea32742240      0t0  UDP 192.168.100.121:52724->mct01s14-in-f3.1e100.net:443
```

6) Find the path of routers to www.google.com.What is its IP address? How many hops are involved in the path?

Command: _____traceroute www.google.com_____

Reason:Target IP is `142.250.181.132` and The path to Google has **14 hops**. It identifies each intermediate router (hop) between system and the destination. This helps troubleshoot delays or connectivity issues along the route.

```
[izzafarhat@Izzas-MacBook-Air ~ % traceroute www.google.com
traceroute to www.google.com (142.250.181.132), 64 hops max, 40 byte packets
 1  192.168.100.1 (192.168.100.1)  7.412 ms  3.419 ms  6.311 ms
 2  113.203.205.254 (113.203.205.254)  15.036 ms  4.515 ms  4.421 ms
 3  221.120.249.233 (221.120.249.233)  8.174 ms  8.027 ms  10.806 ms
 4  119.159.240.165 (119.159.240.165)  6.825 ms  5.888 ms  5.595 ms
 5  10.253.4.44 (10.253.4.44)  13.311 ms
    10.253.4.68 (10.253.4.68)  5.462 ms  6.036 ms
 6  10.253.4.28 (10.253.4.28)  7.365 ms  5.806 ms
    10.253.4.6 (10.253.4.6)  9.046 ms
 7  72.14.211.72 (72.14.211.72)  25.478 ms  25.201 ms  27.943 ms
 8  * * *
 9  142.251.64.134 (142.251.64.134)  36.741 ms
    192.178.96.4 (192.178.96.4)  38.792 ms
    142.251.64.132 (142.251.64.132)  27.705 ms
10  192.178.105.150 (192.178.105.150)  34.932 ms  49.788 ms
    192.178.105.152 (192.178.105.152)  29.275 ms
11  142.251.77.152 (142.251.77.152)  29.459 ms
    142.251.225.200 (142.251.225.200)  31.693 ms
    142.251.225.198 (142.251.225.198)  64.724 ms
12  192.178.98.163 (192.178.98.163)  36.125 ms  31.282 ms
    192.178.98.249 (192.178.98.249)  31.740 ms
13  142.251.51.59 (142.251.51.59)  39.682 ms
    142.251.51.57 (142.251.51.57)  31.346 ms
    142.251.51.59 (142.251.51.59)  31.047 ms
14  fjr04s09-in-f4.1e100.net (142.250.181.132)  32.388 ms  29.335 ms  28.693 ms
```

7) A ping to 192.168.0.2 works but a ping to the machine's name "blue machine" fails. What could be wrong?

Reason:

Due to DNS issues or the hostname is not mapped to an IP address, The `hosts` file might be missing or misconfigured, Can Check using `/etc/hosts` and verify DNS server configuration.

8) Which type of cable will you use to connect in a normal home installation?

Answer: Straight-through cables are typically used to connect devices like a computer to a switch/router.

9) Can you connect a Switch to another Switch or a router to a PC using a straight- through cable? Explain your answer.

Answer: Yes, it's possible if the devices support Auto-MDI/MDI-X, which auto-configures the port type. Otherwise, a crossover cable is required for connecting similar devices.

10) Write a brief report on your home network or any organizational network including topology (1 page max).

Answer: My home network uses a star topology. There is one router in the center to which several devices are connected. An internet source was provided through the ISP modem via the router. Laptops, smartphones, and smart home devices are configured to receive Wi-Fi. For stable and speed-requiring applications like desktop PCs and game consoles, wired connections exist. WPA3 encryption and MAC address filtering provide security. The router uses DHCP for dynamic IP assignment and NAT for network address translation.