4CCS1DBS Database Systems
Coursework 2017
Part 1: Design

Overview

The purpose of this coursework is to create a database ER schema and relational schema based on specific domain based on the provided requirements. This coursework also involves implementing your relational schema in SQL and writing some queries in SQL's Data Manipulation Language.

This coursework is comprised of 2 Parts, __each with separate deadlines.__ Be aware any late submissions will have the grade for that part capped at 40%. This is Part 1 of the Coursework.

The entire coursework is formally assessed and is worth **10%** of your final grade. Each Part of the Coursework is worth 5%. You will receive some feedback as part of the marking of the coursework.

Part 1: Design (5% of your final grade)

(1.1) Identification and representation of entities, relationships and attributes.

(1.2) Identification and representation of relationship cardinalities based on the coursework requirements, or by making proper use assumptions if the coursework requirements are vague. Any assumptions need to be reasonable and realistic.

(1.3) Conversion of the ER schema to a relational schema.

(1.4) Identify domain constraint specific to the database requirements.

Part 1 Deadline: Sunday February 19th by 11:55 pm on KEATs.
(Part 1 Late Deadline: Monday February 20th by 11:55pm on KEATs)

Overall presentation including legibility and proper use of language (where applicable).

Database Requirements

Chipp quit his career in computing to start a fleet of London's Premier Burrito Food Trucks. Every day Food Trucks will sell burritos (with various fillings and toppings) and refreshing beverages at various markets throughout London. Being data-minded Chipp wants to utilize a DBMS to track the sales for each Food Truck. In addition, he would like to start a customer loyal program called the BurritoClub. Customers who sign-up to BurritoClub can get offers on free burritos! This also will allow Chipp to store data on customer purchases for his Data Science team to analyze.

Here are the specifications for the database requirements:

Chipp will invest in a fleet of one or more Food Trucks that each sell the same menu at different markets across London. Each **Food** Truck has a unique identifier, its vehicle registration number (see https://www.gov.uk/displaying-number-plates for the format), and the date that Chipp put the Food Truck in service.

Food Trucks will be scheduled to appear at one of London's many street markets. Markets have a name, a post code where they are located, and the days of the week that they are active. Assume that Chipp will assign a Food Truck to a street market for an entire day, and that no more than one of the Food Truck will be present at a Market at a time.

Customers may sign up to the BurritoClub with their email address. They will provide their Date of Birth, address, and their name as part of the sign-up. Every Customer (identified by their email) may have only one BurritoClub membership.

Chipp would like to keep the offer scheme of the BurritoClub simple at first. Every BurritoClub customer gets 1 free Burrito for every 10 Burritos that they buy. In other words, every 11th Burrito is free. The database should keep track of this necessary information for the BurritoClub.

The items sold in the Food Truck can be of different types: burritos and beverages. Every item have an ID, a description and a price. Assume that every Food Truck has infinite stock of each item (i.e. we do **not** need to track stock levels in each Food Truck).

All Burritos come with rice, a type of bean, a filling, and a set of optional toppings. Burritos are priced by size (Mini, Regular, and Grande). Bean types will vary. Chipp will start by offering two types: black beans and red beans. Burrito fillings will vary (depending on the season). There are at least 3 types of Burrito fillings and there should be a vegetarian option.

A Burrito may optionally have toppings: lettuce, tomato, and mild and hot salsa. Toppings are free, but Chipp will also offer guacamole as a topping for which there is an extra charge.

The Food Truck also sells different types of refreshing beverages, both alcoholic and non-alcoholic. All beverages have a size measured in milliliters (just in case Chipp takes his Food Truck business over the Channel to mainland Europe).

Each order is identified by a unique order number, and should include the date and at which Food Truck and Market it was placed. An order may contain any

of the items available at the Food Truck. Additionally, the total cost and the quantity of items in the order may be derived from the order contents.

Assume that a customer may use their BurritoClub card with an order. But orders may also be placed without a BurritoClub card and as a result there is no customer attributed to them.

Part 1: Design

1.1 ER Diagram. Draw the ER schema that would correspond to the requirements above. Include all entities, attributes, and relationships.

If necessary, please explain/justify your design choices.

1.2 Cardinalities and Assumptions. On the ER Diagram include all cardinalities of the relationships using the ERD (min,max) notation from lecture. State assumptions made and ensure that those assumptions do not contradict with the coursework requirements.

Please list your assumptions as bullet points.

1.3 Relational Schema. Convert the ER schema into a relational schema separately grouping the Entity and the Relationship relations.

1.4 Constraints.
(i) For each relation, identify their **primary** and **foreign keys**. You may write (PK) and (FK) to indicate the attribute(s) that serve as primary and foreign keys, respectively. For example, 'ProjectNumber (PK), EmployeeNumber (FK)'.

(ii) In addition, define all of the **domain constraints** for <u>three</u> relations in your relational schema. If necessary, include an explanation for these domain constraints.

(iii) Define <u>three</u> **semantic integrity constraints** for your schema specific to the Burrito Food Truck domain. Include an explanation for each semantic integrity constraint.

What to turn in

Organise your design into a single **PDF** document for Part 1 and submit it on KEATs before the deadline. <u>**Other documents and extra materials will be ignored**</u>.

Be sure to include your **Name** and **Student number** on your submission.

Your design will be accessed not only on the **quality of the design,** but also on the overall **presentation** including **legibility** and proper use of language in your explanations.

Utilise a diagramming / sketching program (as practiced in the Lab Practicals) to create a ER Diagram and relational schema. It will be hard for the marker to properly access your work if it is drawn by hand.