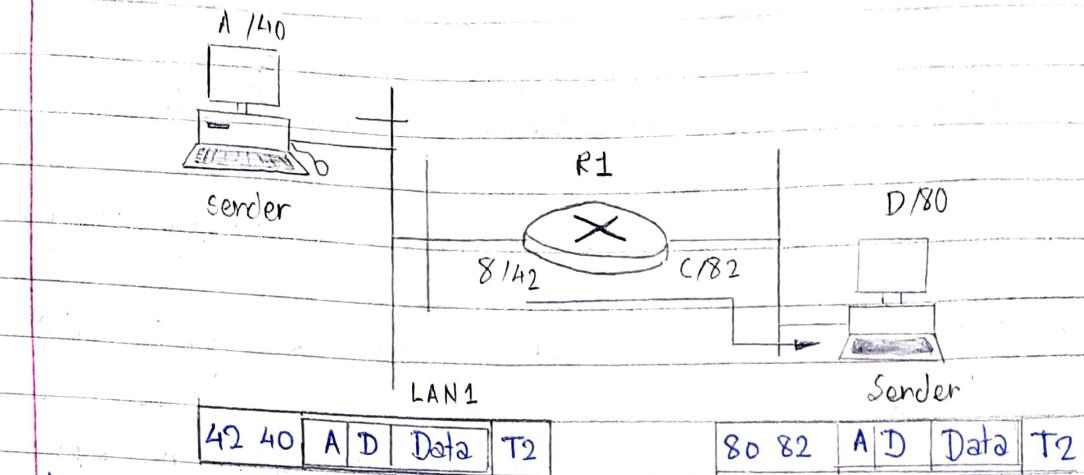


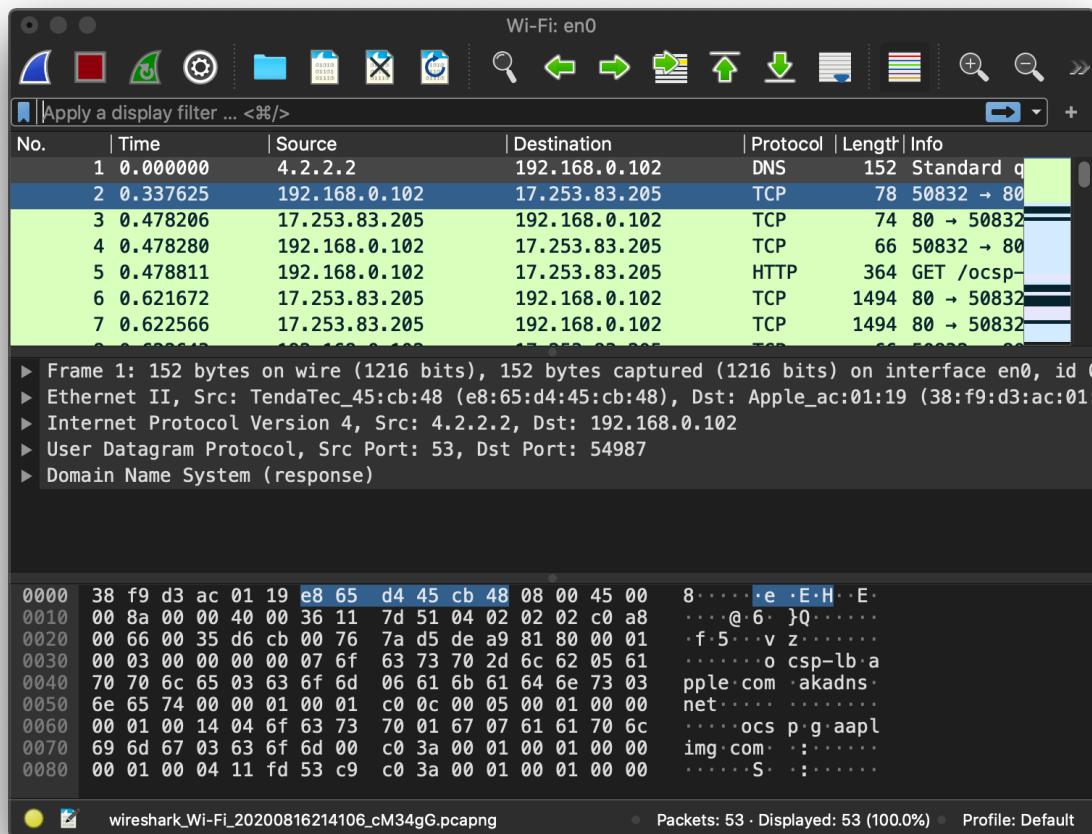
- 1) Which layers in the Internet model are the network support layers?
- 2) Which layer in the internet model is the user support layer?
- 3) What are headers and trailers, and how do they get added and removed?
- 4) Differentiate b/w a port address, a logical address and a physical address.
- 5) Name some services provided by the application layer in the Internet model.
- 6) Define: peer-to-peer process
- 7) Match the following to one or more layers of the OSI model:
 - a) Format and code conversion services
 - b) Establishes, manages and terminates sessions.
 - c) Ensure reliable transmission of data.
 - d) Log-in Log-out procedures.
 - e) Provides independence from differences in data representation.
- 8) Match the following to one or more layers of the OSI model:
 - a) Communicates directly with user's application program
 - b) Error correction and retransmission
 - c) Mechanical, electrical and functional interface.
 - d) Responsibility for carrying frames between adjacent nodes
 - e) Given figure computer A sends message to computer D via LAN1, router R1 and LAN2. Show the contents of the packets and frames at the network and data link layers for each hop interface.



