2. In a distribution center pallets with products are transported on an automatic conveyor system. In Figure 1 a junction is shown, where pallets from the West and North join the main conveyor belt. The time to pass the transfer point (dark square in Figure 1) is exactly
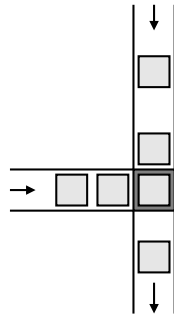

Figure 1: Junction of an automatic conveyor system transporting pallets.

8 seconds for a pallet coming from the North. Pallets from the West first need to be lifted a little bit, and therefore the time to pass the transfer point is longer, i.e., it is exactly 12 seconds for pallets from the West. Pallets arrive at the transfer point according to a Poisson process, with a rate of 3 pallets per minute from the North and 2 pallets per minute from the West. Calculate the mean time to pass the transfer point (waiting time plus transfer time) for a pallet from the North and for a pallet from the West in case pallets are transferred in order of arrival.

3. In a dairy barn, cows arrive at a milking robot according to a Poisson stream with a rate of 6.5 cows per hour. The cows are milked by the robot in order of arrival. Data (in minutes) on the milking times is available.

   (a) Calculate the sample mean and sample standard deviation of the collected milking times. Plot also a histogram of the milking times.

   (b) Estimate the mean flow time (waiting time plus milking time) of a cow, based on the sample mean and sample standard deviation of the milking times.