CS425A: Computer Networks
Assignment 3

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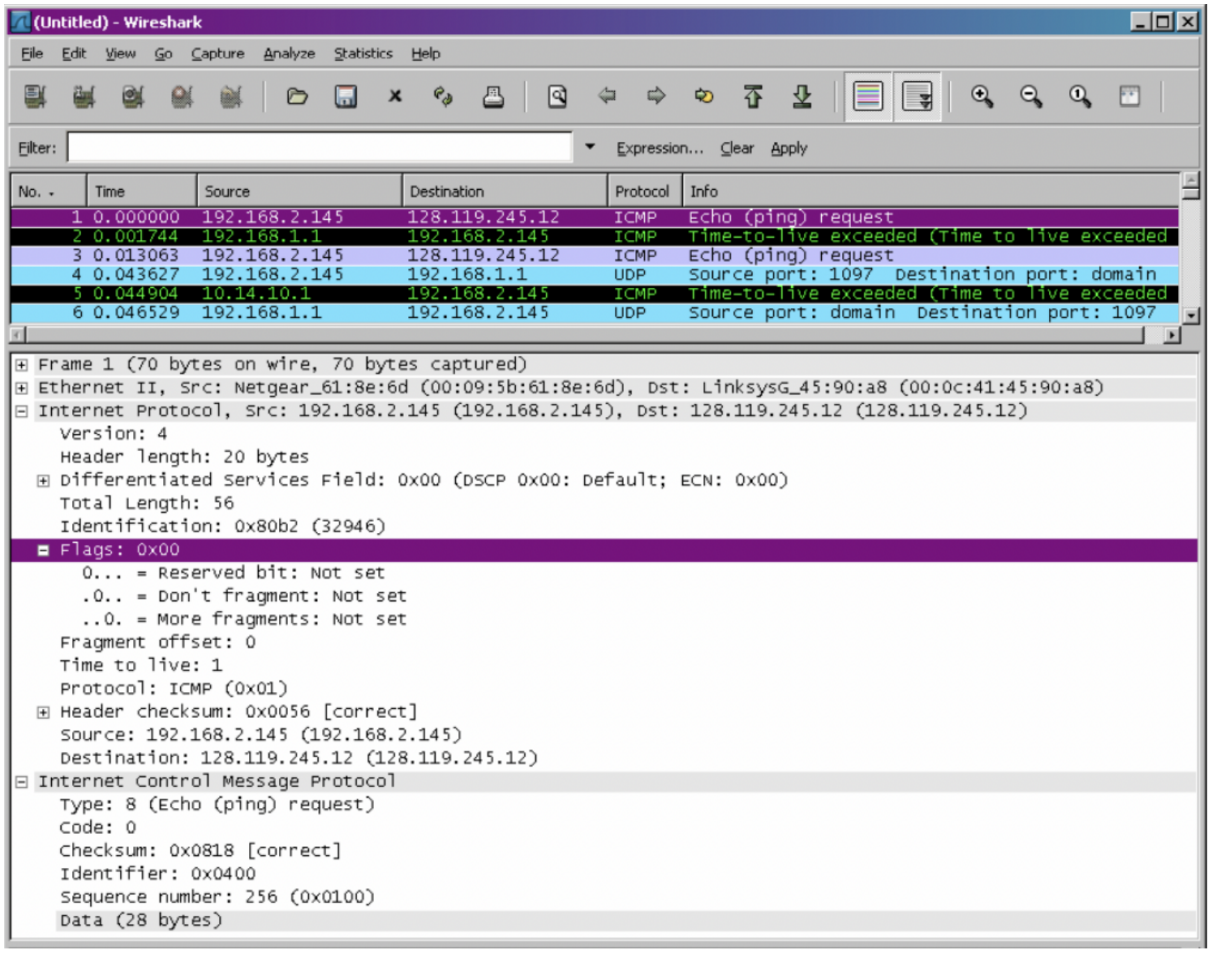
1 Part 1



1.1 Question 1:

Within the IP packet header, what is the value in the upper layer protocol field?
Solution: ICMP (0x01).

1.2 Question 2:

How many bytes are in the IP header? How many bytes are in the payload of the IP datagram? Explain how you determined the number of payload bytes.
Solution: The IP datagram has a header that spans 20 bytes. And therefore the payload of an IP datagram is 36 bytes, calculated by subtracting the 20-byte header from the total 56-byte length.

