Report for problem 2 - The car Dealer

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Problem formulation & Objectives:

System: The car Dealer.

Objects: cars, showroom, inventory.

Purpose:

1. The average ending units in showroom and the inventory.
2. The number of days when a shortage condition occurs.
3. Does the theoretical average demand of the demand distribution match the experimental one?
4. Does the theoretical average lead time of the lead time distribution match the experimental one?
5. Is there a better value for the review period variable N to minimize the shortage?

System Components:

- **Entity:** cars.
- **Attributes:** Model.
- **Activity:** selling.
- **State variables:**
    - **a.** The number of available cars.
    - **b.** The number of demands.
- **Events:**
- **Exogenous event:** Demand.
- **Endogenous event:** Review of inventory.

System analysis including cumulative distribution tables, calendar table (for 10 Days).

Demand	Probability	Cumulative probability	Intervals
0	0.04	0.04	1-4
1	0.30	0.34	5-34
2	0.36	0.7	35-70
3	0.16	0.86	71-86
4	0.14	1	87-100

Days	Random digit	Demand
1	59	2
2	100	4
3	25	1
4	60	2
5	71	3
6	71	3
7	83	3
8	56	2
9	13	1
10	17	1

Lead time	Probability	Cumulative probability	Intervals
1	0.5	0.5	1-50
2	0.35	0.85	51-85
3	0.15	1	86-100

Days	Random digit	Lead time
1	87	3
2	58	2
3	27	1
4	1	1
5	14	1
6	85	2
7	65	2
8	65	2
9	94	3
10	14	1

Days	Beginning inventory	Beginning showroom	Random digit for demand	Demand	Ending inventory	Ending showroom	Shortage	order	Random digit for lead time	Days until order arrive
1	3	4	59	2	1	4	0	-	-	1
2	1	4	100	4	0	1	0	-	-	0
3	1	4	25	1	0	4	0	11	27	1
4	0	4	60	2	0	2	0	-	-	0
5	8	5	71	3	5	5	0	-	-	-
6	5	5	71	3	2	5	0	8	85	2
7	2	5	83	3	0	4	0	-	-	1
8	0	4	56	2	0	2	0	-	-	0
9	5	5	13	1	4	5	0	-	-	0
10	4	5	17	1	3	5	0	7	14	1

- Average ending units in showroom = 37/10 = 3.7
- Average ending units in inventory = 15/10 = 1.5
- The number of days when a shortage condition occurs = 0

Experimental Design Parameters

Days =

Review period N=3

Daily demand is random value

Lead time is random value

Max size in inventory = 10

Max size in showroom = 5

Justification of experiment parameters values

Days = to test every case in the problem (shortage- Ending inventory- Ending showroom- Average Demand-Average lead time).

Lead time is a random value because there is no specific days until order arrive.

Daily demand is random because there is no specific demand during the day.

Results Analysis

- In theoretical Average ending units in showroom = 37/10 = 3.7 and the experimental one =
- In theoretical average ending units in inventory = 15/10 = 1.5 and the experimental one =
- In theoretical the number of days when a shortage condition occurs = 0 and the experimental one =
- The theoretical average demand = 2.2 and in the experimental one =
- The theoretical average lead time = 0.6 and in the experimental one =

Conclusion

In the simulation model we will find the experimental is with more accuracy than the theoretical because we trace with large number but in theoretical, we trace with small number so the result of experimental is the best one.