Deliverable 3

SYSC 4005 Project Group # 7

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## Validation

From the textbook “Discrete Event System Simulation, 5th Edition”, validation is described as “building the correct model”, so that the results of the simulation are accurate. As no output data was given, the input of the model was validated. This was done in the file “input\_validation.py”. The goal was to asses whether the random values generated from “model.py” were accurate to the data provided in the 6 .dat files that described the inspector’s inspection times and the workstations processing times. A method was created for each relevant component for each inspector and one for each work station. The methods first calculate the average of the data provided in the .dat files. Next, the function would call its respective function in “model.py” that corresponded to the same inspector or workstation and calculate the average of the random values returned. The difference between the actual average and the randomly generated average is then calculated and displayed. Each function in “input\_validation.py” was called twice, once using 1000 samples of random values and once more using 30000. The results of these calculations can be seen in the table below.

Table 1: Difference Between Actual and Random Means

|  |  |  |
| --- | --- | --- |
| **Inspector/Workstation** | **Difference Between Actual and Random Averages, N=1000 (%)** | **Difference Between Actual and Random Averages, N=30000 (%)** |
| Inspector 1 – Comp 1 | 2.6833 | 0.8658 |
| Inspector 2 – Comp 2 | 0.5354 | 0.0990 |
| Inspector 3 – Comp 3 | 0.0614 | 0.5787 |
| Workstation 1 | 2.3883 | 0.3826 |
| Workstation 2 | 2.2243 | 0.4737 |
| Workstation 3 | 0.3288 | 0.2081 |

It was apparent with a sample size of 1000 that the actual mean and the random mean matched very well, as the difference only reached a maximum of a couple percent. In order to further reinforce this a sample size of 30000 was used, with all the differences being under 1%. This was taken as sufficient evidence that the input data being generated was accurate to the real-world model and was properly validated.

## Verification

## Product Runs