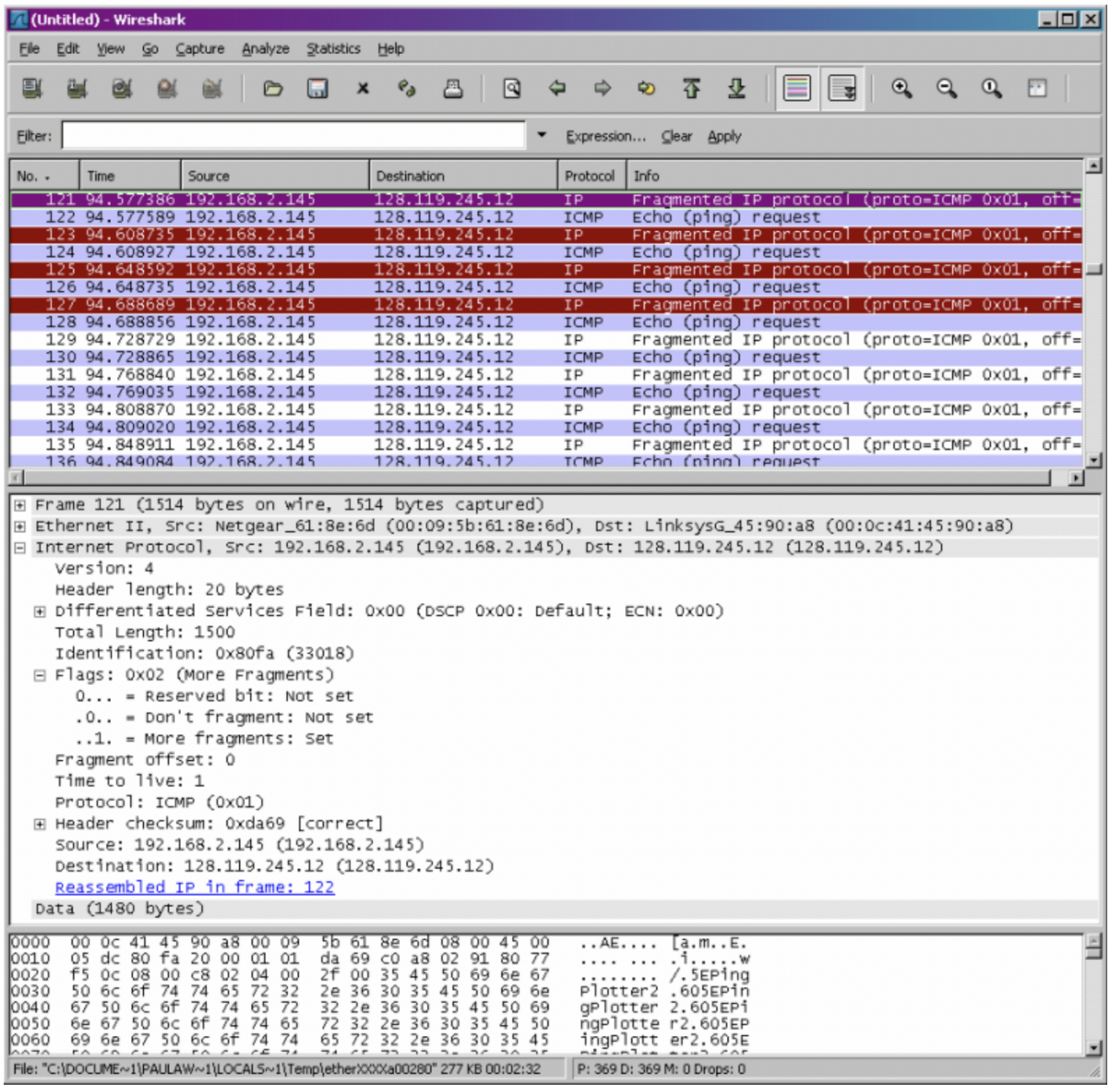
1.3 Question 3:

Has this IP datagram been fragmented? Explain how you determined whether or not the datagram has been fragmented.
Solution: This IP packet remains unfragmented because its fragment offset is set to 0, and the "more fragments" field is inactive.

1.4 Question 4:

What is the value in the Identification field and the TTL field?
Solution: The Identification field holds the value 32946 (0x80b2), and the Time to Live (TTL) field is set to 1.

2 Part 2



2.1 Question 5:

Can you say whether the message corresponding to the above packet has been fragmented?
Solution: It can be definitively stated that the message associated with the aforementioned packet has undergone fragmentation.

