

Perishable Products Inventory Management using MC Simulation



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Purpose

- ❖ Wastage due to overstocking.
- ❖ Uncertainty of Demand.
- ❖ Limited storage capacity.
- ❖ Possibility of Defective / Damaged products.

Project objective:

**Simulating different scenarios which
would optimize costs.**

Scenario 1

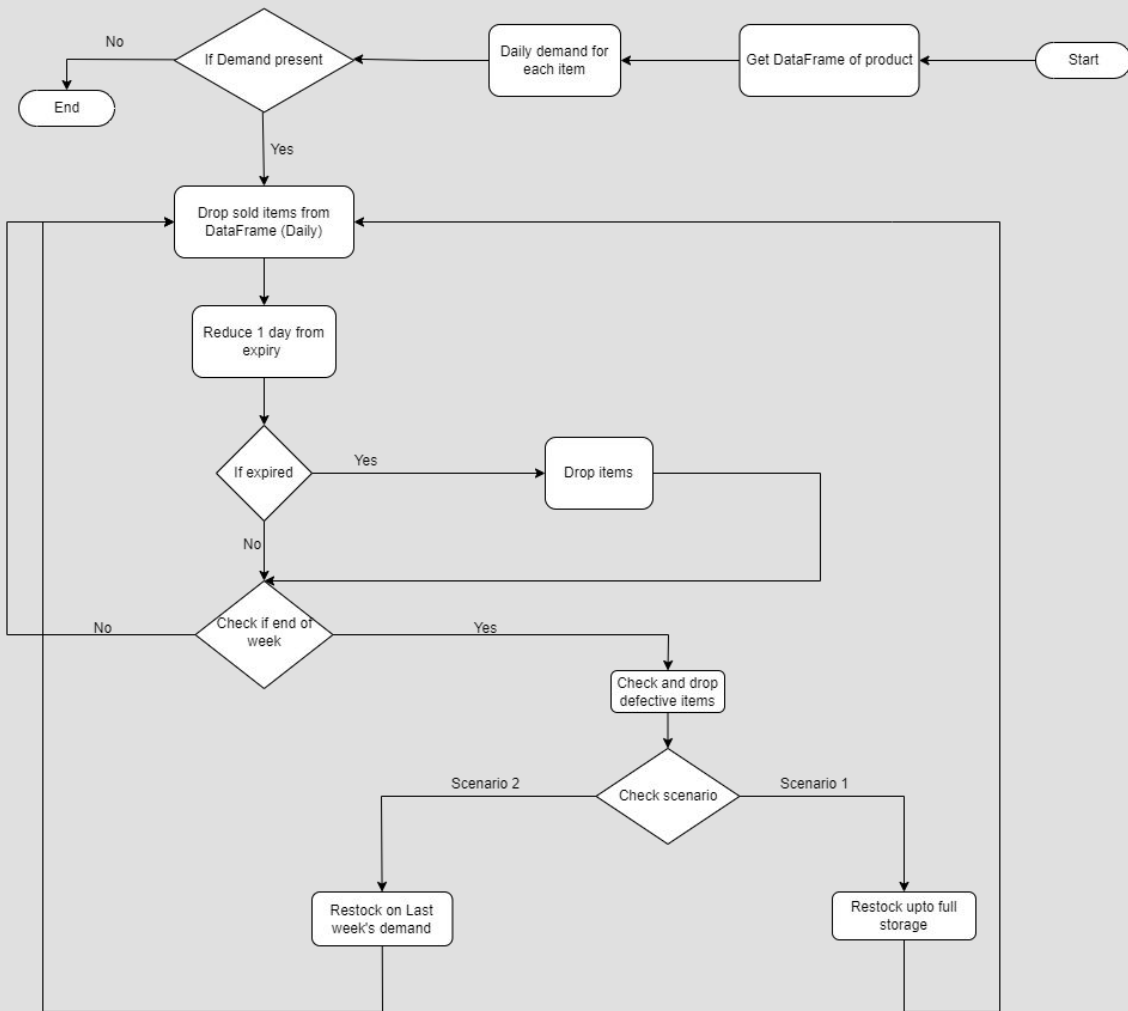
- No estimate of Demand
- Restocking to full capacity
- Interval: Weekly

