SEHH2238

Computer Networking

Group 13

Assignment 2

Member:

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Part A

Q1

(a) N=1+5+7+5+0+0 = 18 mod 10 +17
=25
Therefore, the address is 10.100.111.216/25
The binary address is 00001010.01100100.01101111.11011000/25

The mask in dotted binary notation is
11111111.11111111.11111111.10000000
The mask in dotted decimal notation is 255.255.255.128

(b) The starting range is 10.100.111.128
The end range is 10.100.111.255
which have a total of 128 addresses

(c) The network address(binary) is 00001010.01100100.01101111.10000000
The network address(decimal) is 10.100.111.128

(d) The broadcast address(binary) is 00001010.01100100.01101111.11111111
The broadcast address(decimal) is 10.100.111.255

Q2

(a) 1st first address: 10101100 00011111 00000000 00000000/22

	First address	Last address
1st company	172.31.0.0/22	172.31.3.255/22
2nd company	172.31.4.0/22	172.31.7.255/22
3rd company	172.31.8.0/22	172.31.11.255/22
4th company	172.31.12.0/22	172.31.15.255/22

(b) 1st first address: 10101100 00011111 00010000 00000000/25

	First address	Last address
1st company	172.31.16.0/25	172.31.16.127/25
2nd company	172.31.16.128/25	172.31.16.255/25
3rd company	172.31.17.0/25	172.31.17.127/25
4th company	172.31.17.128/25	172.31.17.255/25
4 last company	172.31.30.0/25	172.31.30.127/25
3 last company	172.31.30.128/25	172.31.30.255/25
2 last company	172.31.31.0/25	172.31.31.127/25
Last company	172.31.31.128/25	172.31.31.255/25

(c) 1st first address: 10101100 00011111 00100000 00000000/27

	First address	Last address
1st company	172.31.32.0/27	172.31.32.31/27
2nd company	172.31.32.32/27	172.31.32.63/27
3rd company	172.31.32.64/27	172.31.32.95/27
4th company	172.31.32.96/27	172.31.32.127/27
4 last company	172.31.47.128/27	172.31.47.159/27
3 last company	172.31.47.160/27	172.31.47.191/27
2 last company	172.31.47.192/27	172.31.47.223/27
Last company	172.31.47.224/27	172.31.47.255/27

Part B

Q1

Physical Address	2C-F0-5D-38-0C-6B
IPv4 Address	192.168.0.159
Default Gateway	192.168.0.1
DNS Server	1.1.1.1

Q2

ip.src == 192.168.0.159 and tcp

	Information(in hex)
Destination Ethernet Address	b0:4e: 26:1c:f9:44
Source Ethernet Address	2c:f0:5d:38:0c:6b
Type	0x0800

i) 192.168.0.1

ii) No

iii) Router

Q3

Header Field	**Value (hex)**	**Meaning**
Version	4	Version:4
Header Length	5	20 bytes
Service type	00	DSCP: CS0, ECN: NOT-ECT
Total Length	00 7e	126
Identification	34 1b	13339
Flags	40	Don’t fragment
Fragment Offset	00	0
Time to Live	80	128
Protocol	06	TCP
Header checksum	00 00	validation disabled
Source IP address	C0 a8 00 9f	192.168.0.159
Destination address	A2 9f 81 eb	162.159.129.235

Q4

Used filter: ip.addr == 14.136.239.59 and tcp.port == 443 and tcp.port == 54016

(a) 14.126.239.59

(b) Server: 443 client: 54016

(c)

No.	Source IP address	Destination IP address	Source port no.	Destination port no.	Flags (0x)	What happened
1903	192.168.0.159	14.136.239.59	54016	443	40	SYN
1921	14.136.239.59	192.168.0.159	443	54016	40	SYN, ACK
1922	192.168.0.159	14.136.239.59	54016	443	40	ACK

(d)

	Length in bytes
Total length	1500 bytes
Ethernet header length	14 bytes
IP header length	20 bytes
TCP header length	20 bytes
TCP Segment length	1460 bytes

(e)

No.	Source IP address	Destination IP address	Source port no.	Destination port no.	Flags (0x)	What happened
5777	192.168.0.159	14.136.239.59	54016	443	011	FIN, ACK
5842	14.136.239.59	192.168.0.159	443	54016	011	FIN, ACK
5845	192.168.0.159	14.136.239.59	54016	443	014	RST, ACK

(f) TCP Keep-Alive packet is to check two links between the two link is connecting and to prevent the link disconnected. After the server issues a FIN request, the client sends TCP Keep-Alive packets to ensure that the server still running and does not disconnect.

