

# OPTIMIZATION OF TEA BLENDING SCHEDULE



# INTRODUCTION

31M

Tea bags are produced by lipton everyday



**HOW WE CAN HELP LIPTON?**

1. WE OPTIMIZED THE BLENDING **SCHEDULE & WASTE**
2. WE HAVE INTERACTIVE VISUALIZATION (DASHBOARD)

# INITIAL CONNECTION MATRIX

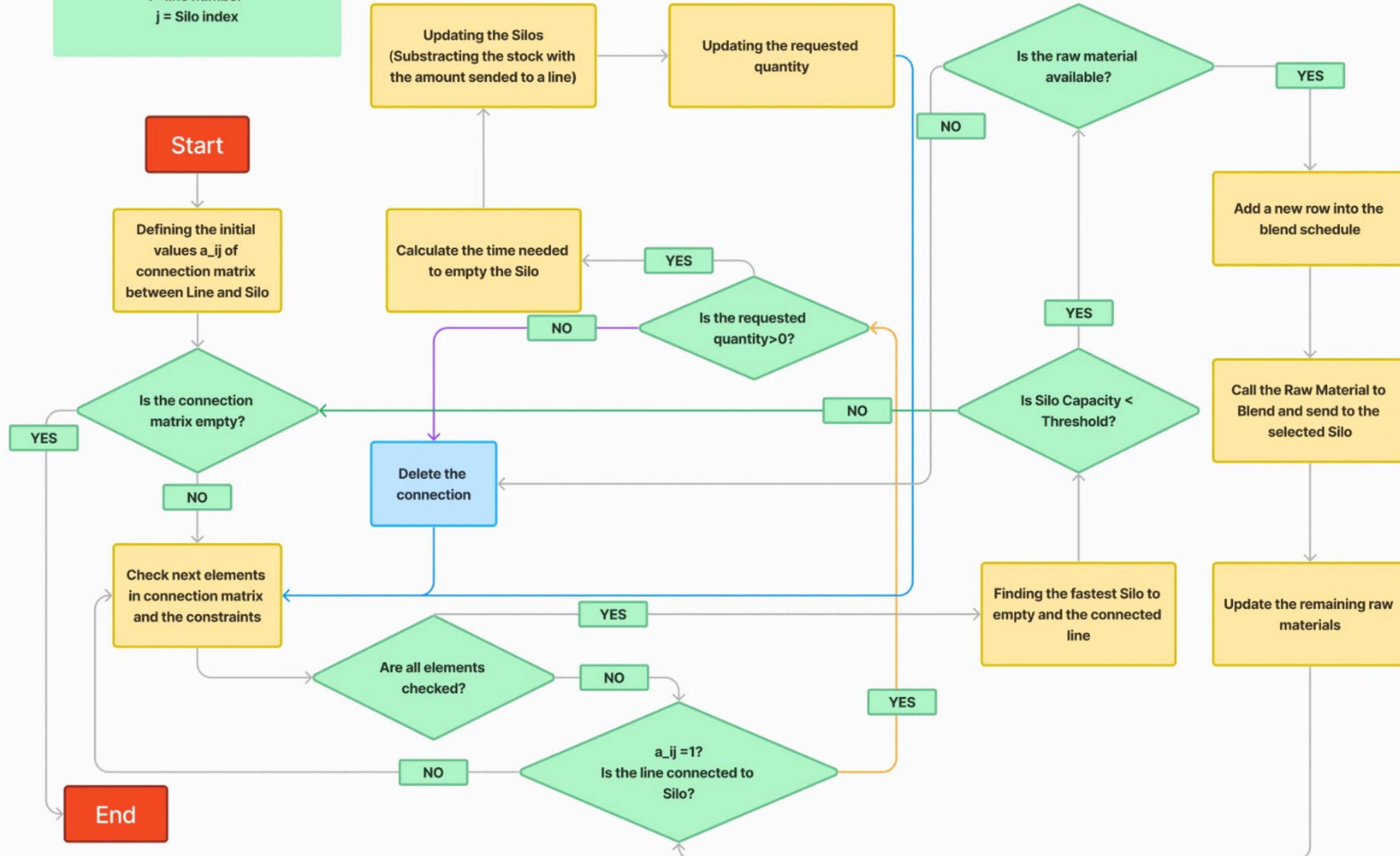
Sku_Code	SiloC	SiloD	SiloE	SiloF
F0001	1	0	0	0
F0004	0	0	1	0
F0002	0	0	1	0
F0006	0	1	0	0
F0028	0	0	0	1

