Homework 1

> **Warning:** You have already made the maximum number of submissions. Additional submissions will not count for credit. You are welcome to try it as a learning exercise.

☐ **I, Matthew Kramer, certify that my answers here are my own work, and that I completed this in accordance with the Coursera Honor Code.**

Question 1

A client-server system uses a satellite network, with satellites at a height of 40,000 km.

What is the best case delay in response to a request?

(Hint: Speed of light is 300,000,000 meters/second)

○ 0.133 s

○ 533 ms

○ 1.067 s

○ 26 ms

Question 2

How long (in meters) was a bit in the original 802.3 standard? Use transmission speed of 10 mbps (mega bits per second) and assume the propagation speed in coax is 2/3 the speed of light in vacuum. (The speed of light in vacuum is 300,000,000 m/s)

○ 0.2 m

○ 200 m

○ 2 cm

○ 20 m

Question 3

TV channels are 6 MHz wide. How much data can be sent per second, if four-level digital signals are used? Assume a noiseless channel, and use the Nyquist limit.

- ○ 3,000,000 bits per second
- ○ 24 kbps (Kilobits per second)
- ○ 24,000,000 bits per second
- ○ 24,000,000 bytes per second

Question 4

What signal to noise ratio is needed to get a bit rate of 2 Mbps (mega bits per second) on a channel with 1MHz bandwidth?

Hint: Use Shannon limit

- ○ 47 dB
- ○ 4.77
- ○ 3
- ○ 3dB

Question 5

What characteristic of the network would you care most about to get good performance for the following activity:

Navigating a predominantly text-only website.

- ○ Low Latency
- ○ Both
- ○ High Bandwidth

Question 6

What characteristic of the network would you care most about to get good performance for the following activity:

Downloading a large video file.

- ⚪ Both
- ⚪ Low Latency
- ⚪ High Bandwidth

Question 7

What characteristic of the network would you care most about to get good performance for the following activity:

A remote shell application (such as telnet or SSH).

- ⚪ Low Latency
- ⚪ High Bandwidth
- ⚪ Both

Question 8

To provide more reliability than a single parity bit can give, an error-detecting coding scheme uses one parity bit for checking all the odd-numbered bits and a second parity bit for all the even-numbered bits. What is the Hamming distance of this code?

Remember: Hamming distance is the distance between two code words (valid words).

- ⚪ 1
- ⚪ 4
- ⚪ 0

◎ 2

Question 9

A bit string, 0111101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? Use the bit-stuffing technique discussed in lecture (where the flag is six consecutive 1's).

In your answer, write the encoded binary string.

Question 10

Issue traceroute to www.google.com and copy/paste the output below.

Question 11

Issue traceroute to www.facebook.com and copy/paste the output below.

Question 12

Issue traceroute to www.wikipedia.org and copy/paste the output below.

Question 13

Issue traceroute to www.bbc.co.uk and copy/paste the output below.

Question 14

Issue traceroute to www.nytimes.com and copy/paste the output below.

Question 15

Issue traceroute to www.twitter.com and copy/paste the output below.

Question 16

Issue traceroute to www.youtube.com and copy/paste the output below.

Submit Answers   Save Answers

You cannot submit your work until you agree to the Honor Code at the top. Thanks!