TKK HELSINKI UNIVERSITY OF TECHNOLOGY
Department of Communications and Networking
S-38.1145 Introduction to Teletraffic Theory, Spring 2008

Exercise 4
12.2.2008

1. Consider the M/M/2/2 model with mean customer interarrival time of $1/\lambda$ time units and mean service time of $1/\mu$ time units. Let $X(t)$ denote the number of customers in the system at time t, which is a Markov process.
   (a) Draw the state transition diagram of $X(t)$.
   (b) Derive the equilibrium distribution of $X(t)$.
   (c) Assume that $\lambda = 3$ and $\mu = 2$. What is the average number of customers that depart from the system in a time unit?

2. Consider the M/M/2 model with mean customer interarrival time of $1/\lambda$ time units and mean service time of $1/\mu$ time units. Let $X(t)$ denote the number of customers in the system at time t, which is a Markov process.
   (a) Draw the state transition diagram of $X(t)$.
   (b) Derive the equilibrium distribution of $X(t)$.
   (c) Assume that $\lambda = 3$ and $\mu = 2$. What is the average number of customers that depart from the system in a time unit?

3. Consider the M/M/2/4 model with mean customer interarrival time of $1/\lambda$ time units and mean service time of $1/\mu$ time units. Let $X(t)$ denote the number of customers in the system at time t, which is a Markov process.
   (a) Draw the state transition diagram of $X(t)$.
   (b) Derive the equilibrium distribution of $X(t)$.
   (c) Assume that $\lambda = 3$ and $\mu = 2$. What is the average number of customers that depart from the system in a time unit?