► Ans:

- 1.) The Network support layers are:
 - 1.) Physical
 - 2.) Data link
 - 3.) Network
- 2.) User support layers is Application layer.
- 3.) Headers and trailers (control data added) at the beginning and the end of each data unit at each layer of the sender and removed at the corresponding layers of the receiver. They provide source and destination addresses, synchronization points, information for error detection etc.
These extra bits are added at the layer at the sender's side, and removed at the corresponding layer at receiver's side.
- 4.) Port address : transport layer, logical address : network layer, physical address : data link and physical layer.
 - Port address is the address of a process on a host
 - A logical address (IP) in the Internet is currently a 32-bit address that can uniquely define a host connected to the Internet
 - Physical address is the address of node as defined by its LAN or WAN

- 5) The Application layer enables the user, whether a human or software, to access the network. It provides user interfaces and support for services such as electronic mail, remote file access and transfer, shared database management and other type of distributed information services. Network virtual terminal, file transfer access and management, mail service, directory services.
- 6) The process at each machine that communicates at a given layer. Physical layer has a direct link b/w 2 devices, while other layer have to pass the information down to the lower layers on the sender devices by adding extra bits at each layer, and the receiver device unwraps the messages at each layer moving upwards till it finally reaches the corresponding communicating layer.
- 7.) a) Presentation
b.) Session
c.) Data link and transport
d.) Session
e.) Presentation.
- 8.) a.) Application
b.) Data link and transport
c.) Physical
d.) Data link.



WIRESHARK

```
Last login: Sun Aug 16 21:53:58 on ttys009
The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
[Authenticode]MacBook-Pro-2:~ 19BCE245 ~
lo0: flags=8049UP,BROADCAST mtu 1500
    options=403<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP>
    inet 127.0.0.1 netmask 0xffffffff
        inet6 ::1 prefixlen 128
            inet fe80::1%lo0 prefixlen 64 scopeid 0x1
                nd6 options=201<PERFORMNUD,DAD>
gi0: flags=8049UP,BROADCAST,MULTICAST mtu 1280
    options=403<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP>
    ether 3a:f9:d3:ac:01:19
        media: autoselect
        status: inactive
en0: flags=8049UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST mtu 1500
    options=403<CHANNEL_IO>
    ether 38:f9:d3:ac:01:19
        inet6 fe80::86:81bb:503c:29ken0 prefixlen 64 secured scopeid 0x6
        inet 192.168.0.102 netmask 0xffffffff broadcast 192.168.0.255
            nd6 options=201<PERFORMNUD,DAD>
            media: autoselect
            status: active
en1: flags=8049UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST mtu 1500
    options=448<TS04,TS06,CHANNEL_IO>
    ether 82:98:89:67:cc:01
        media: autoselect <full-duplex>
        status: inactive
en2: flags=8049UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST mtu 1500
    options=448<TS04,TS06,CHANNEL_IO>
    ether 82:98:89:67:cc:08
        media: autoselect <full-duplex>
        status: inactive
en3: flags=8049UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST mtu 1500
    options=448<TS04,TS06,CHANNEL_IO>
    ether 82:98:89:67:cc:05
        media: autoselect <full-duplex>
        status: inactive
en4: flags=8049UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST mtu 1500
    options=448<TS04,TS06,CHANNEL_IO>
    ether 82:98:89:67:cc:04
        media: autoselect <full-duplex>
        status: inactive
bridge0: flags=8063UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST mtu 1500
    options=63<RXCSUM,TXCSUM,TS04,TS06>
    ether 82:98:89:67:cc:01
    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 0 path cost 0
    member: en2 flags=3<LEARNING,DISCOVER>
        ifmaxaddr 0 port 8 priority 0 path cost 0
    member: en3 flags=3<LEARNING,DISCOVER>
        ifmaxaddr 0 port 0 priority 0 path cost 0
    member: en4 flags=3<LEARNING,DISCOVER>
        ifmaxaddr 0 port 10 priority 0 path cost 0
```

