Submission Date: Monday, June 13, 2011

QUESTION 1:

Gab Moss manages a large Mongomery, Alabama, movie theatre complex called Cinema I, II, III, and IV. Each of the four auditorium plays a different film: the schedule staggers starting times to avoid the large crowds that would occur if all 4 movies started at the same time. The theatre has a single ticket booth and a cashier who can maintain an average service rate of 280 patrons per hour. Service times are assumed to follow an exponential distribution. Arrivals on a normally active day are Poisson-distributed and average 210 per hour.

In order to determine the efficiency of the current ticket operation, Gab wishes to examine several queue – operating characteristics.

    i.   Find the average number of moviegoers waiting to purchase a ticket

    ii.   What percentage of the time is the cashier busy?

    iii.   What is the average time that a customer spends in the system?

    iv.   What is the average time spent waiting in line to get the ticket window?

    v.   What is the probability that there are more than two people in the system?

QUESTION 2

Two technicians, working as a team, monitor a group of 5 computers that run an automated manufacturing facility. It takes an average of 15 minutes (exponentially distributed) to adjust a computer that develops a problem. Computers run for an average of 85 minutes(Poisson-distributed) without requiring adjustments. Determine the following:

    a.   The average number of computers waiting for adjustments

    b.   The average number being adjusted

    c.   The average number of computers not in working order.

QUESTION 3

    1.   What is a waiting line problem? What are the components in a waiting – line system?

    2.   Briefly describe three situations in which the FIFO discipline rule is not applicable in queuing analysis

    3.   Provide 4 examples of four situations in which there is limited , or finite waiting line

    4.   Most banks have changed from having a line in front of each teller to a situation whereby one line feeds all tellers. Which system is better? Why?