Tutorial: SQL, a Refresher

Your company Singgah Technologies Pte Ltd has been commissioned to design and implement the database for a payment portal. The portal records its customers with their social security number, first and last name, and country of residence. Customers are identified by their social security number. The portal records the credits cards used by the customers with their number and type (e.g. 'visa', 'mastercard'.) Credit cards are identified by their number. The portal records its merchants with their code, name, and country. Merchants are identified by their code. The portal records transactions. A transaction involves a credit card and merchant at a given date and for a given amount. Transactions are identified by an identifier.

1. Create and populate the database.
   (a) Write the SQL DDL code to create the tables for this application with appropriate domains and integrity constraints.
   (b) Generate and write the SQL DML code to populate the tables. Use `www.mockaroo.com` and SQL to create around 100 customers, 20 merchants, 300 credit cards, and 3000 transactions. Explore different options regarding the distribution of the number of credit cards per customer and the number of transactions per credit card and merchant.
2. Translate the following queries into SQL.
   (a) Find the first and last names of the different customers in Singapore who own both a JCB and a Visa credit card (the credit card type is "`jcb`" or "`visa`".) Make sure that the same customer is not printed twice (note that your answer should cater for the fact that there could be, in this or in future instances of the database, different customers with the same name: each different customer must be printed.)
   (b) For each customer, find how many credit cards the customer owns. Print the customer's social security number and the number of credit cards owned. Print zero if a customer does not own any credit card.
   (c) Print the identifier of the transactions with the largest amount among all other transactions using the same type of credit card. Use aggregate queries.
   (d) Print the transaction identifier of the transactions with the largest amount among all other transactions using the same type of credit card. Do not use aggregate functions and queries.