

# THE YOUNG OPTIMIZATION CRACKERJACK

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# FORECASTING DEMAND

- ▶ For every combination of Products and Regions an ARIMA model with 4 Lag observations was used.
- ▶ Cross validated by training on 33 months and using the last 3 months as validation set.
- ▶ ARIMA models worked far better than than aggregation models like mean of whole historical demand.

# SCHEDULING IN EXCEL

- ▶ For the objective function demand price, delivery and production costs are considered.
- ▶ For the constraints product demands are aggregated and the month wise constraints are also considered.
- ▶ Active days for production and changeover per month is taken as 20 days, to account for the changeover days later in the sequencing.
- ▶ Using a solver we can get the number of days corresponding to a each combination of product and region.
- ▶ Since the days are not integers, the days had to be manually rounded off.
- ▶ Now to account for the rounded off days, we have to further optimise the transportation distribution.(explained in later stage)

# SEQUENCING

- ▶ From the 'days a product should run on each line', that we got from scheduling , initially choose product greedily with maximum run days on a production line.
- ▶ Now choose another product with minimum changeover time and continue the path.
- ▶ If there is a tie in changeover days ( most of the times ) then next product is chosen by its run time on the line.
- ▶ As a tie is a frequent case this greedy approach ensures the sequencing is optimised with minimum changeover time between the products in a sequence and also meets most of the demand.
- ▶ The whole process is done for each production lines( 6 lines in A,B,C) and then repeated again for each month.

# TRANSPORTATION DISTRIBUTION

- ▶ **Number of days a product is run in sequence \* Production Capacity of a product in a plant** ( sum of all lines) will give how much of a product can be produced in the respective plants.
- ▶ Now we can get individual plant revenue for each combination of product and region.
- ▶ Then products are sorted according to their revenues from each plant.
- ▶ Now each product and region combination demand is satisfied from the plant which generates more revenue for that particular combination.
- ▶ If the plant capacity of a product form the step 1 is exhausted, then we move on to the next profitable plant for that specific region and product combination.