

10th Lab Report

Birthday Paradox

In this simulation, there are “m” participants and for each participant, a random number (birthday) is chosen among “n” possible values. The aim is to compute the average number of people with the same birthday, evaluate the probability of birthday conflict in the function of “m”, and compare it with the theoretical result.

Simulator Inputs and Outputs

Inputs;

- The seed value
- Number of people (m)
- Number of days
- Number of runs
- Confidence level

Outputs;

- Number of people (m)
- Average
- Confidence interval upper bound
- Confidence interval lower bound
- Relative error
- Theoretical value

As initial settings, I create a confidence level variable to compute the confidence interval, an input list of m people which is set to increase by three for a clear view in plotting, and the possible number of runs and days are set to 100 and 365 respectively as default.

The simulator runs each time for different values and it saves the output in the Birthday Paradox .dot file, and this file is then used to create the plots.

Plots are used to compare the accuracy of theoretical results, and I run the simulator multiple times with different values, in order to see the improvement in the accuracy.

Plots

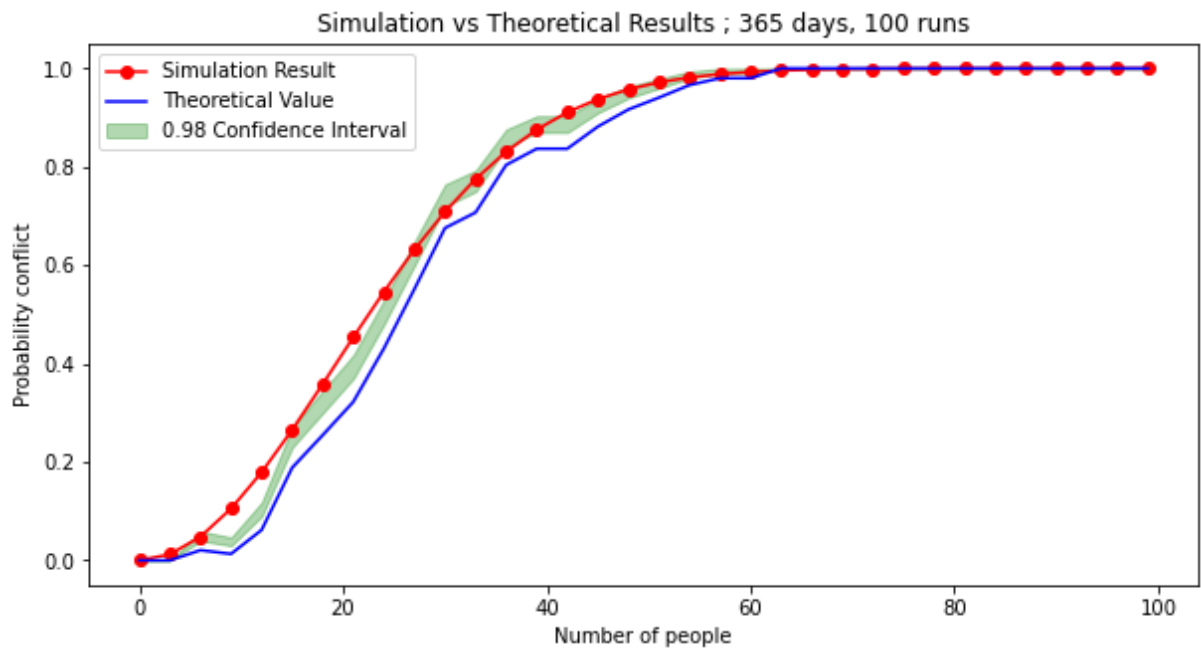


Figure 1

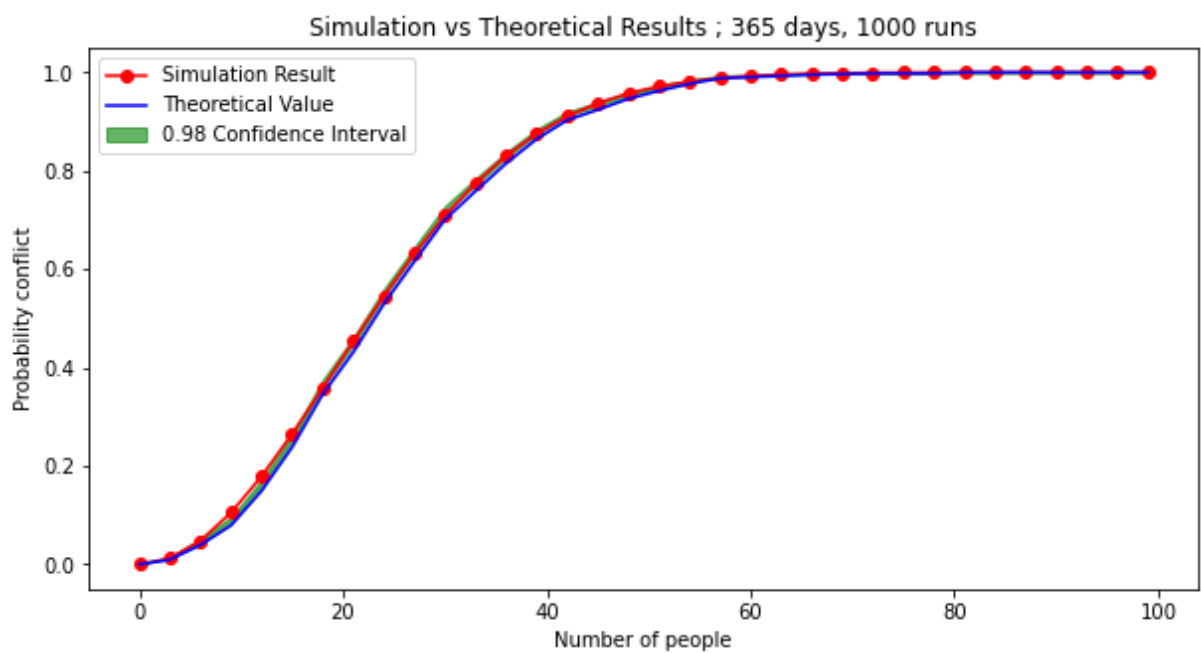


Figure 2

Figure 1 and 2 shows us the comparison of Simulation and Theoretical Value, and it's clear to see that we can obtain better results by increasing the number of runs.