(g) Selected frame 2126

Frame no.	payload	Payload size(bytes)	Sequence no.	Acknowledge number
2121	407-1866	1460	32240	3202
2122	1867-3326	1460	33700	3202
2123	3327-4786	1460	35160	3202
2124	4787-6246	1460	36620	3202
2125	6247-7706	1460	38080	3202

(h) Frame no.: 2126

TCP segment length: 8221

```
Transmission Control Protocol, Src Port: 443, Dst Port: 54016, Seq: 39540, Ack: 3202, Len: 1460
  Source Port: 443
  Destination Port: 54016
  [Stream index: 30]
  [Conversation completeness: Complete, WITH_DATA (63)]
  [TCP Segment Len: 1460]
  Sequence Number: 39540    (relative sequence number)
  Sequence Number (raw): 88288403
  [Next Sequence Number: 41000    (relative sequence number)]
  Acknowledgment Number: 3202    (relative ack number)
  Acknowledgment number (raw): 1959216645
  0101 .... = Header Length: 20 bytes (5)
> Flags: 0x010 (ACK)
  Window: 169
  [Calculated window size: 21632]
  [Window size scaling factor: 128]
  Checksum: 0x42d0 [unverified]
  [Checksum Status: Unverified]
  Urgent Pointer: 0
> [Timestamps]
v [SEQ/ACK analysis]
    [iRTT: 0.006533000 seconds]
    [Bytes in flight: 8760]
    [Bytes sent since last PSH flag: 17520]
  TCP payload (1460 bytes)
  TCP segment data (514 bytes)
  TCP segment data (880 bytes)
[7 Reassembled TCP Segments (8221 bytes): #2119(407), #2121(1460), #2122(1460), #2123(1460), #2124(1460), #2125(1460), #2126(514)]
```

Q5

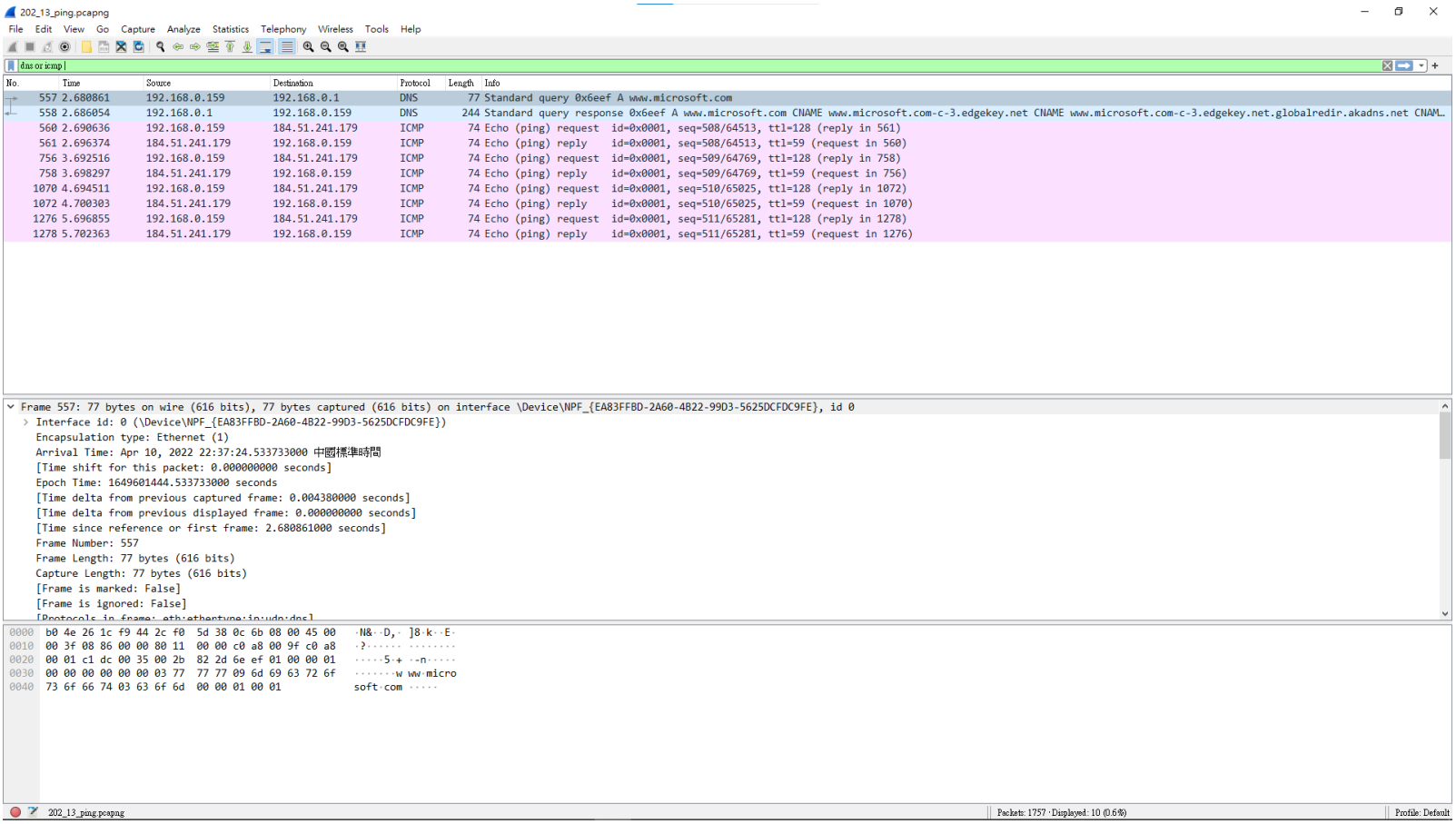
Frame no.	Source IP address	Destination IP address	Transport layer protocol	Source port number	Destination port number	Domain name/ IP address
24	192.168.0.159	1.1.1.1	UDP	58666	53	clients2.google
33	1.1.1.1	192.168.0.159	UDP	53	58666	clients2.google
68	192.168.0.159	1.1.1.1	UDP	63790	53	mtalk.google
70	1.1.1.1	192.168.0.159	UDP	53	63790	mtalk.google
106	192.168.0.159	1.1.1.1	UDP	52690	53	update.googleapis
114	1.1.1.1	192.168.0.159	UDP	53	52690	update.googleapis

