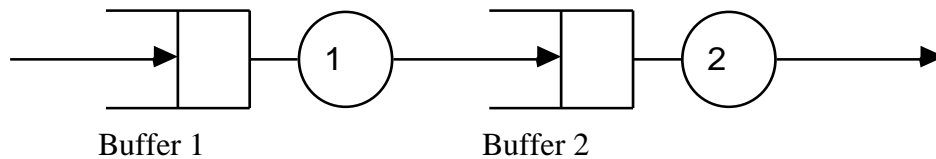


Homework Assignment #2

due 1:30 PM, Tuesday, March 1

*** *Due time will be strictly enforced. Late HW is subject to at least 25% penalty*

1. (15 points) Read Chapter 3 of the Arena book and use ARENA to simulate the following two-node system:



Suppose the interarrival times are exponentially distributed with **rate** 0.8 (the mean is 1.25), the service times are Unif[0.5, 1.5) for both servers. Have the following simulation setup:

Number of Replications: **1**
Length of Replication **500**
Beginning Time: **0**

Print your Arena model and one page of your output report showing the average system time. Please highlight or circle the average system time.

2. (10 points) Consider this LCG $\{ Z_i = (5 * Z_{i-1} + 7) \bmod 16 \}$. Suppose $Z_0 = 1$. What are the next 20 numbers generated using this LCG? What is the period of this LCG?

3. (8 points) Consider the LCG given in Question 2, i.e., $Z_i = (5 * Z_{i-1} + 7) \bmod 16$. Let

$$X_i = Z_i \bmod 5.$$

What are the first 20 numbers, i.e., X_1, X_2, \dots, X_{20} ? What is the period of this LCG?

4. Suppose you have \$1,000,000 for investment. We are considering three groups of mutual funds: A, B, and C. Each group consists of several similar funds. Before deciding how to invest this \$1M among these three groups, we need to explore their performances. In specific, we are interested in the investment annual return rate and have obtained 100 data points for each group. The data are contained in an Excel file available at the class web site. Each data point is an annual return rate obtained based on the performance of the mutual funds in a same group in the past five years.

a. (7 points) For group A, what is average of the annual return rate? What is the standard deviation? What fraction of data are between [4%, 5%]? What fraction of data are between [5%, 6%]? What fraction of data are between [6%, 7%]? What fraction of data are between [7%, 8%]?

b. (5 points) For group B, what is average of the annual return rate? What is the standard deviation? What fraction of data are between [4%, 5%]? What fraction of data are between [5%, 6%]? What fraction of data are between [6%, 7%]? What fraction of data are between [7%, 8%]?

c. (5 points) For group C, what is average of the annual return rate? What is the standard deviation? What fraction of data are between [0%, 20%]? What fraction of data are between [20%, 40%]? What fraction of data are between [40%, 60%]? What fraction of data are yielding negative return?