Case Background

Chocolate Nation is a Belgian chocolate museum that offers opportunities for hands-on events and tasting experiences to an exclusive audience. They are expanding to Australia, and the project manager has enlisted you as a database designer to create a database design (including designing the ERD, transforming, and creating the tables) and run some analysis for the Australian branch. Please note this is a hypothetical scenario, so please do not contact the museum.

Chocolate Nation provides different opportunities for visitors to explore the history of chocolates. There is a wide range of options for visitors to book during their visit to the museum. Every visitor must be registered and identified with a visitor identifier number. Other details of a visitor include the name, date of birth, and email.

Some events happen throughout the year. Every event is uniquely identified. Other details of the event include name, date, time, cost, and capacity. Events can be one-off or recurring. An event will make use of a maximum of one exhibit that the museum owns. A code identifies every exhibit. The details of the exhibit, such as the description and number of items, are stored. An exhibit may be made up of multiple exhibits. When making a booking for an event, the booking date and the number of people the booking is for are recorded as well. Events are run by multiple employees (one supervisor and multiple demonstrators, but at least one).

A visitor can also sign up for a tasting experience. Every experience offered is uniquely identified. Other details of the experience include name, duration, and cost. Experiences are offered every day. To schedule an experience, the visitor must make an appointment with an employee (who is an administrator) for a particular date and time. The appointment by itself doesn't cost anything, and a Zoom meeting ID is sent to the visitor. After the appointment, if the visitors want to proceed with the booking, a reservation for the experience is created. A reservation is made for an experience with three employees (who are all demonstrators) and for a visitor. Other details of the reservation, such as the employee making the reservation, the date of reservation, the experience date, time, the number of people, and the group's different dietary preferences (dairy-free, nut-allergy, etc), are stored. The demonstrators are booked for a certain number of minutes, which is also recorded.

Chocolate Nation records details of their employees, each identified by a unique identifier. Other details captured include the name, address, the department they work for and qualifications. Each employee can have only one direct manager. The department is identified with a unique identifier, and the department name is recorded. An employee (the head of the department) can head only one department, and every department has one employee who is the head of the department.

The products are identified by a unique identifier, and their name and description are recorded. Products can contain multiple ingredients; an ingredient can be used in many products. Each ingredient is identified by a unique identifier alongside the name and allergens. The amount and the unit of measurement of ingredients in every product are recorded as well. Every ingredient is sourced from a single supplier. Suppliers may change, and hence, the history of sourcing must be stored. The date range of the sourcing must be recorded for documentation and food safety reasons. The cost, quantity, and unit of measurement (for example, $5 for one kilo (or) $50 per 250 grams) is also recorded in the sourcing.

Visitors can sign up for one subscription from the range of subscriptions that Chocolate Nation offers. The name and cost of every subscription will be recorded. Every subscription has a set of packages that are ready for visitors to pick up. The identification number for the package is repeated for every subscription it is under. The name of the package is stored. A package is made up of multiple products. A product may belong to multiple packages.

Group Assignment

You are expected to work on this assignment as a group consisting of 4-5 members from the same practical class. The assignment is designed to be worked in a group of 2-3 members, and this means even if you lose group members, you should be complete the task with the rest of the team. You will be required to enrol in the group on iLearn in Week-4 or 5 in your practicals. Failure to do this will mean you will be assigned to random groups which may require you to be in groups with students from other classes.

Task Descriptions

Task 1- ER Diagram (40 marks)

Based on the business rules provided under the case background, you are expected to construct an ER diagram using a Crow's Foot notation. The ER diagram should include entities, attributes, and identifiers. You are also expected to name the relationships among entities and add the cardinality and constraints. You may choose to add attributes to the relationships (if there are any) or create an associative entity, when necessary.

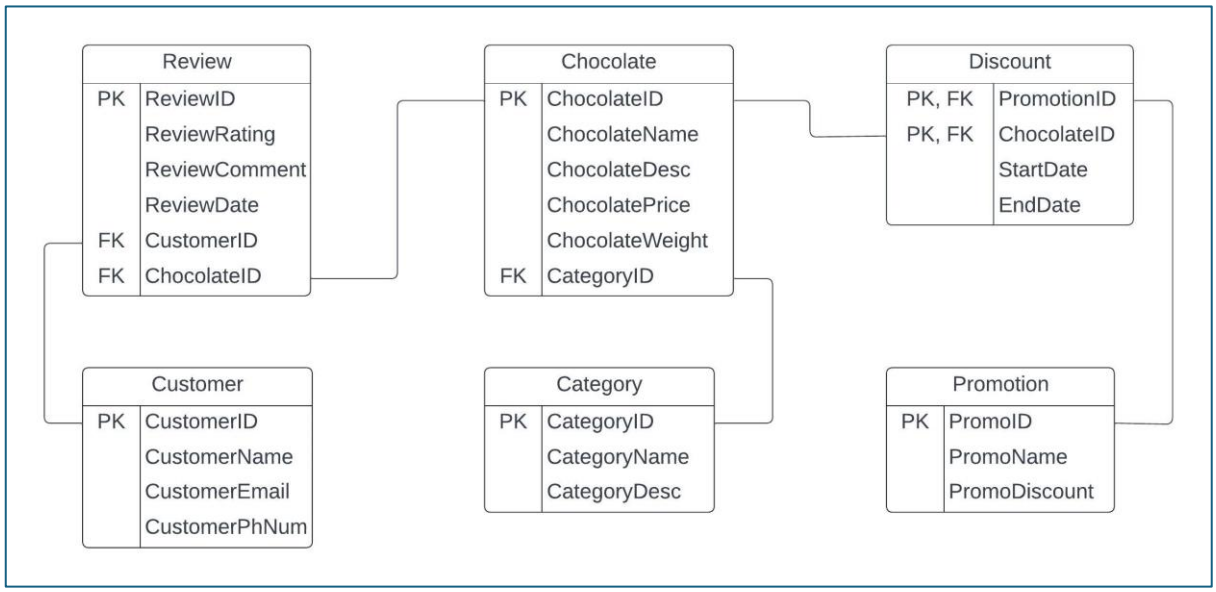
Task 2- Logical Transformation (30 marks)

Based on your ERD from Task 1, perform a logical transformation. You must include a step-by-step transformation and the final list of tables with primary and foreign keys denoted with (PK) and (FK). Please note, that if there are errors in the ER diagram, this will impact your marks in the transformation. However, the correctness of the process will be considered.

Task 3- SQL (30 marks)

One of the database engineers, Mr. Jon Snow, who was working on the database has quit and you have been also tasked with the responsibility of completing the creation of tables, inserting the data, and writing some queries for this task that they were hired to do. The schema for the tables is provided below. The schema represents a part of the online store for Chocolate Nation.

Schema



Question-A (10 marks)

Please download the SQL file provided in the folder and continue to work on it. Add the primary keys, foreign keys, and complete the DDL script including creating any tables that are missing in the script. You will also have to insert at least 5 records in every table. We have provided a sample insert statement for every table that Mr.Snow has already created.

Question-B (20 marks)

Formulate 4 SQL queries corresponding to the above tables and provide both the SQL query and the solution for each of the queries. Each query result should display at least 3 unique results for each of the following types of questions.

- Query 1: A query involving a single table with one condition.
- Query 2: A query involving a single table and two conditions. One of these conditions must use a wild card operator.
- Query 3: A query that joins at least two tables and uses an order by clause.
- Query 4: A query involving a single table with an aggregate and group by function.