ifconfig

Screenshot 1

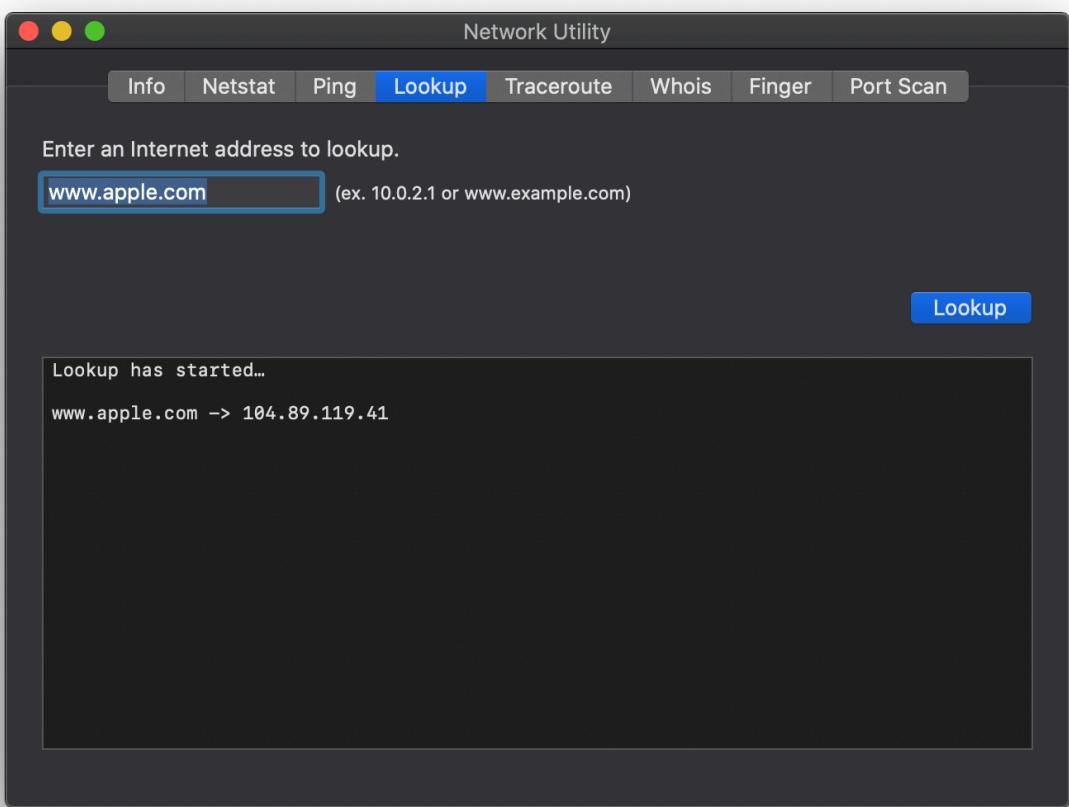
```

media: autoselect <full-duplex>
status: inactive
en3: flags=9&43<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
options=4&0<TS04,TS06,CHANNEL_IO>
ether 82:98:89:67:cc:05
media: autoselect <full-duplex>
status: inactive
en4: flags=9&43<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
options=4&0<TS04,TS06,CHANNEL_IO>
ether 82:98:89:67:cc:04
media: autoselect <full-duplex>
status: inactive
bridge0: flags=4&43<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
options=4&0<TS04,TXCSUM,TXSUM,TS04,TS06>
ether 82:98:89:67:cc:01
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 7 priority 0 path cost 0
member: en2 flags=3<LEARNING,DISCOVER>
    ifmaxaddr 0 port 8 priority 0 path cost 0
member: en3 flags=3<LEARNING,DISCOVER>
    ifmaxaddr 0 port 9 priority 0 path cost 0
member: en4 flags=3<LEARNING,DISCOVER>
    ifmaxaddr 0 port 10 priority 0 path cost 0
nd6 options=2&1<PERFORMNUD,DAD>
media: <unknown type>
status: inactive
p2p0: flags=8&43<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 2304
options=4&0<CHANNEL_IO>
ether 0:ff:0:0:d3:ac:01:19
media: autoselect
status: inactive
awd10: flags=9&43<UP,BROADCAST,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1484
options=4&0<CHANNEL_IO>
ether 66:d0:07:78:a1:4a
inet6 fe80::44d0:77ff:fe8a:13a4%awd10 prefixlen 64 scopeid 0xd
nd6 options=2&1<PERFORMNUD,DAD>
media: autoselect
status: inactive
llw0: flags=8&43<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
options=4&0<CHANNEL_IO>
ether 66:d0:07:78:a1:4a
inet6 fe80::44d0:77ff:fe8a:13a4%llw0 prefixlen 64 scopeid 0xe
nd6 options=2&1<PERFORMNUD,DAD>
media: autoselect
status: inactive
utun0: flags=8&051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1380
inet6 fe80::0b17:p258:bae9:771e%utun0 prefixlen 64 scopeid 0xf
nd6 options=2&1<PERFORMNUD,DAD>
utun1: flags=8&051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 2000
inet6 fe80::7009:11c:8f1c:bde8%utun1 prefixlen 64 scopeid 0x10
nd6 options=2&1<PERFORMNUD,DAD>
en5: flags=4&43<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
ether ac:de:48:09:11:22
inet6 fe80::ade4:8fff:fe09:1122%en5 prefixlen 64 scopeid 0x4
nd6 options=2&1<PERFORMNUD,DAD>
media: autoselect (10baseTX <full-duplex>)
status: active
Aayushs-MacBook-Pro:- aayush$ 

