

Student _____

Group _____

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HOMework 1

1. Assume:

$$\lambda = 7.5 \times 10^5 \text{ packets/sec};$$

$$\mu = 9 \times 10^5 \text{ packets/sec};$$

$$B = 30 \text{ packets}.$$

Determine the packet loss ratio due to the buffer overflow.

2. Responses from 150 subjects on a VoIP quality are as follows:

Rating	Number of Subjects
Excellent	20
Good	55
Fair	45
Poor	20
Unsatisfactory	10

Determine the MOS, %GoB and %PoW.

3. Using the delay budget table for G.729 modem, determine the end to end delay of connection via an airplane 10 km above ground.

4. Erlang B System (Finding N)

Assume: Number of user hosts, $M = 100$; Number of virtual connection requests per host during busy hour, $\lambda = 5$; Virtual connection holding time, $H = 20 \text{ seconds}$. **What is the number of virtual connections required to keep the busy hour virtual connection blocking probability P_B at 0.5% (i.e., 0.005)?**

5. Erlang B System (Finding M)

Assume: Number of virtual connections, $N = 10$; Number of virtual connection requests per host during busy hour, $\lambda = 1.2$; Virtual connections holding time, $H = 30$ seconds. **Find the number of hosts that could be supported by the system if the required busy hour virtual connections blocking probability P_B is 2% (i.e., 0.02).**

6. Erlang B System (Finding P_B)

Assume: Number of users $M = 1400$; Number of virtual connections, $N = 20$; Number of virtual connection requests per host during busy hour, $\lambda = 3$; Virtual connection holding time, $H = 12$ seconds. **What is the busy hour virtual connection blocking probability during the busy hour?**

7. Erlang C System

Assume: Number of users, $M = 1,000$; Number of call requests per host during busy hour, $\lambda = 2$; Call holding time, $H = 1.5$ minutes; Number of virtual connections $N = 60$. **What is the mean delay of call?**