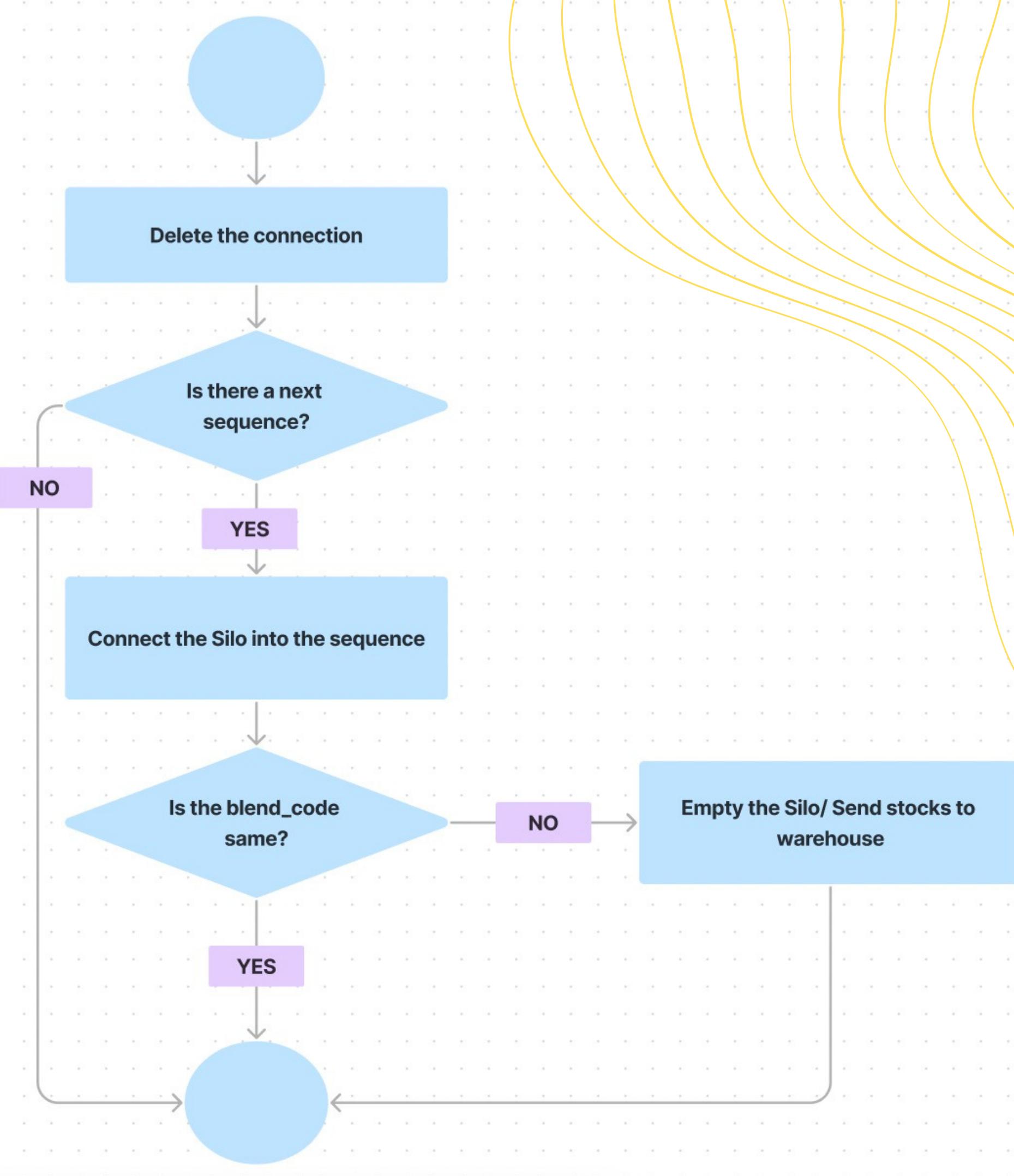
We do Black Tea and Loose Tea  
blending in parallel

