**Inventory System Simulation**

**Problem statement:**

Suppose that the maximum inventory level or stock limitation, M is 11 units and the review period or reordering point, N is 5 days. **The problem is to estimate, by simulation, the average ending units in inventory and the average number of days when a shortage condition occurs.**

The simulation has been started with the initial inventory level at 3 units and an order of 8 units scheduled to arrive after one day.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Random digit assignment for daily demand**   |  |  |  |  | | --- | --- | --- | --- | | Demand | Probability | Cumulative probability | Random digit assignment | | 0 | 0.10 | 0.10 | 01-10 | | 1 | 0.25 | 0.35 | 11-35 | | 2 | 0.35 | 0.70 | 36-70 | | 3 | 0.21 | 0.91 | 71-91 | | 4 | 0.09 | 1.00 | 92-100 |   **Random digit assignment for lead time**   |  |  |  |  | | --- | --- | --- | --- | | Lead time (days) | Probability | Cumulative Probability | Random digit assignment | | 1 | 0.6 | 0.6 | 1-6 | | 2 | 0.3 | 0.9 | 7-9 | | 3 | 0.1 | 1.0 | 0 | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cycle | Days | Beginning inventory | Random digit for demand | Demand | Ending inventory | Shortage quantity | Order quantity | Random digit for lead time | Days until order arrive |
|  | 1 | 3 | 24 | 1 | 2 | - | - | - | 1 |
|  | 2 | 2 | 35 | 1 | 1 | - | - | - | 0 |
|  | 3 | 9 | 65 | 2 | 7 | - | - | - | - |
|  | 4 | 7 | 81 | 3 | 4 | - | - | - | - |
| 1 | 5 | 4 | 54 | 2 | 2 | - | 9 | 5 | 1 |
| 1 | 1 | 2 | 03 | 0 | 2 | - | - | - | 0 |
|  | 2 | 11 | 87 | 3 | 8 | - | - | - | - |
|  | 3 | 8 | 27 | 1 | 7 | - | - | - | - |
|  | 4 | 7 | 73 | 3 | 4 | - | - | - | - |
| 2 | 5 | 4 | 70 | 2 | 2 | - | 9 | 0 | 3 |
|  | 1 | 2 | 47 | 2 | 0 | - | - | - | 2 |
|  | 2 | 0 | 45 | 2 | 0 | 2 | - | - | 1 |
|  | 3 | 0 | 48 | 2 | 0 | 4 | - | - | 0 |
|  | 4 | 9 | 17 | 1 | 4 | 0 | - | - | - |
| 3 | 5 | 4 | 09 | 0 | 4 | 0 | 7 | 3 | 1 |
| 1 | 1 |  |  |  |  |  |  |  |  |
|  | 2 |  |  |  |  |  |  |  |  |
|  | 3 |  |  |  |  |  |  |  |  |
|  | 4 |  |  |  |  |  |  |  |  |
| 4 | 5 |  |  |  |  |  |  |  |  |
|  | 1 |  |  |  |  |  |  |  |  |
|  | 2 |  |  |  |  |  |  |  |  |
|  | 3 |  |  |  |  |  |  |  |  |
|  | 4 |  |  |  |  |  |  |  |  |
| 5 | 5 |  |  |  |  |  |  |  |  |