Data exploration:

1. Uploaded tables in SQL and power bI
2. This is a drink manufacturing company. the tables given here shows the downtime is manufacturing due to various reasons
3. Line efficiency typically measures how effectively production resources are being used compared to a standard or ideal scenario. In your case, the **minimum time required** can serve as that standard.

Transformation

1. Use first columns as headers
2. In Line Downtime time table, all the values are in columns so unpivoted the columns

Finally, there are 2 columns Downtime factor and downtime Minutes

1. Products Table: all the products size is in ML but Cola product is in liters convert to ML for consistency
2. **Size** column has values with suffixes like "ML" or "L" so first split the suffix and create a calculated column to keep all the size in ML for consistency
3. Line productivity: calculated the time taken in total duration for each Product and worker ID

Insights

**Production Analysis:**

* **Total Products:** 6
* **Total Batches:** 38
* **Total Production Hours:** 64 hours 18 minutes
* **Average Production Time:** 2 hours 42 minutes per batch
* **Key Insights:**
  1. Product **C0-2L** had a production time of 2 hours 5 minutes.
  2. **CO-600** demonstrated the highest line efficiency at 23.2.
  3. The **longest production time** occurred on 9/2/2024, totaling 21 hours 55 minutes, with **downtime** accounting for 8.3 hours.
  4. Most batches exceeded the minimum production time.

**Downtime Analysis:**

* **Total Downtime:** 23 hours 8 minutes
* **Average Downtime:** 22.7 minutes per instance
* **Operator-Related Downtime:** 12 hours 56 minutes
* **Non-Operator Downtime:** 10 hours 12 minutes
* **Key Insights:**
  1. **Extended downtime** contributes to longer production times.
  2. Product **CO-600** experienced the highest downtime.
  3. Leading downtime factors include **machine adjustments**, **machine failures**, **inventory shortages**, **batch changes**, and **batch coding**.
  4. **Batch 422147** faced the highest downtime at 1 hour 47 minutes.
  5. Operator **Charlie** had the longest downtime, totaling 3 hours 48 minutes due to frequent **machine adjustments**.

**Top Operator Errors:**

* **Charlie:** Machine adjustment (1 hr 9 min)
* **Dee:** Machine adjustment (1 hr 3 min)
* **Dennis:** Machine adjustment (2 hrs)
* **Mac:** Batch change (2 hrs 10 min)

SQL

1.Line of efficiency

Create a columns which has startdat+satrttime and enddate+end itime

Handle if end time crosses to next dat by adding 1 to daypart of enddate

Calculate duration in mim

Finalay divide both totoaltime and min time

With CTE as(select \* ,(CAST(DATE as datetime)+Cast(Start\_Time as datetime)) as StartDate,

Case When End\_time < Start\_time

Then CAST(Dateadd(day,1,Date) as datetime)+Cast(End\_time as datetime)

Else CAST(Date as datetime)+CAST(End\_Time as datetime) end as EndDate

from [dbo].[Line Productivity])

Select Product,sum(duration)/Min(duration)

from(

select \*,Datediff(minute,StartDate,EndDate) as duration

from CTE) as tab

group by Product