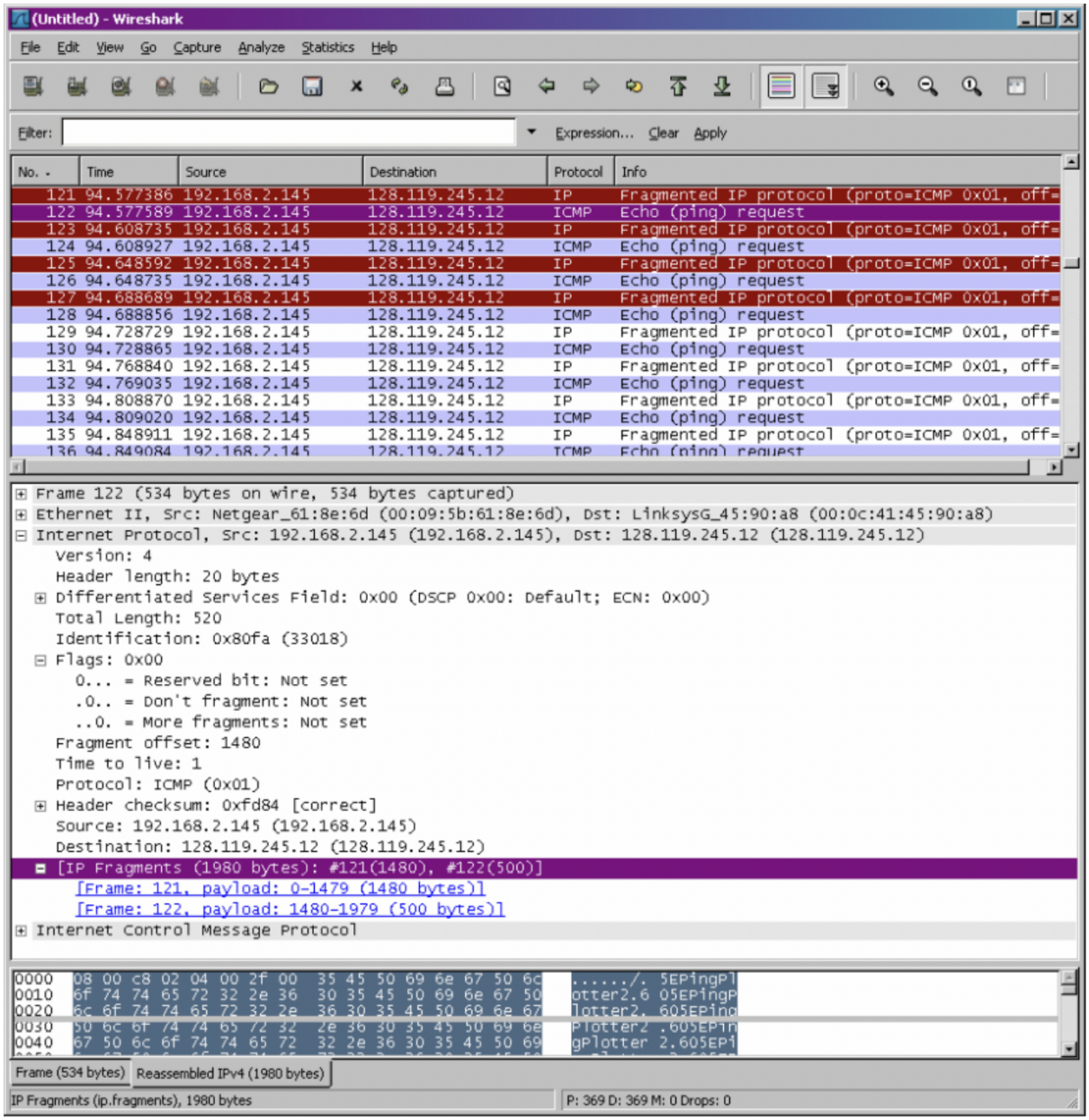
2.2 Question 6:

What information in the IP header indicates that the datagram been fragmented?
Solution: The fragment offset value is 0, and the "more fragments" field is marked as 1, signifying that the datagram has undergone fragmentation.

2.3 Question 7:

What information in the IP header indicates whether this is the first fragment versus a latter fragment?
Solution: The fragment offset, with its value set to 0, indicates that this is the initial fragment.

3 Part 3



3.1 Question 8:

What information in the IP header indicates that this is not the first datagram fragment?
Solution: The fragment offset, having a value of 1480 instead of 0, signals that this piece is not the initial fragment.

3.2 Question 9:

Are the more fragments? How can you tell?
Solution: No subsequent fragments are present, as indicated by the "more fragments" field being unset, with its value at 0.

3.3 Question 10:

If Fig. 2 and Fig. 3 are the 1st and 2nd fragments of a message, then what fields change in the IP header between the first and second fragment?
Solution: The comparison between the two fragments reveals variations in four distinct fields. These alterations, listed sequentially based on their appearance, are delineated as follows:

1. The **Total Length** parameter exhibits a modification, transitioning from 1500 in the initial fragment to 520 in the subsequent one.
2. The **Flags** field displays a change, evolving from 0x02 in the first instance to 0x00 in the latter. This shift indicates that the 'more fragments' flag was active in the first fragment but is not in the second.
3. A variation is observed in the **Fragment Offset**, which is initially 0 and alters to 1480 in the second fragment, reflecting the position of the fragment within the original packet data.
4. Lastly, the **Header Checksum** undergoes a modification, from 0xda69 in the premier fragment to 0xfd84 in the ensuing one.