Northwestern University
Department of Electrical and Computer Engineering

ELEC ENG 422 Winter 2020

Problem set 4: Date due: Feb. 12, 2020

Announcements:

- The mid-term will be on Feb. 12 during regular class time.

Reading: Sections 2.1-2.3 in the text.

Problems:

1. Exercise 2.3 in Gallager.
2. Exercise 2.4 in Gallager (this shows that if we started iwth the 2nd definition of a Poisson process, we could have derived the first definition).
3. You arrive at a corner to wait for a bus. Buses arrive according to a Poison process with rate $\lambda = 1$ bus/hour.
   a.) What is the average time between buses?
   b.) At the moment you arrive, what is the expected time until the next bus arrives?
   c.) At the moment you arrive, what is the expected time until the last bus arrived (Hint: Using the "Baby Bernoulli" definition of the Poisson process, relate this to the question in part (b).
   d.) Using your answers in parts (b) and (c) determine the expected time between the last bus and the next bus to arrive at the moment you arrive.
   e.) Your answers in (a) and (d) should be different. Can you explain this?
4. Exercise 2.23 parts (a)-(c) in Gallager.