Assignment 1

Please make sure that you always use notations consistent with lecture notes. Different notations will not be accepted. The deadline for assignment 1 is:

Fri 12 Mar, 5:00 pm

Question 1 (6 marks)

A car dealership organization hires you to design a small database, and gives you the following requirements:

- A dealership is uniquely identified by its ID. For each dealership, we also record its name, contact number, email, and address. The address is composed of a suburb and a street. Each dealership must have one or more employees.
- An employee is uniquely identified by his/her ID. For each employee, we also record his/her name, phone number and email. An employee works in one or more dealerships. In addition, an employee can have multiple working time periods availabl
- A vehic make, model, build date, an vehicle will be sold by exactly one employee.
- An employee can sell zero or more vehicle
- A dealership owns zero or more vehicles. ed by exactly one dealership.
- There are some showrooms. A showroom is uniquely identified by its ID. For each showroom, the name, the contact person, and the contact number will be recorded. Each showroom has one or more vehicles, and a vehicle is parked in zero or one showrooms.
- A customer is uniquely identified by his/her ID. For each customer, we also record his/her name, phone number and email. A customer may not buy any vehicle but can also buy multiple vehicles. A vehicle may not be sold yet. If sold, a vehicle must be bought by exactly one customer.
- When a customer purchases a vehicle, we also record the date and sales price.

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:

Department (dID, dName, location)

Employee (eID, eName, dID, gender)

Project (pID, pName, cost, startTime, endTime)

WorkOn (eID, pID)

Host (dID, pID)

Write relational algebra expression to answer the following questions:

1) Find the *names* of the employees who work for the *sales* department. (2 marks)
2) Find the *names* of the projects which has no employee from the *human resource* department and involves at least one employee from each of the rest of the departments. (2 marks
3) Find the or only have *female* employees. (2 marks)
4) Find the *names* of the departments which ha projects (>= 1 million), but their employees do not participate in the projects hosted by any other departments. (2 marks)

Note that, only the following operators can be used in your answer: *Select*, *Project*, *Union*, *Intersection*, *Difference*, *Cartesian Product*, *Join*, and *Divide*. Any name may not be unique, different departments, projects or employees can have a same name. For duplicate entity names in two different relations, you may use relation.entity to specify the entity, e.g., $R_1 \bowtie_{R_1.eID=R_2.eID} R_2$

Assignment Submission

- Students must submit an electronic copy of their answers to the above questions to the course website in Moodle.
- Only **.doc** or **.pdf** file is accepted. The file name should be ass1_**studentID**.doc or ass1_**studentID**.pdf (e.g., **ass1_z5100000.doc** or **ass1_z5100000.pdf**).

Note:

1. For any problems in submissions, please email to comp9311unsw@gmail.com
2. All submissions will be checked for plagiarism.
3. We do not accept e-mail submissions.

Warning: Before submission, please keep a copy in your university account or other reliable cloud servers (such as dropbox or google drive). If you are not sure how, please have a look at taggi. Usually, the submission should be successful. In case it fails, we do **not** accept backups from your own computers as the modification time can be edited.

Late Submission Penalty

0 mark.