Homework on Stochastic Processes

1. Prove properties III and IV of a Poisson process (merging and splitting) listed in the class notes posted on the web site for the lecture on Stochastic processes. For the splitting case, just prove the random assignment case.

2. Consider a packet stream whereby packets arrive according to a Poisson process with rate 10 packets/sec. If the interarrival time between any two packets is less than the transmission time of the first to arrive, the two packets are said to collide. Find the probabilities that a packet does not collide with either its predecessor or its successor, and that a packet does not collide with another packet assuming all packets have a transmission time of 20ms.