OPER 561 15 Estimating Relative Performance Homework

1. Reference BCNN Example 12.1 – SMP Call Center. I have provided you with a SIMIO model of this system along with an experiment set up to look at all 3 scenarios modeled independently (assigned different random number streams for the 4 driving input processes – these 4 streams are controls in your experiment along with two other controls to select layout for current or cross-trained system and the number of cross-trained operators) and 3 scenarios using Common Random Numbers (make sure you understand the setup of the simulation and the experiment – you don't need to change anything).

   Input parameters used for the simulation: Call arrivals ~ Exponential (1) minute; Caller Type ~ 41% contact and 59% financial; Contact processing time ~ Triangular (1,2,3) minute; Financial processing time ~ Triangular (2,3,4) minute; current system 3 operators for Contact callers and 4 for Financial; Cross-trained number set at 6 or 7 respectively for scenarios 2-5. The experiment runs 10 replications for each scenario and has two responses: Response Time in minutes (time to speak to operator after call initiated) and the Maximum Number on Hold.

   Go to the "Response Results" tab for the experiment and select "Export Details" at far right of the top ribbon. From the created Excel spreadsheet **construct the following six separate two population confidence intervals** for each response:

   (Response Time and Maximum Number on Hold):

   Current - 6 cross-trained;
   Current - 7 cross-trained; and
   6 cross-trained - 7 cross-trained

   (NOTE: one set of 3 will use the independent runs and the second set will use CRNs. Also note that your response times are in hours). Please used a paired-t approach for both sets (since you can always use a paired-t test regardless of independence, however, you must use it if responses from the two systems being compared are dependent). DO NOT use BCNN Simulation Tools. Also **provide a measure of the percentage reduction in the 95% half-width of the dependent interval (CRN) compared to the independent interval** (NOTE: you will have 3 percentage reduction figures for each metric). Comment on your results.

2. Reference BCNN 11.6 and 12.2. You have been provided a SIMIO model of the system described in 11.6 using common random numbers with an experiment set up using Max_Inventory (M) and Reorder_Level (L) controls.

a. Set up 4 scenarios matching the 4 (M, L) systems listed in 12.2 [(50,30); (50,40); (100,30);(100,40)].

b. Run 10 replications for each scenario. **Look at your response results and see if you can pick out the "best" (lowest average total cost) system**.

c. Now choose the "Select the Best using KN" add-in procedure with following settings under properties: Primary Response: AvgTC (NOTE: must select Minimize as Objective

for AvgTC response); Confidence Level: .90; Indifference Zone: 5; and Replication Limit: 500. Open up properties for the AvgTC response and set Objective to Minimize.

d. Now select run from the Experiment Design tab and **report the number of total replications SIMIO ran for each of the scenarios and which scenario was selected as best** (that scenario will be checked).