Sku_code	SiloA	SiloB
F0007	1	0
F0014	0	1

# A Rule-based Optimization of Tea Blending Schedule

$a_{ij} = 0$  (not occupied), 1 (occupied)  
 $i$  = line number  
 $j$  = Silo index





# BLEND SCHEDULE

1 blend time = sending time,  
warehouse - blending - silo

blend_time	blend_code	blend_desc	sequence	quantity	silo	line	sku_code	quantity_line
3	B0002	Black Tea 2	1	1000	siloE	line6	F0002	18297
3	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	8115
4	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	7044
5	B0002	Black Tea 2	1	1000	siloE	line6	F0002	17535
5	B0004	Loose Tea 1	1	1000	siloA	line5	F0007	1829
6	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	5328
7	B0002	Black Tea 2	1	1000	siloE	line6	F0002	16773
7	B0004	Loose Tea 1	1	1000	siloA	line5	F0007	509
8	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	4328
9	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	3328
10	B0002	Black Tea 2	1	1000	siloE	line6	F0002	15630
10	B0004	Loose Tea 1	2	1000	siloA	line5	F0008	24469
11	B0004	Loose Tea 1	1	1000	siloB	line4	F0014	2328
12	B0004	Loose Tea 1	2	1000	siloA	line5	F0008	23469
12	B0003	Black Tea 3	1	1000	siloF	line11	F0028	13413



# LATEST PRODUCTION SCHEDULE

line	description	blend_code	blend_description	quantity	sequence	time_expected
line1	LYL 1	B0001	Black Tea 1	0	1	4267
line2	ENV 3	B0012	Black Tea 7	1302	1	654
line3	ENV 1	B0009	Black Tea 4	233	1	117
line3	ENV 2	B0010	Black Tea 5	3726	2	1874
line4	LYL Loose 3	B0004	Loose Tea 1	0	1	454
line4	LYL Loose 4	B0004	Loose Tea 1	0	2	549
line4	BB Loose 6	B0005	Loose Tea 2	10800	3	1156
line4	BB Loose 7	B0006	Loose Tea 3	0	4	715
line4	BB Loose 8	B0006	Loose Tea 3	3060	5	130
line4	BB Loose 9	B0006	Loose Tea 3	8640	6	346
line4	LYL Loose 5	B0008	Loose Tea 5	8640	7	346
line4	LYL Loose 6	B0008	Loose Tea 5	3240	8	130
line4	LYL Loose 7	B0007	Loose Tea 4	12960	9	520
line5	LYL Loose 1	B0004	Loose Tea 1	0	1	299
line5	LYL Loose 2	B0004	Loose Tea 1	0	2	1147
line5	BB Loose 1	B0005	Loose Tea 2	10272	3	1023
line5	BB Loose 2	B0006	Loose Tea 3	0	4	384
line5	BB Loose 3	B0006	Loose Tea 3	0	5	397
line5	BB Loose 4	B0007	Loose Tea 4	13500	6	620
line5	BB Loose 5	B0007	Loose Tea 4	10800	7	496
line6	LYL 2	B0002	Black Tea 2	0	1	2195
line6	LYL 3	B0001	Black Tea 1	7920	2	894
line7	LYL 3	B0001	Black Tea 1	0	1	4280
line8	LYL 4	B0002	Black Tea 2	0	1	169
line8	BB 1	B0003	Black Tea 3	33360	2	3909
line9	LYL 5	B0010	Black Tea 5	5040	1	2333
line10	BUSH 1	B0011	Black Tea 6	15450	1	3576
line11	LYL 6	B0003	Black Tea 3	0	1	2376
line11	LYL 7	B0001	Black Tea 1	15587	2	2160

# Calculation

## Threshold = 1000 kg

- We have used 6 silos and have solved 12 sku\_codes/jobs.
- Wastage = remaining stock in silos after completing the job  
(0 requested demand/quantity) = 6161 kg.
- Idle Time = difference between “the time to finish the job” and  
“the expected time” = 3181 minutes.
- Higher threshold, higher wastage, lower idle time.

