IE 535 Computer Simulation

Spring 2011

Take Home Final Examination

Due Monday, 13th of June, 2011

Question Number One:

For a single queueing system, you are given the following arrival times and service times:

Customer no.	1	2	3	4	5	6	7	8	9	10
Arrival time	0	3	5	7	11	15	19	25	31	37
Service completion times	2	8	10	14	20	26	33	40	-	-

Plot Q(t), B(t), and L(T). Then, estimate d(9), q(9), and u(9). Also, compute the average service time, average time in system, and the probability of the server being busy (show all of your work).

Where:

d(n): the average delay when the n^{th} customer started the service.
q(n): the average number of customers in queue when the n^{th} customer started the service.
u(n): the average server utilization when the n^{th} customer started the service.
L(n): the average number of customers in system when the n^{th} customer started the service.
Q(t): the number of customers waiting in the queue at time t.
L(t): the number of customers in system at time t.
B(t): the utilization of the server at time t.

Question Number Two:

Solve question number 6.8 in Pritsker's book (Please follow the attached form for report format for SLAM II network modeling)

Question Number Three:

Solve question number 7.14 in Pritsker's book (Please follow the attached form for report format for SLAM II network modeling)

Question Number Four:

Solve question number 7.6 in Pritsker's book. (Please follow the attached form for report format for SLAM II network modeling)

Question Number Five:

Perform a literature survey in one of the following area:

1. Implementation of Simulation Modeling and Optimization modeling to optimize inventory systems
2. Implementation of simulation modeling in health sector.

Then, summarize your survey in a report format that summarizes all papers surveyed in topic selected and try to compare them with respect to all aspects such as the objective functions, simulation software type, …etc

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Report Format for network modeling problems

Reports for AweSim homework assignments should follow the following format:

1. PROBLEM STATEMENT (in your own words) including objectives. This section should be understandable by someone who is not familiar with AweSim, and hence you should minimize the amount of technical details relating to the problem. Any assumptions about the situation should be listed. A diagram might be worthwhile in this section.

2. MODEL DESCRIPTION. This section reviews the techniques that you used to model the situation and lists all technical modeling assumptions. This section should include the following:

   a. NETWORK DIAGRAM (as a figure) and explanation.

   b. AweSim VARIABLES used in the model (list the variable name, its definition, its initial condition, etc. in columns).

   c. FILE DESCRIPTIONS. This section will list all the files (e.g., a file associated with a queue) used in the program along with the file number and usage.

3. PRESENTATION OF RESULTS. The results which are relevant to the objectives stated in Section 1 should be presented here. This should *not* be simply the AweSim output report. The important results from the simulation should be presented in tables, graphs, pie diagrams, etc.

4. ANALYSIS OF RESULTS. This section should reflect the fact that after the simulation model was coded and debugged, time was spent thinking about the output from the model. You should do whatever quantitative work (e.g., hypothesis testing) is appropriate.

5. CONCLUSIONS. As with Section 1, this section should be readable by a non-technical person. It should state the conclusions drawn from you study.

   APPENDIX; AweSim INPUT STATEMENTS AND OUTPUT REPORT. This appendix to the report contains the INPUT STATEMENTS and OUTPUT REPORT cut to page size.

Please start as early as possible on this on developing your model. Code should be written as early as possible that will allow enough to debug the program and write up a report. Make sure to leave time to proofread your report. Points will be deducted for spelling and grammatical errors.