```

ifconfig

Screenshot 2

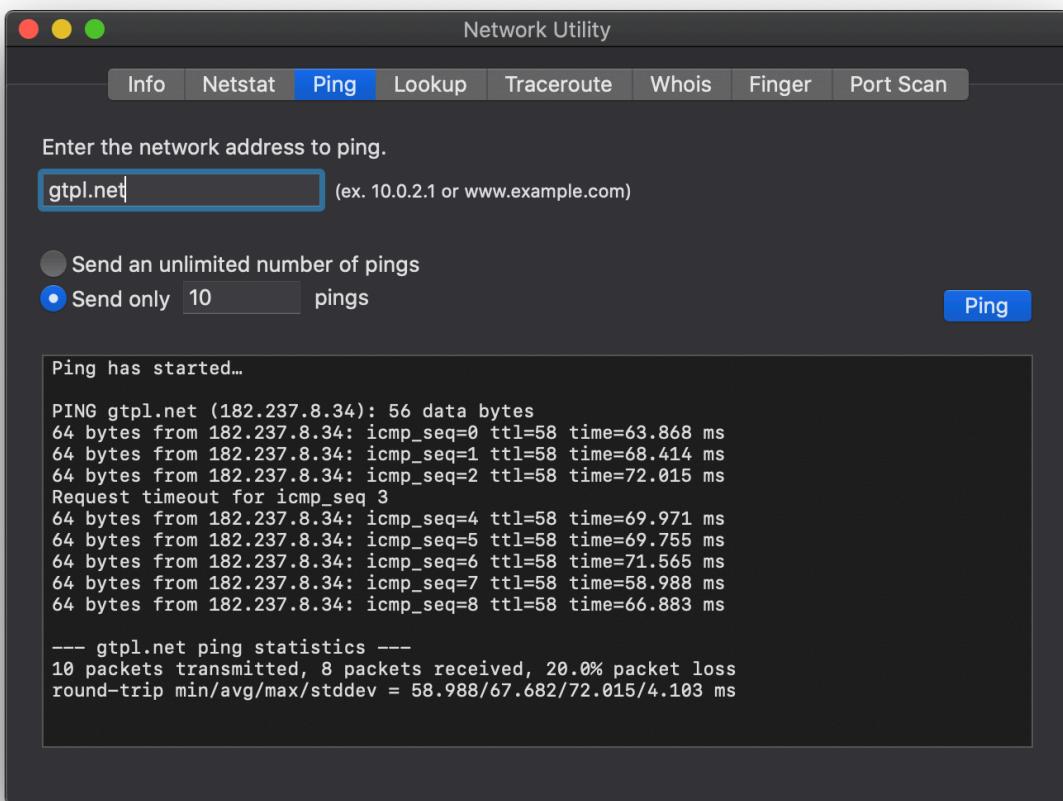


Lookup

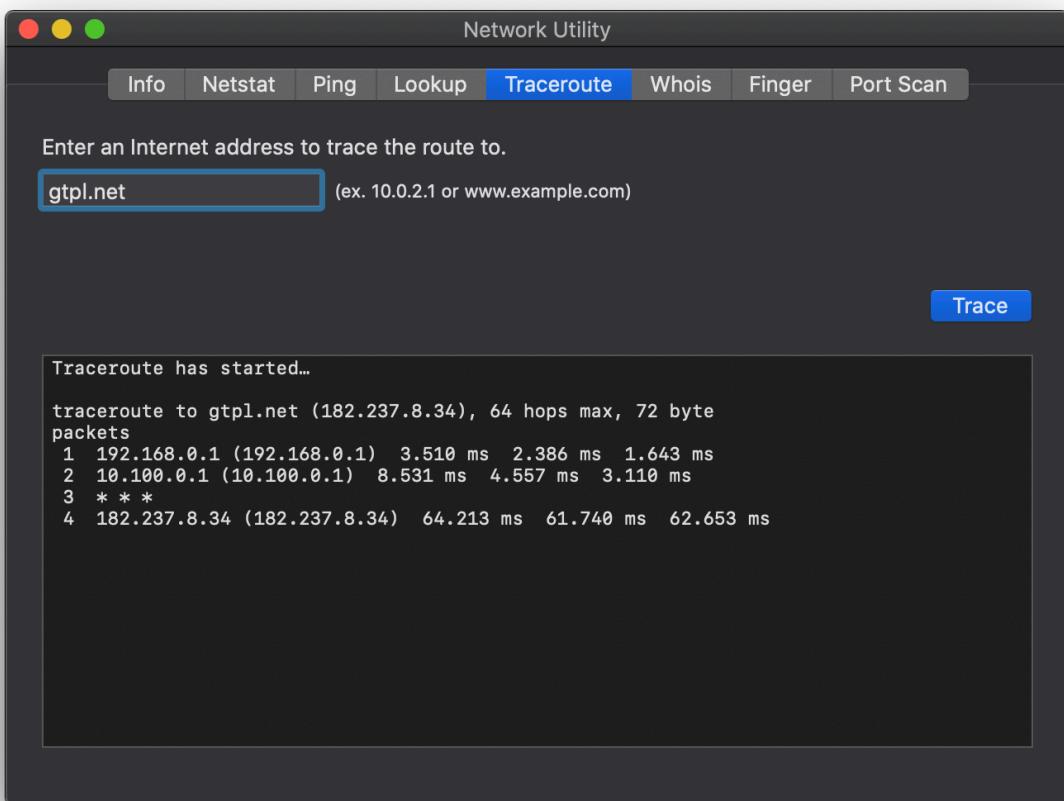
```
● ● ● aayush — netstat — 80x24
Last login: Sun Aug 16 21:44:32 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
[Aayushs-MacBook-Pro:~ aayush$ netstat
] Active Internet connections
Proto Recv-Q Send-Q Local Address          Foreign Address        (state)
tcp4      0      0 192.168.0.102.50933  ec2-54-64-149-11.https ESTABLISHED
tcp4      0      0 192.168.0.102.50931  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50930  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50929  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50928  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50927  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50926  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50925  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50924  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50923  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50922  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50921  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50920  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50919  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50918  a23-36-253-25.de.https ESTABLISHED
tcp4      0      0 192.168.0.102.50917  a23-36-253-25.de.https ESTABLISHED
```

Netstat



Ping



Traceroute