**Research**  
Find out on the web about a **Poisson point process**. See if you can see any analogy with this Exercise and verify whether your distributions come close (for N, M sufficiently large) to the theoretical asymptotic distribution.

A Poisson point process is a mathematical model used in probability theory and statistics to describe the random arrangement of points or events in a given space or time interval. It is commonly used to model the occurrence of rare events in time or space. In a Poisson point process:

1. Events occur randomly and independently of each other.
2. The probability of more than one event occurring in an infinitesimally small interval is negligible.
3. The average rate of events occurring is constant.

The Poisson distribution is closely related to the Poisson point process, where the distribution represents the number of events occurring in a fixed interval of time or space. The Poisson distribution has a probability mass function that describes the probability of observing a specific number of events in a given interval.

In the exercise you described, there are analogies with the Poisson point process. You're simulating attacks on **M** servers over a period of **T** years, subdividing the time into **N** subintervals, and modeling the probability of attacks occurring in each subinterval.

As **N** and **M** become sufficiently large, the distribution of the number of attacks at the end of the period is expected to approach a Poisson distribution if the attacks are rare and randomly distributed. In the exercise, the number of attacks in each subinterval follows a binomial distribution with parameters **M** (number of trials, servers) and **λ T/N** (probability of success, attack probability per subinterval). If **M** is sufficiently large and **λ T/N** is sufficiently small, this binomial distribution can approximate a Poisson distribution.

To verify whether your distributions come close to the theoretical asymptotic distribution (Poisson), you can compare the simulated distribution to a Poisson distribution with a matching average rate (lambda). As **N** and **M** become larger, the simulated distribution should converge to the Poisson distribution, demonstrating the analogy between your exercise and the Poisson point process. You can use statistical tests and visual comparisons to assess the closeness of fit between the simulated and theoretical distributions.