

# 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 delay =  $110,592,000 / (256 * 1000) = 432s$

Propagation delay =  $1500 / 200,000 = 0.0075s$

Latency =  $432 + 0.0075 = 432.0075s$

(2) over a 1Gbps broadband link

Transmission delay =  $110,592,000 / 1000 = 0.110592s$

Propagation delay =  $1500 / 200,000 = 0.0075s$

Latency =  $0.110592 + 0.0075 = 0.118092s$

#### Question 3 (1 point)

Using Shannon's theorem, we have:  $B \times \log_2(1+S/N)$

SNR = 20dB,  $S/N = 100$

Max data rate =  $16kHz \times \log_2(1+100) = 16kHz \times 6.658 = 106.528$  kbps

Using Nyquist's theorem, we have:  $2B \times \log_2 V$

Max data rate =  $2 \times 16kHz \times \log_2 8 = 2 \times 16kHz \times 3 = 96$  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,

$P1 + P3 + P5 + P7 = ? + 1 + 0 + 0 \rightarrow P1 = 0$

$P2 + P3 + P6 + P7 = ? + 1 + 0 + 0 \rightarrow P2 = 0$

$P4 + P5 + P6 + P7 = ? + 0 + 0 + 0 \rightarrow P4 = 1$

The data to send is **0011000**

#### 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.

# Assignment Project Exam Help

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