# Next Steps

- Connecting more lines.
- Optimizing the silo threshold.
- Optimizing the connection matrix. How to get the best initial connection matrix? We can use brute force, discrete genetic algorithm, etc.
- Creating dashboard for better visualization.

# SIMULATION

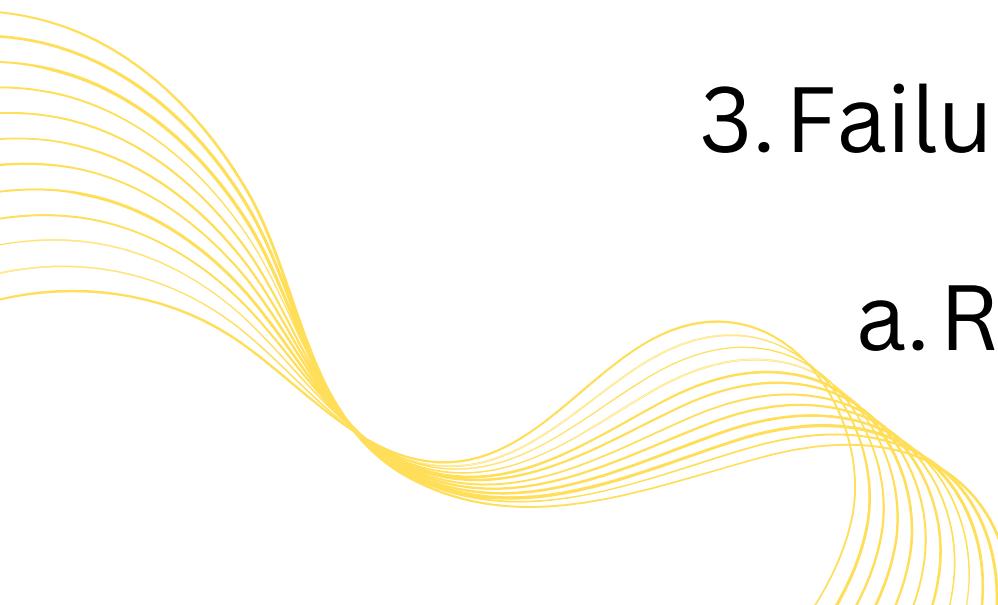
1. Object Oriented Programming:

- a. ROBUST
- b. SCALABLE
- c. MODULAR

2. Create visualizations and simulate what happens at each timestep during production

3. Failure cases

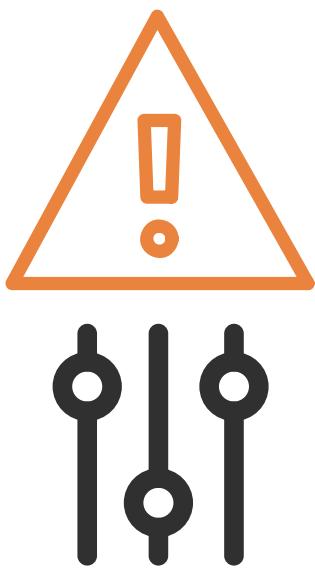
- a. Regenerate solution based on current data





# **DASHBOARD**

## WHAT WE CAN GIVE MORE?



1. Easier error detection when combined with LIPTON production factory data
2. Easy to customize (OOP)
3. Easy to integrate with other tools (Python)