Scenario 2

- Estimated Demand
- Restocking basis Demand
- Interval: Weekly

**We hypothesize that,
Having an estimate of the demand, will
optimize our cost and minimize wastage.**

Design Flowchart



Assumptions

- ❖ Each simulation is performed for 28 days i.e. a month.
- ❖ Considering 2 items (A and B) having different shelf lives.
- ❖ Fixed storage capacity (100 units per item).
- ❖ $\text{Cost}(A) = 15\$$ and $\text{Cost}(B) = 10\$$
- ❖ $\text{Profit}(A) = 5\$$ and $\text{Profit}(B) = 3\$$

Data Structure

SciView - pythonProject

SciView: Data Plots

df × a × +

↗ □

	↕ A	↕ B
0	10	5
1	10	5
2	10	5
3	10	5
4	10	5
5	10	5
6	10	5
7	10	5
8	10	5
9	10	5
10	10	5
11	10	5
12	10	5
13	10	5
14	10	5
15	10	5
16	10	5
17	10	5
18	10	5
19	10	5

SciView - pythonProject

SciView: Data Plots

df × +

↗ □

	↕ A
76	3
77	3
78	3
79	3
80	3
81	3
82	3
83	3
84	3
85	10
86	10
87	10
88	10
89	10
90	10
91	10
92	10
93	10
94	10
95	10
96	10
97	10
98	10
99	10

Variables of Uncertainty

Randomised Daily Demand

```
stock_demand = {dict: 2} ... Loading Value
```

```
>  $\frac{1}{28}$  'A' = {list: 28} [3, 3, 3, 3, 3, 2, 3, 3, 2, 3, 2, 3, 1, 3, 2, 1, 2, 1, 3, 3, 3, 3, 2, 3, 3, 2, 3, 2]
```

```
>  $\frac{1}{28}$  'B' = {list: 28} [9, 10, 10, 10, 10, 10, 11, 10, 11, 10, 10, 9, 9, 10, 10, 8, 9, 10, 10, 10, 8, 10, 9, 10, 11, 9, 11, 10, 10]
```

Defective Items

Randomly generated value between
5 - 10% of the number of items to
restock



```
graph TD; Factors[Factors] --> Wastage[Loss due to Wastage]; Factors --> Opportunity[Missed Opportunity];
```

