TCS Quantum Challenge 2023

Challenge 1 – Replenishment of Retail Stores

Technical - Frequently Asked Questions (FAQ)

Version 1.1

1. **What are the deliverables for each phase (Phase 1 and Phase 2) of the Challenge?**

   Phase 1:

   During this phase the participating teams will be expected to submit and present their proposed approach to solving one or more of the Challenge Statements, along with some results of preliminary experimentation using the approach. The submissions and presentations will be evaluated by a jury panel, and the most promising proposals for each Challenge Statement will be shortlisted for participation in Phase 2.

   Note: In phase 1, code is not required, however participants are welcome to include the same.

   Phase 2:

   During this phase the teams shortlisted at the end of Phase 1 will be expected to implement their solution using quantum hardware/simulators provided and then submit & present their results, learnings and proposed future work. The submissions and presentations will be evaluated by a jury panel, and the best solution to each Challenge Statement, as adjudged by the jury will be declared as the winner.

2. **Which file contains data for "Store demand by product, by time period"? There is historical sales data, is it the same?**

   Yes, the historical sales and forecast(fcst.csv) contains data for store demand by product.

3. **"Total budget amount (Available inventory capital) for store and DC" not present?**

Any feasible total budget amount can be assumed by the candidate, also behaviour of solutions for different values of budget can be observed and noted.

4. **"Product categories: (Combination of below categories)" not present?**

   Not present to reduce the complexity of the problem.

5. **"SKU segment" does not seem to be present?**

   Not present to reduce the complexity of the problem.

6. **SKU mapping from DCs to stores not present?**

   Not present to reduce the complexity of the problem.

7. **Allocation priority order of stores from DCs not present?**

   Not, present to reduce the complexity of the problem.

8. **What is #oh (last column) in StoreStock file? Is it no of units of the item?**

   Yes, OH stands for on hand.

9. **What is the definition of "total invested inventory value"? Is it on-hand inventory X holding cost?**

   It is total inventory in a given time period times total cost (holding+procurement)

10. **Question # 10 In the Fcst file, why are some totfcst negative? What do these quantities mean?**

    The negative values can be changed to zero.

11. In the Fcst file, the quantities are very small .. The largest one is 2.10. Is there a reason for this? Is it ok if we multiply these by 10 so results look more comprehensible?

Yes, you can multiply the forecast value by 10 or 100 but make sure you make necessary changes in other datasets as well if required to maintain consistency across the dataset.

12. DCs/stores capacity and available inventory capital not present

Appropriate feasible value for the inventory capital can be assumed by the candidate.

13. "On hand inventory of preceding time period <= On hand inventory after current time period + expected demand to be satisfied, provided inventory replenishment order is expected arrived or not"

Does this mean that the constraint is to be satisfied even if the replenishment order is not received in the time period?

Yes, by taking the replenishment order received = 0

14. "On hand inventory + expected demand to be satisfied on time period, t >= forecasted demand + safety stock"

Should this be <= instead of >=?

It should be >=. This is because on hand inventory left after demand being fulfilled in time period t must be greater than the predicted forecast and calculated safety stock

15. One of the inputs is "Standard normal value (z-value) associated with CSL". CSL of each product is not present in the dataset. Also, this CSL class is listed as one of the decision variables. Is this correct?

It is expected that CSL be calculated by the solution model. Yes, CSL class is mentioned as decision variable.

16. The data provided is not complete to formulate and solution the problem, can we synthesize data where necessary or should we restrict ourselves to the data provided?

Yes, the missing data can be generated by the candidate if required.

 e.g. Any feasible total budget amount can be assumed by the candidate, also behavior of solutions for different values of budget can be observed and noted.

17. Holding cost is provided as a value, is it over a time unit or any length of time the store carries the product, how should we consider it?

In the dataset, the value of holding cost is per day.

18. Safety stock, transit costs, similar parameters, are not provided, should we assume the same?

Appropriate safety stock should be calculated by the solution model.

Transit cost is not considered separately to reduce the complexity of the problem.

19. Is CSL, Customer Service level? Any specific way- this needs to be quantified? Please explain.

Customer Service Level(CSL) of an inventory describes the percentage of customer orders that are satisfied by that inventory.

For example, if a company receives 100 orders for an inventory in a week and is able to fill 95 of them, its service level would be 95%.

20. Unit gross profit provided, is only product related or cost like transit cost baked into it?

Unit gross profit is only product related. Transit cost is not considered separately to reduce the complexity of the problem.

21. What is run_date in PrevOrder.csv?

The date at which orders were placed.

22. There is no in-transit data as part of the dataset. Kindly suggest the same.

Not present to reduce the complexity of the problem.

23. There is no in-transit data as part of the dataset. Kindly suggest the same.

Not present to reduce the complexity of the problem.

24. We didn't see any supply lead time and supplier vs DC replenishment dataset.

Not present to reduce the complexity of the problem.

25. What is the relationship between storeid vs lead time? There store if - loc202 and lead time 2 my question what does that mean in real time scenario? Question refering to LeadTime dataset. Another point - we have more than 1000 stores but lead times is less than 875.

Lead time is the time taken to receive the product at that store. If lead time for loc202 is 2 it means it take two days to receive the product.

For the stores which does not have lead time, can be ignored or the value can be assumed as 0.

26. How to get the demand quantity for a particular product for particular date? Is dataset given per day wise or per week wise?

Demand quantity for a particular product can be taken from Previous orders and forecast. The dataset is given per day wise.

27. How the prevorder and pastforecast and forecast dataset is related?

Pastforecast contains the previously forecasted value for the demand whereas prevorders contains the actual demand. They can be compared to see what was expected demand vs how much was actual demand.

Forecast dataset contains data for future forecasts for which the actual demands are unknown.

28. Is the date format unique across all over the dataset? Is it mm/dd/yyyy ?

The date format is unique. It is dd/mm/yyyy.

29. Is holding cost is per day or per unit wise?

Yes, holding cost is per unit and per day wise.

30. What is the meaning of start date in Fact dataset? Also we can see there is fraction value in totfcst .can you please let us know what is formula to use this fraction value?

The start date is the date for which the forecast value is predicted.