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Assignment 6

Q1) What is the size of UDP header? What are the different fields? Describe its fields.

→ The size of header is 8 bytes (64 bits).

Source Port	Destination Port
Length	Checksum
Application data (message)	

Fig: UDP Header format

- There are 4 main fields and they are:

① Source Port:

This field is an optional field. When meaningful, it indicates the port of the sending process and assumed to be the port to which a reply should be addressed. If the field is not used, a value of zero is inserted. It is a 2-byte long field.

② Destination Port:

This field identifies the destination port and is required. It is a 2-byte long field.

③ Length:

This is the size in bytes of the UDP packet including the header and data. The minimum length is 8 bytes, the length of the header zone.

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(v) Checksum:

The 2-byte long checksum field is used for error checking of the header and data.

(Q2) What is the size of TCP header? What are the different fields? Describe its fields?

⇒ The header of a TCP segment can range from 20-60 bytes. 40 bytes are for options. If there are no options, header is of 20 bytes else it can be of utmost 60 bytes.

32 bits						
Source Port						Destination Port
Sequence number						
Acknowledgement number						
TCP header length	U R G	A C K	P S H	R S T	S Y N	F I N	Window size
Check sum						Urgent Pointer
Options						
Data						

Fig: TCP header format

The different fields of TCP header are:

① Source Port:

This is a 16-bit field that holds the port address of the application that is sending the data segment.

⑪ Destination port address:

This is a 16-bit field that holds the port address of the application in the host that is receiving the data segment.

⑪ Sequence number:

This is a 32-bit field that holds the sequence number ie. the byte number of the first byte that is sent in that particular segment.

⑫ Acknowledgement number:

This is a 32-bit field that holds the acknowledgement number ie. the byte number that the receiver expects to receive next.

⑬ Header Length (HLEN):

This is a 4-bit field that indicates the length of the TCP header by number of 4-byte words in the header, ie. if the header is of 20 bytes, then this field will hold 5 (because $5 \times 4 = 20$. & if the header is of maximum length: 60 bytes, then it will hold value 15 (because $15 \times 4 = 60$).

Hence, the value of this field is always between 5 & 15.

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- **Control flags:**

There are 6 1-bit control bits.

① **URG:**

Urgent pointer is valid, the receiving TCP should interpret the urgent pointer field.

② **ACK:**

Acknowledgement number is valid

③ **PSH:**

Request for push.

④ **RST:**

Reset the connection

⑤ **SYN:**

Synchronize sequence numbers.

⑥ **FIN:**

Terminate the connection (finish)

- **Window size:**

This field tells the window size of the sending TCP in bytes.

- **Checksum:**

This field holds the checksum for error control. It is mandatory in TCP as opposed to UDP.

- **Urgent Pointer:**

This field (valid only if the URG control flag is set)

is used to point the data that is urgently required that needs to reach the receiving process at the earliest.

- Options:

  This field provides additional functionality, like congestion control.