Factors

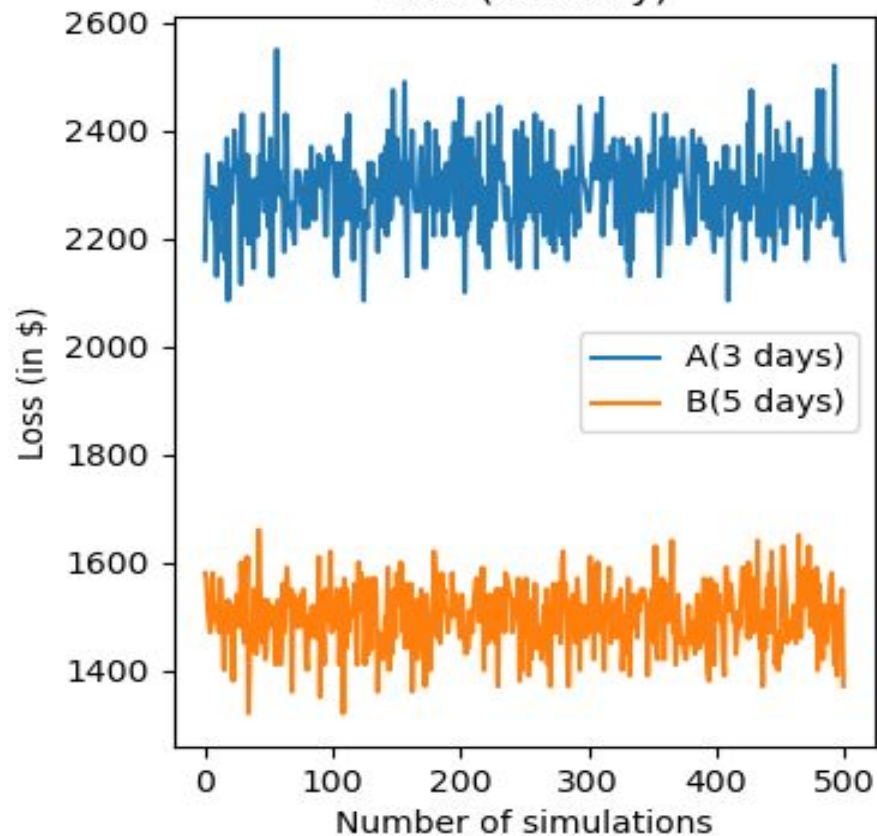
**Loss due to
Wastage**

**Missed
Opportunity**

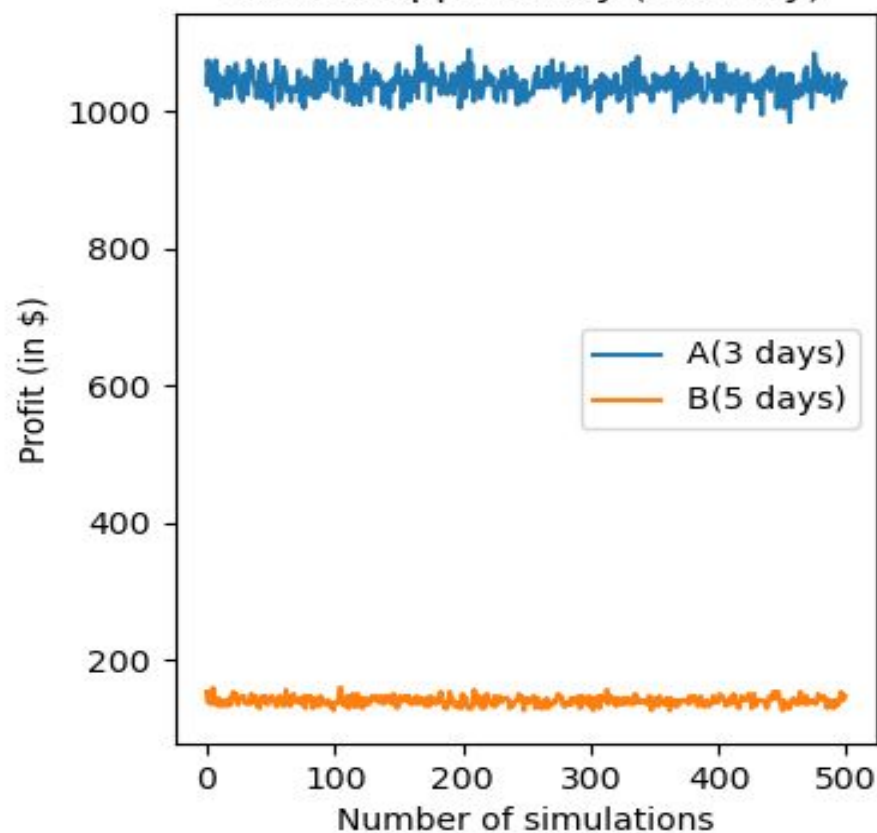
Results

Scenario 1

Loss (Monthly)