# OUR TEAM



Muhammad  
Luthfi  
Student, PhD  
Mathematics



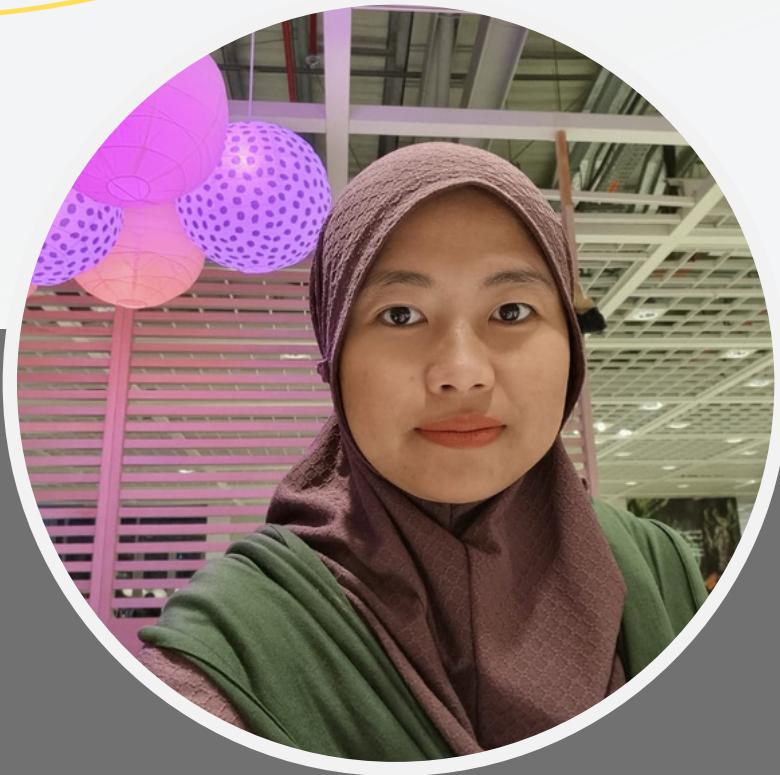
Mariam Al  
Zaabi  
Student, Masters  
Comp Science



Segni  
Desalegn  
Student, BSc  
Comp Science

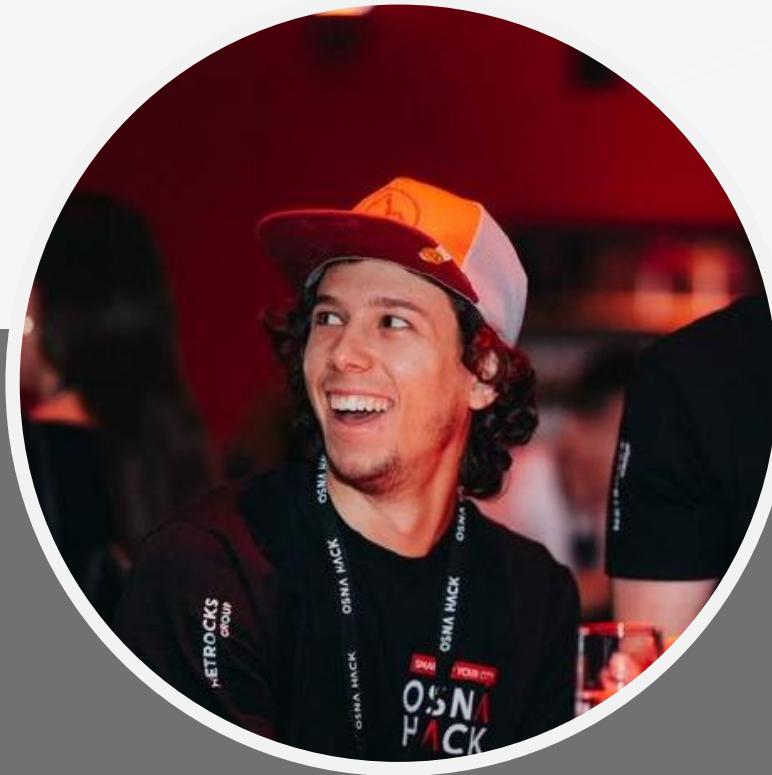


# OUR TEAM



Siti M. Ulyah

Student, PhD  
Mathematics



Sebastian  
Cavada

Student, Masters  
Comp. Science



Sara  
Abdulbasit

Student, BSc Networking  
Security