CS425A: Computer Networks

Assignment 3

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Question 1

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

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.

The header length of the IP datagram is 20 bytes, so there are 20 bytes in the IP header. There are 36 bytes in the payload of the IP datagram, because the total length is given to be 56 bytes. So, we subtract the header length from the total length to obtain the number of bytes in the payload.

Question 3

Has this IP datagram been fragmented? Explain how you determined whether or not the datagram has been fragmented.

This IP datagram has not been fragmented because the **fragment offset** is 0, and the **more fragments** field has not been set.

Question 4

What is the value in the Identification field and the TTL field?
The value in the Identification field is 32946 (0x80b2), and the value in the TTL field is 1.

Question 5

Can you say whether the message corresponding to the above packet has been fragmented?
Yes, we can say conclusively that the message corresponding to the above packet has been fragmented.

Question 6

What information in the IP header indicates that the datagram been fragmented?

The value in the **fragment offset** is 0, and the **more fragments** field has been set to 1, thus indicating that the datagram has been fragmented.

Question 7

What information in the IP header indicates whether this is the first fragment versus a latter fragment?

The fragment offset lets us know that this is the first fragment since the offset's value is **0**.

Question 8

What information in the IP header indicates that this is not the first datagram fragment?

Again, the fragment offset lets us know that this is not the first fragment, since its value is **not 0** (the value of the fragment offset is 1480).

Question 9

Are there more fragments? How can you tell?

No, there are no more fragments. This is because the **more fragments** field has not been set (its value is 0).

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?

4 fields have changed between the two fragments. These are (in order of appearance):

- Total Length has changed from 1500 in the first one, to 520 in the second one.
- Flags have been changed from 0x02 in the first fragment, to 0x00 in the second fragment. Essentially, the first fragment has its more fragments field set in the flag while the second fragment does not.
- Fragment Offset has changed from being 0 for the first fragment to being 1480 for the second fragment.
- Header Checksum has changed from being 0xda69 in the first one to being 0xfd84 in the second one.