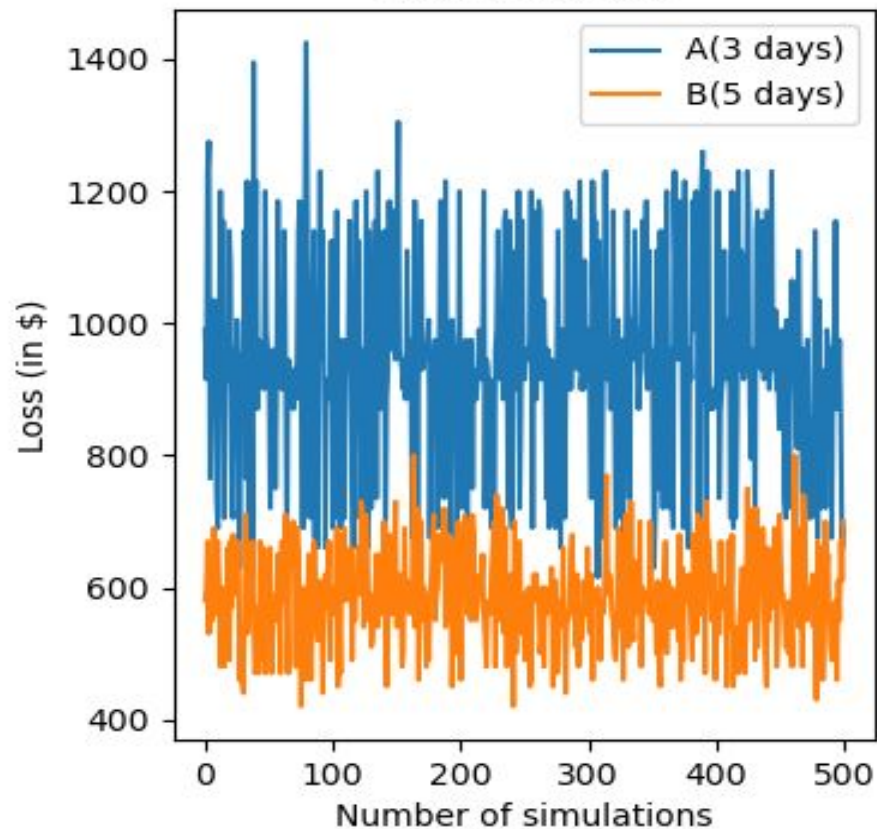


Missed Opportunity (Monthly)

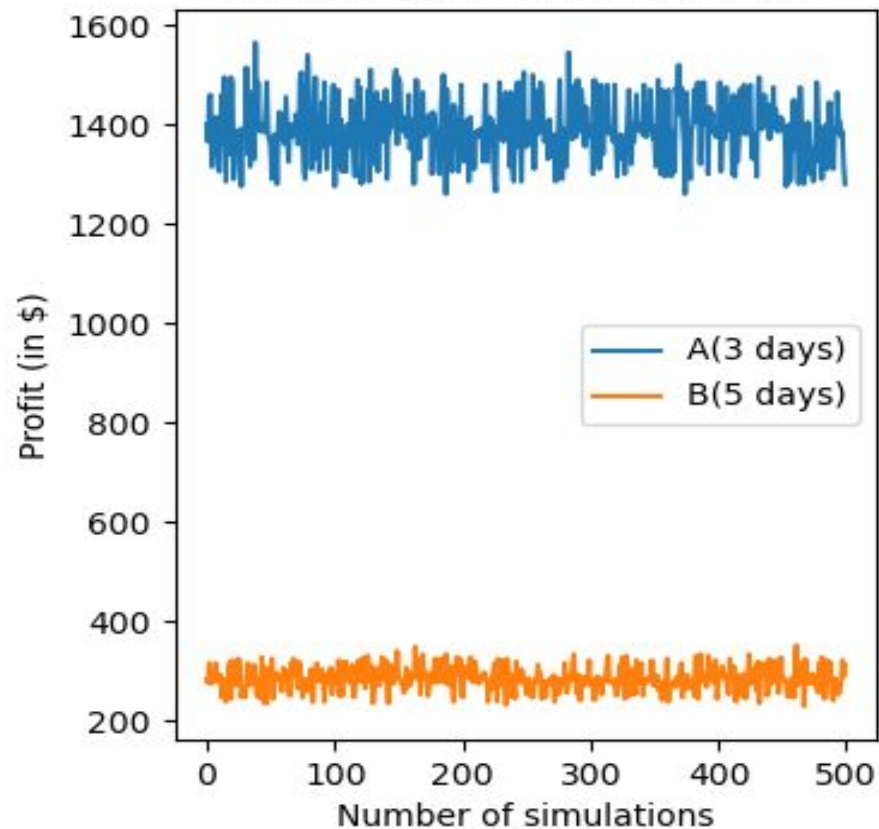


Scenario 2

Loss (Monthly)