Q6

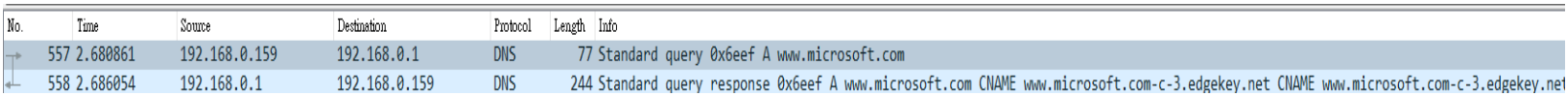
(A)

```
C:\Users\abaddon>ping www.microsoft.com

Pinging e13678.dscb.akamaiedge.net [184.51.241.179] with 32 bytes of data:
Reply from 184.51.241.179: bytes=32 time=5ms TTL=59
Reply from 184.51.241.179: bytes=32 time=5ms TTL=59
Reply from 184.51.241.179: bytes=32 time=5ms TTL=59
Reply from 184.51.241.179: bytes=32 time=5ms TTL=59

Ping statistics for 184.51.241.179:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 5ms, Average = 5ms
```

(B)Used filter: dns or icmp



(C)

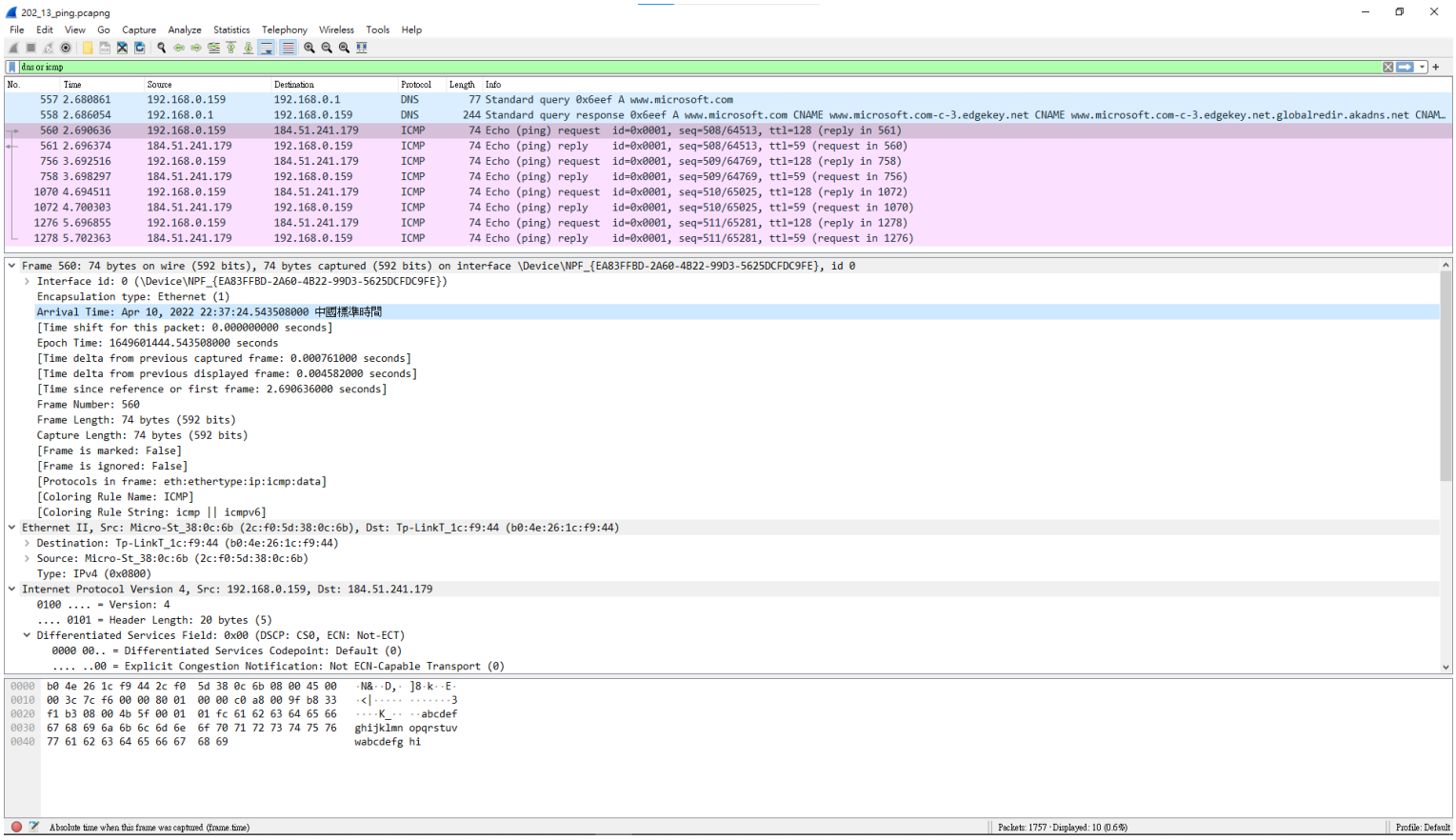


(D)

Frame no	Source IP address	Destination IP address	Protocol	Source port number	Destination port number	Domain name/ IP address
557	192.168.0.159	192.168.0.1	DNS	49628	53	microsoft
558	192.168.0.1	192.168.0.159	DNS	53	49628	microsoft

Frame no.	Time	Source IP address	Destination IP address	Protocol	Time to Live	Type	Response Time	Sequence Number (BE)	Sequence Number (LE)
560	2.691	192.168.0.159	184.51.241.179	ICMP	128	8	n.a.	508	64513
561	2.696	184.51.241.179	192.168.0.159	ICMP	59	0	5.738ms	508	64513
756	3.693	192.168.0.159	184.51.241.179	ICMP	128	8	n.a.	509	64769
758	3.698	184.51.241.179	192.168.0.159	ICMP	59	0	5.781ms	509	64769
1070	4.695	192.168.0.159	184.51.241.179	ICMP	59	8	n.a.	510	65025
1072	4.700	184.51.241.179	192.168.0.159	ICMP	128	0	5.792ms	510	65025
1276	5.697	192.168.0.159	184.51.241.179	ICMP	59	8	n.a.	511	65281
1278	5.702	184.51.241.179	192.168.0.159	ICMP	128	0	5.508ms	511	65281

E) We can find timestamp in the packet headers. While packets are being captured, each packet is time stamped as it comes in. While capturing packets, Wireshark gets the time stamps from the Npcap library and the Npcap library in turn gets them from the operating system kernel. Finally, Wireshark gets the response time. capture data is loaded from a capture file, Wireshark obviously gets the data from that file.



F)

32 bytes

Hex:

61 62 63 64 65 66 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76 77 61 62 63 64 65 66 67 68 69

ASCII:

a b c d e f g h I j k l m n o p q r s t u v w a b c d e f g h i