An Introduction to Monte Carlo Simulation Methods

Monte Carlo Simulation Methods are used in situations where an exact solution or a closed form to a problem is not available, most likely due to the complexity of the problem or the degree of computation **OR** the distribution of the statistic of interest is either not known or can not be derived simply.

One solution is to empirically reproduce the experiment LOTS of times and simulate the results to obtain an understanding of the process distribution. One characteristic of the solution is the use of a random number generator.

The term Monte Carlo technique was introduced by the mathematician Stanislaw Ulam while working on the Manhattan atomic bomb project.

Procedure:

1. Describe the experiment and all of its possible outcomes
2. Characterize the probabilities associated with each outcome
3. Match these probabilities up with what is produced by some random number generator
4. Generate a large number of random experiments according to this rule