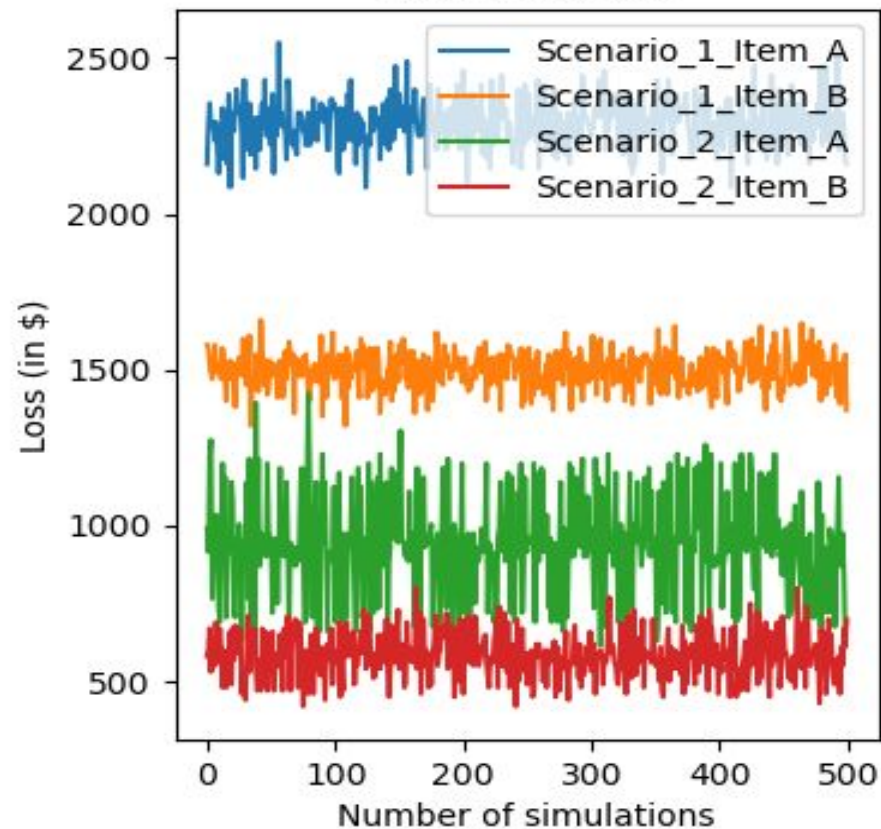


Missed Opportunity (Monthly)

