

**Performance Evaluation  
Fall 2017**

**Homework No. 2  
(Due on Sept. 25)**

1. Is the following function valid CDF? You must show the reason of your answer. (10)  
 $F(x) = (1/9)x^2, 0 \leq x \leq 3$
2. Is the following function valid PDF? You must show the reason of your answer. (10)  
 $f(x) = (3/2)x^2, -1 \leq x \leq 1$
3. Assume that the prob. of Texas Rangers to defeat Los Angeles Dodgers in a baseball game is 0.6. What is the prob. that Rangers wins two games out of seven game series with Dodgers? (10)
4. Draw the CDF and PDF of the following distributions. (60)
  - (a) Geometric distribution with  $p = 0.2$ . Draw up to  $k = 7$ .
  - (b) Binomial distribution with  $p = 0.2$  and  $n = 20$ . Draw up to  $k = 7$ .
  - (c) Poisson distribution with  $\lambda = 0.1/\text{sec}$  and  $T = 10$ . Draw up to  $k = 7$ .
  - (d) Exponential distribution with  $\lambda = 0.1/\text{sec}$ . Draw up to  $t = 7$ .
5. Find the prob. of 5 successes for binomial distribution with  $p = 0.2$  and  $n = 20$ . (10)
6. Find the prob. of 3 arrivals for Poisson distribution with  $\lambda = 0.1/\text{sec}$  and  $T = 10$ . (10)
7. For exponential distribution with  $\lambda = 0.1/\text{sec}$ , find the probability that an event does not occur in 2 sec. (10)
8. Assume that the prob. of Manchester United to defeat Arsenal is 0.7. What is the prob. that Arsenal wins a game after losing four games? (10)
9. With Poisson distribution of  $\lambda = 0.1/\text{sec}$  and  $T = 10$ , what is the standard deviation? (10)
10. For the example of Lecture note 2-57, assume that the two random variables are  $H$ (the number of heads) and  $C$  (the number of coins flipped ). Find  $F(h,c)$ ,  $f(h,c)$ ,  $f(h|c)$ , and the marginal density function  $f(h)$  for  $h = 0, 1, 2$ , and 3. (20)
11. JMT (Java Modeling Tool) is a framework for system performance evaluation, tuning, and capacity planning, etc. Once the course is over, the tool should be very useful for research and development of various projects. (40)
  - (a) Read the first part of Chapter 8 of the lecture note handed out.
  - (b) Go to the homepage of the tool, and print the screen snapshot of the first page.
  - (c) Install the program in your PC.
  - (d) Run the simulator, and print the screen snapshot of the starting page.
  - (e) Put the two pictures in **one page** of word file.
  - (f) Exercise JMT by following the steps of Example 3.14.1 in the JMT Manual from page 79 to 84. Show the snapshot of the screen for Figure 3.77 ~ 3.82, and Table 3.3.