

IE 324 - Simulation
Spring 2017
Homework #4
Due: Mar 24, 2017, 5:30 pm

This homework must be done individually. No collaboration is allowed. Violation of academic integrity rules will not be tolerated and may result in serious consequences and disciplinary action.

1. A simulation model of a job shop was developed to investigate different scheduling rules. To validate this model, the scheduling rule currently used was incorporated into the model and the resulting output was compared against observed system behavior. By searching the previous year's database records, it was estimated that the average number of jobs in the shop was 21.5 on a given day. Seven independent replications of the model were run, each of 30 days' duration, with the following results for average number of jobs in the shop:

17.96 20.90 18.43 21.00 18.81 20.81 19.19

Develop and conduct a statistical test to evaluate whether model output is consistent with system behavior. Use the level of significance $\alpha = 0.05$.

2. System data for the job shop of Exercise 1 revealed that the average time spent by a job in the shop was approximately 4 working days. The model made the following predictions, on seven independent replications, for average time spent in the shop:

3.62 4.13 4.26 4.05 3.75 4.23 3.97

Is model output consistent with system behavior? Conduct a statistical test, using the level of significance $\alpha = 0.01$.

3. For the job shop of Exercise 1, four sets of input data were collected over four different 10-day periods, together with the average number of jobs in the shop Z_i for each period. The input data were used to drive the simulation model for four runs of 10 days each, and model predictions of average number of jobs in the shop Y_i were collected, with these results:

i	1	2	3	4
Z_i	23.87	21.12	25.08	21.34
Y_i	27.06	23.21	21.67	27.39

Conduct a statistical test to check the consistency of the system output and model output. Use the level of significance $\alpha = 0.05$.