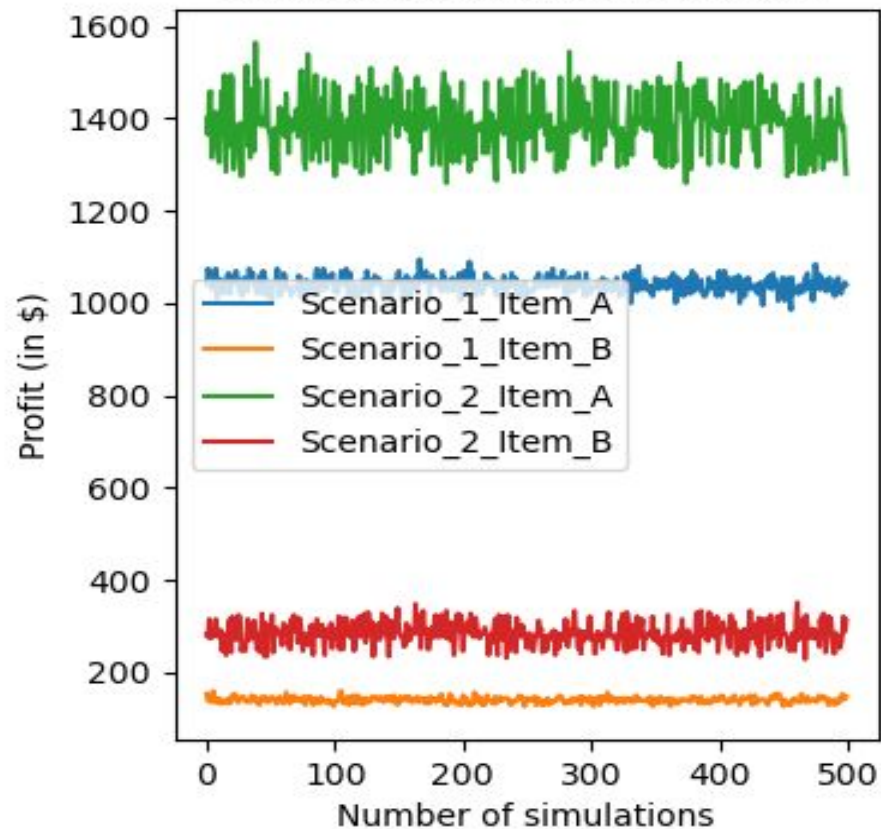


Scenario 1 vs Scenario 2

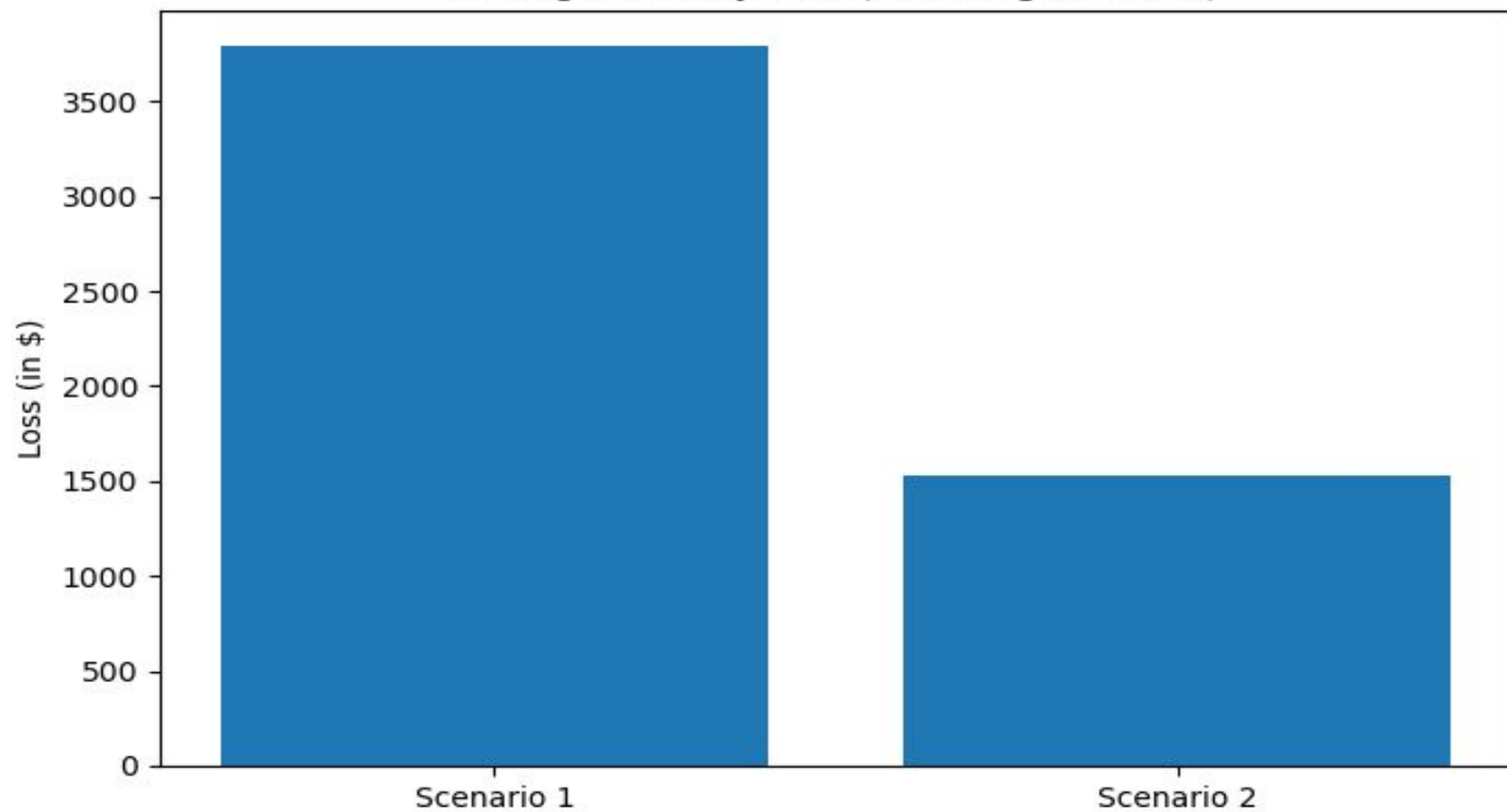
Loss (Monthly)



Missed Opportunity (Monthly)



Average Monthly Loss (Including all items)



Thank You!