

Semester A, 2012/13

a) $\lambda = 300 \text{ packets} / 60 \text{ sec.} = 5 \text{ packets} / \text{sec.}$
 $\mu = 64 \text{ kbps} / (500 * 8 \text{ bits}) = 16 \text{ packets} / \text{sec.}$
b) $T = 1 / (16 - 5) = 0.091 \text{ sec.}$

- The sequence number of the second segment is 121.
- The two acknowledgement numbers are 121 and 181.
- No, since TCP uses cumulative ACK. After receiving the second ACK, Host A knows that Host B has received both segments successfully.

a) Bandwidth-delay product = $(L / x) * d = L d / x$ bits
b) average rate = $L \text{ bits} / (x + d + y + d) \text{ sec.} = L / (x + y + 2d)$ bps

<https://www.coursehero.com/file/8665526/test2sol/>

5.

- a) $k = pq$, $n = (p + 1)(q + 1)$, or equivalently $pq + p + q + 1$
- b) min. distance = 4
- c) 4-bit error may not be detected.

6.

Host	Interface
D	2
A	1

Switch Table of S1

Host	Interface
D	3
C	2
A	1

Switch Table of S2

Host	Interface
D	1
C	2
A	1

Switch Table of S3

Host	Interface
D	2
C	1

Switch Table of S4

7.

- a) Max Throughput = $300 / (300 + 10) = 96.78\%$
- b)

$$\begin{aligned}
 \text{Average Throughput} &= \frac{300 \times 20}{(300 + 10) \times 20 + (10 + 10) \times 80} \\
 &= \frac{6000}{6200 + 1600} \\
 &= 76.92\%
 \end{aligned}$$

8. Apply each subnet mask and if the corresponding subnet number matches the Subnet Number column, then use the entry in Next Hop.

- a) Applying the subnet mask 255.255.254.0, we get 128.96.170.0. Use interface 0 as the next hop.
- b) Applying subnet mask 255.255.254.0, we get 128.96.166.0 (next hop is R2)
Applying subnet mask 255.255.252.0, we get 128.96.164.0 (next hop is R3)
As 255.255.254.0 is a longer prefix, use R2 as the next hop.
- c) None of the subnet number entries match, hence use default R4 as the next hop.
- d) Applying the subnet mask 255.255.254.0, we get 128.96.168.0. Use interface 1 as the next hop.

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