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Project Report
Independent Study in Simulation
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Report

For this project I decided to use the process oriented approach. It seems more logical to think of things this way versus an event oriented approach. I also think it simplifies the model. I have a patient process that computes entry statistics at the beginning of the life cycle and computes various exit statistics at each possible exit. For example, when a patient balks and leaves, I update the total expenses and number of patients balked. Then I use a 'return;' statement to simulate the patient leaving the clinic. Or, in simulation terms, the life cycle of the patient process has ended.

Study Questions:

1. Daily operating costs: $25,200
2. Number of patients per day that:
    - arrive at the clinic for treatment: 83
    - balk due to an overcrowded waiting room: 19
    - get diverted to the E.R. after seen by the nurse: 8
    - get fully treated at the clinic: 56
3. Average response time of fully treated patients at clinic: 24.26
4. Utilization rates for:
    - Nurse: 69.71%
    - Specialist: 25.89%
5. Average number of patients in the waiting room: 0.679

System Comparison:

1. Is there a statistically significant decrease in daily costs when adding an additional nurse? Yes, the total expenses were decreased to $19,900 when adding an extra nurse. Additionally only 2 people balked and only 5 were diverted to the ER.
2. Is there a statistically significant decrease in daily costs when adding an additional specialist? Yes, the total expenses decreased to $20,100 when I added an additional specialist. 0 people balked and only 2 were diverted to the E.R.

System Optimization:

The system is fully optimized when there are 2 nurses, 2 specialists and 4 exam rooms. I tried increasing the number of exam rooms but it only added to the costs. The total expenses in this configuration are $19,000.