Exercises #1 of Computer Networks

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1. Suppose that we have a circuit-switched network where

   - users share a 1 Mbps link;
   - each user alternates periods of activity and of inactivity:
     - when he is active, he generates data at the constant rate of 100 Kbps;
     - when he is idle, he produces no data.
   - each user is active during 10% of the time.

   Question: How many users can the link support?

2. Consider a message of size $7.5 \cdot 10^6$ bits, three links of rate 1.5 Mbps connecting two hosts (i.e., there are two switches in-between them) and assume that there is no congestion and no delay at the switches.

   Question: How much time is required to send and receive the message?

3. The situation is as in case 2 but now the message is broken into two packets of equal size.

   Question: Assuming that only one packet can travel a link at a time, how much time is required to send and receive the message?