Assignment 1

Question 1 (6 marks)

A factory hires you to design a small database, and gives you the following requirements:

- A worker is uniquely identified by his/her ID. For each worker, we also record his/her name, gender, phone number, email, and address. The address is composed of a suburb and a street. Each worker must work in a workshop and can have multiple available working periods.

- A workshop is uniquely identified by its ID. For each workshop, the name, the contact person and the contact number will be recorded. There are multiple workshops, and each workshop has at least one worker. Each worker only works in exactly one workshop. The number of workers in a workshop is needed.

- A warehouse is uniquely identified by its ID. For each warehouse, the name, the contact person and the contact number will be recorded.

- Each type of product is uniquely identified by its ID. All the products are produced in the workshops. Different workshops can produce the same type of product, and each workshop produces zero or more types of products. For each type of product, we also record its price.

- A type of product is composed of at least one type of part, and all types of parts will be assembled in at least one type of product. We also record the quantity for each type of the product produced in each workshop. Each type of part is uniquely identified by its ID, and we also record its weight and price.

- There are zero or more types of parts/products stored in each warehouse. The same type of product/part will be stored in the same warehouse.

Draw an ER diagram to represent the scenario, clearly state the assumptions you make if any.

Question 2 (6 marks)

Convert your ER-diagram from Question 1 into a relational data model.

Question 3 (8 marks)

Consider the following relational schemas:
CarDealership (dID, dName, location)
SalesPerson (sID, sName, dID)
Customer (pID, pName, gender)
Car (cID, brand, model, year, condition)
Sale (pID, cID, sID, salePrice)

Write relational algebra expression to answer the following questions:

1) Find the *names* of the customers who have bought cars from *Sydney City Toyota* in *Waterloo.* (2 marks)
2) Find the *names* of the salespeople who have sold all brands of cars. (2 marks)
3) Find the *names* of the car dealership who have sold some *Audi* cars but never sell any *Mazda* cars. (2 marks)
4) Find the *names* of the customers who only bought *brand-new* cars or only bought *used* cars. (2 marks)

Note that, only the following operators can be used in your answer: *Select*, *Project*, *Union*, *Intersection*, *Difference*, *Cartesian Product*, *Join*, and *Divide*. The names may not be unique, different dealerships or people can have a same name. The condition of a car would be either brand-new or used, and no other conditions will be included.

Assignment Submission

We accept electronic submissions only. Please submit your assignments as follows:

- The file name should be ass1.pdf.
- Log into the CSE server, ensure that you are in the directory containing the file to be submitted. (note: we only accept files with .pdf extension)
- Type "give cs9311 ass1 ass1.pdf" to submit.
- You can also use the web give system to submit.
- In case that the system is not working properly, you **must** take the following actions:
  1) Please keep a screen capture (including your **zid**, the submission **timestamp** and the **size** of the submitted file) for your submissions as proof. If you are not sure how, please have a look at the guidelines.
  2) Please keep a copy of your submitted file on the CSE server. If you are not sure how, please have a look at taggi.

Note:

1. If the size of your pdf file is larger than 2MB, the system will not accept the submission. If you face this problem, try converting to compress pdf.
2. If you have any problems in submissions, please email to comp9311unsw@gmail.com.
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Late Submission Penalty

0 mark.