

SQL - Case Study

Instructions:

This case study is designed with a set of use case scenarios extracted from real life business needs. There has been some simplifications done to enable all learners to learn different SQL concepts while diluting very deep business rules. The names of any company/application or person are indicative and do not relate to any real brands or people.

You are required to

1. Read the case study requirements carefully and raise your queries to the facilitator/Mentor

Background:

JagChalo runs public transport buses across the city of Mumbai. They are now keen to develop an app to display all their bus schedules, bus routes, current status of bus with respect to each stop, bus fares for routes based on different bus types. Currently they run AC, Luxury as well as Economic buses. AC have AC facility with TV as well as only sitting. Luxury is only sitting without AC. Economic buses allow standing as well and run without AC.

They have around 10000 buses plying across the city to around 300 routes. Around 100 routes are round-robin covering main market places to residences or train suburban stations to people residences. 3000000 (30 lakhs) commuters leverage their services through out the city.

JagChalo has christened their app as “KabChalo”. You are required to design the database for “KabChalo”.

Pre-requisites:

1. Please check that mySQL is setup in each machine in lab.
2. We have a pen and paper to jot down our thoughts and action accordingly.
3. Please complete Episodes one after another for complete understanding.

Activity:

Episode 1:

In this episode, you are required to understand the KabChalo app broad objectives and accordingly arrive at the database design. You are required to

1. Design the Entity-Relation Model for KabChalo app.
2. Let's normalize the database to
 - a. 1 NF
 - b. 2 NF
 - c. 3 NF
3. Create the database.

Episode 2:

“KabChalo” database is designed with key entities and their relationships. We need to create the physical table structure as well as define different attributes. How do we define the attributes for the tables/entity?

1. Let's create the tables for all the identified entities and relations.
2. Let's insert few data in all the tables.
3. Now few operations for our immediate help.
 - a. Location of “Khargar” was misspelt everywhere as “Kharaghar”. Now update the same in Route? Do we have to update in other places? Why?
 - b. By mistake, an AC bus-route was created for bus number 143. Kindly remove the same from the table.
 - c. Help the bus drivers with the bus timetable allotted to them for the day.

Episode 3:

“KabChalo” database is designed appropriately with required tables, keys. Now we are in process to help the users and management with different kind of reports. These reports will be used by them for their daily monitoring as well as analyse trends to maximise commuter comfort and increase reach to common man. You need to generate the SQL queries to get the data out of database.

1. KabChalo app administrator needs to have a dashboard report every hour stating Route-wise number of buses planned, number of busses allotted, total INR value collected for the day.
2. We need to write a query to extract the status of a Bus number in terms of which route the bus is, the current stop where bus is, next stop where it would reach.
3. We need to write a query to extract all routes alongwith bus number allotted in whichever route.
4. We need to have a zone-wise, count of busses as well as count of routes with the INR amount generated.

Episode 4:

“KabChalo” database is designed appropriately with required tables, keys. You all have helped in generating reports using Select and joins. Now management would like to leverage their data for future planning in terms of new buses, new routes etc. Read the requirements to get clarity on the same. You are required to again write the queries to extract the data from database.

1. Since the data volume of the day-to-day route schedules are higher, “Kabchalo” DBA had decided to move the bus routes and income generated for previous year to another set of tables with prefix as 2021 and 2020 for two years before. Management wanted to only store 3 years of data in the current database. Hence DBA handled the implementation in this way. Now, when management was looking at the data for

income generated, they could not see any information on year 2021 or 2020. Help them generate their report including 2021 as well.

2. Now, every year, due to some challenges, few of the buses are discarded. Now the reports are providing bus details of the discarded buses. Generate the report only for the active buses in current and year 2021.
3. There are few buses which are active but not at all used due to frequent maintenance. Management has been holding on to them for any emergency kind of requirements. Management wants you to generate the query removing all such buses as well. All such buses are marked as “Hold” in their status.
4. It is required to find out details of all those buses who have been procured 5 years before 2021 and still have gone for minimum maintenance in 2021 and 2022. We need to provide the bus related details as well as INR generated by those buses.