CÂU HỎI ÔN TẬP ĐỀ PE NWC203c FALL 2021

SV PHẢI LÀM TỪNG BƯỚC ĐẾN KẾT QUẢ

1. Suppose two hosts, A and B, are separated by 30,000 kilometers and are connected by a direct link of *R* = 3 Mbps. Suppose the propagation speed over the link is 2.5 x 10^8 meters/sec.

a. Calculate the bandwidth-delay product, *R* _ *d*prop.

b. Consider sending a file of 900,000 bits from Host A to Host B. Suppose the file is sent continuously as one large message. What is the maximum number of bits that will be in the link at any given time?

2. Let $g(x)=x^3+x+1$. Consider the information sequence 1011. Find the codeword corresponding to the preceding information sequence. Using polynomial arithmetic we obtain

3. A packet switch receives a packet and determines the outbound link to which the packet should be forwarded. When the packet arrives, one other packet is halfway done being transmitted on this outbound link and four other packets are waiting to be transmitted. Packets are transmitted in order of arrival.

Suppose all packets are 2,500 bytes and the link rate is 3 Mbps. What is the queuing delay for the packet? More generally, what is the queuing delay when all packets have length *L*, the transmission rate is *R*, *x* bits of the currently-being-transmitted packet have been transmitted, and *n* packets are already in the queue?

4. Suppose a header consists of four 16-bit words: (11111111 11111110, 11111111 00000000, 11110000 11110000, 11000000 11000001). Find the Internet checksum for this code

5. Consider a packet of length 2,000 bytes that propagates over a link of distance 3,500 km with propagation speed of $2{,}5 \cdot 10^8$ m/s, and transmission rate
2 Mbps?
a. How long does the packet propagation take?

b. Does this propagation delay depend on the packet length?
c. Does this propagation delay depend on the transmission rate?

6. 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?

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

7.Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 250 kbps, R2 = 3 Mbps, and R3 = 2 Mbps.

a. Assuming no other traffic in the network, what is the throughput for the file transfer?

b. Suppose the file is 4 million bytes. Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B?

8. 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 $L =$ 200 bytes, 1000 bytes, 2000 bytes

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

a. How long does it take to download the file over a 35 kilobit/second modem?

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

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 35 kilobit and 1 megabit lines respectively:

10. 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?

11. Sender A wants to send 100111010011110 to receiver B. This transmission uses CRC algorithm for error detection with generator polynomial bits string is 10110. What is bits string will be transmitted on the medium. Show your all steps to have result.

12. Consider the following network Figure 1. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from u to all network nodes. Show how the algorithm works by computing a table.

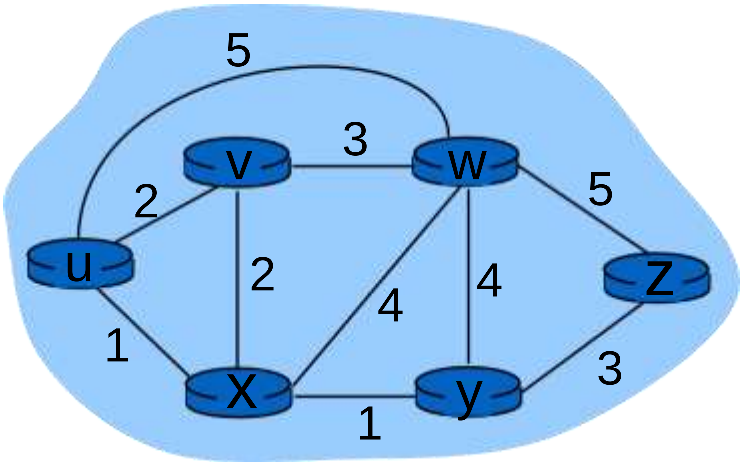

Figure 1

13. Let $g1(x) = x + 1$ and let $g2(x) = x^3 + x^2 + 1$. Consider the information bits (1,1,0,1,1,1).

a. Find the codeword corresponding to these information bits if g1(x) is used as the generating polynomial.

b. Find the codeword corresponding to these information bits if g2(x) is used as the generating polynomial.

14. Consider the 7-bit generator, G=10111, and suppose that D has the value 1010100001. What is the value of R? Show your all steps to have result.