CS425: COMPUTER NETWORKS

Assignment 3

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Problem 1

The value in the upper layer protocol field, within the IP packet header, is **ICMP (0x01).**

Problem 2

The IP datagram's header is **20 bytes** in length, implying the IP header has **20 bytes**. Given the IP datagram's total length as **56 bytes**, the payload therefore occupies **36 bytes**. This is derived through subtracting the header length from the total length:

$$\text{Payload Length} = \text{Total Length} - \text{Header Length} = 56\,\text{bytes} - 20\,\text{bytes} = 36\,\text{bytes}$$

Problem 3

The IP datagram is **unfragmented**, indicated by the **fragment offset** value of **0** and the *more fragments* field being **unset**.

Problem 4

The *Identification field* has the value **32946 (`0x80b2`)**, and the *Time to Live (TTL)* field is assigned a value of **1**.

Problem 5

It can be conclusively determined that the message corresponding to the given packet has been **fragmented**.

Problem 6

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

Problem 7

The *fragment offset*, with a value of **0**, signifies that this fragment represents the **first fragment** of the data packet.

Problem 8

The *fragment offset*, having a value of **1480**, indicates that this segment **does not represent** the **first fragment**, as its value is not **0**.

Problem 9

No further fragments are present, as the *more fragments* field is **unset**, with its value as **0**.

Problem 10

Four fields have been modified between the two fragments, detailed as follows (in order):

1. The *Total Length* field has been adjusted from **1500** in the *initial fragment* to **520** in the *latter*.

2. The *Flags* field was modified from `0x02` in the first fragment to `0x00` in the second fragment. This signifies that the **more fragments** field was set in the flag for the first fragment, but not for the second.

3. The *Fragment Offset* has shifted from **0** in the *first fragment* to **1480** in the second, denoting the fragment's sequence in the original packet.

4. The *Header Checksum* has altered from **`0xda69`** in the first fragment to **`0xfd84`** in the second, reflecting changes in the packet's header information.