COMP90007 Internet Technologies
Semester 2, 2021
Assignment 1 Sample Solutions

Question 1 (1 point)

Compared to OSI, the hybrid model removes presentation and session layers, and include protocols used in practice.

Compared to TCP/IP, the hybrid model clearly splits physical and data link layer to avoid having a crowded link layer division. The hybrid model also distinguishes the concept of protocol, service and interfaces, which was not done in TCP/IP model.

Question 2 (1 point)

Amount of data: 5 * 1280 * 720 * 3 * 8 = 110,592,000 bits

(1) over a 256kbps modem

Transmission d

Propagation de

Latency = 432 +

(2) over a 1Gbps broadband link

Transmission delay = 110,592,000/10^9 = 0.110

Propagation delay = 1500/200,000 = 0.0075s

Latency = 0.110592 + 0.0075 = 0.118092s

Question 3 (1 point)

Using Shannon's theorem, we have: B x log(1+S/N)
SNR = 20dB, S/N = 100
Max data rate = 16kHz x $\log_2(1+100)$ = 16kHz x 6.658 = 106.528 kbps

Using Nyquist's theorem, we have: 2B x $\log_2$ V
Max data rate = 2 x 16kHz x $\log_2$ 8 = 2 x 16kHz x 3 = 96 kbps
The max data rate is 96kbps, as Nyquist's limit is the bottleneck.

Question 4 (1 point)

The check bits are at position 1, 2 and 4.

The data to send is _ _1_000,
if odd parity is used,

P1 + P3 + P5 + P7 = ?+1+0+0 → P1 = 0
P2 + P3 + P6 + P7 = ?+1+0+0 → P2 = 0
P4 + P5 + P6 + P7 = ?+0+0+0 → P4 = 1
The data to send is **00**1**1**000

Question 5 (1 point)

You are expected to answer this question relating the flow graph to the service primitives like LISTEN, CONNECT, ACCEPT, etc. and explain the results observed for selected service primitives.

As this question is open-ended, please check the comments on your answers (will be released soon with your grade) for more details.