

Resumed Shortage – Inventory

Code:

```
import numpy as np
import pandas as pd

m = int(input("Enter maximum capacity: "))
n = int(input("Enter review period: "))
d = int(input("Enter number of simulation days: "))
x = int(d/n)
begining_inventory = int(input("Enter begining inventory: "))
demand = 0
ending_inventory = 0
shortage_quantity = 0
order_quantity = 0
days_of_shortage = 0
days_until_order_arrives = 2
ending_inventory_list = []
days = []
Day = []
Begining_Inventory = []
Demand = []
Ending_Inventory = []
Shortage = []
Order = []
Lead_Time = []

for cycle in range(1, x+1):

    for day in range(1, n+1):
        Day.append(day)
        days_until_order_arrives = days_until_order_arrives-1

        if days_until_order_arrives == -1:
            begining_inventory = ending_inventory+order_quantity

        daily_demand = np.random.choice(
            a=[0, 1, 2, 3, 4], p=[0.10, 0.25, 0.35, 0.21, 0.09])
        total_demand = daily_demand + shortage_quantity
        if total_demand > begining_inventory:
            shortage_quantity = total_demand-begining_inventory
            ending_inventory = 0
```

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        if shortage_quantity > 0:
            days_of_shortage = days_of_shortage+1
        else:
            ending_inventory = begining_inventory-total_demand
            shortage_quantity = 0
        ending_inventory_list.append(ending_inventory)

        Begining_Inventory.append(begining_inventory)
        Demand.append(daily_demand)
        Ending_Inventory.append(ending_inventory)
        Shortage.append(shortage_quantity)

        begining_inventory = ending_inventory

    if day == n:

        days_until_order_arrives = np.random.choice(
            a=[1, 2, 3], p=[0.6, 0.3, 0.1])
        order_quantity = m-ending_inventory+shortage_quantity
        Order.append(order_quantity)
    if day != n:
        Order.append("-")
    if days_until_order_arrives >= 0:
        Lead_Time.append(days_until_order_arrives)
    else:
        Lead_Time.append("-")

    data = pd.DataFrame(list(zip(Day, Begining_Inventory, Demand,
                                Ending_Inventory, Shortage, Order, Lead_Time)),
                        columns=['Day', 'Begining_Inventory', 'Demand',
                                'Ending_Inventory', 'Shortage', 'Order', 'Lead_Time'])
    print(data)

total = sum(ending_inventory_list)
average_ending_inventory = total/d
print("Average Ending Inventory =", average_ending_inventory)

average_shortage_days = days_of_shortage/d
print("Average Shortage Days", average_shortage_days)

```

Output:

```
de Problems/Inventory.py"
```

```
Enter maximum capacity: 11
```

```
Enter review period: 5
```

```
Enter number of simulation days: 20
```

```
Enter beginning inventory: 8
```

	Day	Beginning_Inventory	Demand	Ending_Inventory	Shortage	Order	Lead_Time
0	1	8	3	5	0	-	1
1	2	5	1	4	0	-	0
2	3	4	3	1	0	-	-
3	4	1	2	0	1	-	-
4	5	0	1	0	2	13	2
5	1	0	1	0	3	-	1
6	2	0	0	0	3	-	0
7	3	13	2	8	0	-	-
8	4	8	0	8	0	-	-
9	5	8	3	5	0	6	1
10	1	5	2	3	0	-	0
11	2	9	2	7	0	-	-
12	3	7	1	6	0	-	-
13	4	6	0	6	0	-	-
14	5	6	4	2	0	9	2
15	1	2	2	0	0	-	1
16	2	0	2	0	2	-	0
17	3	9	3	4	0	-	-
18	4	4	2	2	0	-	-
19	5	2	2	0	0	11	1

```
Average Ending Inventory = 3.05
```

```
Average Shortage Days 0.25
```