CÂU HỎI ÔN TẬP PE NWC203c

Q.1 Suppose an application layer entity wants to send an *L*-byte message to its peer process, using an existing TCP connection. The TCP segment consists of the message plus 20 bytes of header. The segment is encapsulated into an IP packet that has an additional 20 bytes of header. The IP packet in turn goes inside an Ethernet frame that has 18 bytes of header and trailer. What percentage of the transmitted bits in the physical layer correspond to message information, if *L* = 100 bytes, 500 bytes, 1000 bytes

Anwser: Because the message overhead includes – TCP's header: 20 bytes; IP packet's header: 20 bytes and Ethernet frame's header and trailer: 18 bytes. Therefore, if an message consists of L byte length so that the total bytes of that message now is L + 20 + 20 + 18 = L + 58. The percentage percentage of the transmitted bits in the physical layer correspond to message information is p = [L/(L+58)].100. When L = 100 bytes → p ≈ 63.29%; L = 500 bytes → p ≈ 89.61%; L = 1000 bytes → p ≈ 94.52%

Note: Explain your answer in details

Q2. Suppose the size of an uncompressed text file is 1 megabyte

a. How long does it take to download the file over a 32 kilobit/second modem?

1 megabye = 1*10^6*8 bits; It will takes 1*10^6*8 / (32*10^3) = 250 sec.

b. How long does it take to take to download the file over a 1 megabit/second modem?

1 Megabit = 10^6 bits. It will takes 1*10^6*8 / (10^6) = 8 sec.

c. Suppose data compression is applied to the text file. How much do the transmission times in parts (a) and (b) change?

If we assume a maximum compression ratio of 1:6, then we have the following times for the 32 kilobit and 1 megabit lines respectively:

Then 1 megabyte will be compressed into 1/6 megabyte.

T_{32k} = 10^6*8/(6*32*10^3) ≈ 41,67 sec; T_{1M} = 10^6*8 / (6*10^6) ≈ 1,33 sec;

Note: Explain your answer in details.

Q3. Consider the three-way handshake in TCP connection setup.

(a) Suppose that an old SYN segment from station A arrives at station B, requesting a TCP connection. Explain how the three-way handshake procedure ensures that the connection is rejected.

(b) Now suppose that an old SYN segment from station A arrives at station B, followed a bit later by an old ACK segment from A to a SYN segment from B. Is this connection request also rejected?

Note: Explain your answer in details.

a) In three-way handshake, to identify which connection is rejected or accepted, the initial sequence number is always unique. If B receives an old SYN segment form A, B will acknowledged the request base old sequence number. When A receives the acknowledge message from B, A will know B used the wrong initial sequence number and discard it then reset the connection.

b) First of all, B recieves an old SYN segment, B will send a SYN segment with its own unique sequence number set by B. If B receives the old ACK from A, B will inform A that the connection is invalid since the old ACK sequence numbers does not match the sequence number previously defined by B. Therefore, the connection is rejected.

Q.4 A router has the following CIDR entries in its routing table:

Address/mask Next hop

135.46.56.0/22 Interface 0

135.46.60.0/22 Interface 1

192.53.40.0 /23 Router 1

default Router 2

(a) What does the router do if a packet with an IP address 135.46.63.10 arrives?

    First, the router will check the routing entry starting with the longest prefix (/23) 135.46.63.10 AND 255.255.254.0 = 135.46.62.0 != 192.53.40.0 therefore this entry does not match. Next longest prefix is 22: 135.46.63.10 AND 255.255.253.0 = 135.46.60.0. Therefore this packet will routed out over Interface 1.

(b) What does the router do if a packet with an IP address 135.46.57.14 arrives?

    Similarly, the router will check the routing entry starting with the longest prefix (/23)
    135.46.57.14 AND 255.255.254.0 = 135.46.56.0 != 192.53.40.0 therefore this entry does not match. Next longest prefix is 22: 135.46.57.14 AND 255.255.252.0 = 135.46.56.0. Therefore this packet will routed out over Interface 0.

Note: Explain your answer in details.

Q5. Sender A wants to send 100111010011011 to receiver B. This transmission uses CRC algorithm for error detection with generator polynomial bits string is 10111. What is bits string will be transmitted on the medium. Show your all steps to have result.

First add 0000 to data bits string. It will be 1001110100110110000.

$0,3 \times 0,3$

$0,9$

$0,09$

. We can rewrite it as $x^{18}+x^{15}+x^{14}+x^{13}+x^{11}+x^{8}+x^{7}+x^{5}+x^{4}$ (1)

. get remainder after (1) divides x^4+x^2+x+1 (10111)

$$
\begin{array}{l|l}
x^{18}+x^{15}+x^{14}+x^{13}+x^{11}+x^{8}+x^{7}+x^{5}+x^{4} & x^4+x^2+x+1 \\
\hline
x^{16}+x^{13}+x^{11}+x^{8}+x^{7}+x^{5}+x^{4} & x^{14}+x^{12}+x^{10}+x^{6}+x^{2} \\
x^{14}+x^{12}+x^{11}+x^{8}+x^{7}+x^{5}+x^{4} & +x \\
x^{10}+x^{8}+x^{7}+x^{5}+x^{4} & \\
x^{6}+x^{5}+x^{4} & \\
x^{5}+x^{3}+x^{2} & \\
+x &
\end{array}
$$

Remainder is x which is 0010.

Therefore, transmitted bits string is 1001110100110110010.

Note: Explain your answer in details.

Note:

- **Students have to do details of each step to have result , if only write the result, students do not have point that sentences**
- **Students do examination on paper**