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 25 June, 5:00 pm (Sydney time)

Question 1 (9 marks)

A civil aviation organization hires you to design a small database with the following requirements:

- An aircraft is uniquely identified by its RegistrationCode. For each aircraft, we record its model and capacity. Each aircraft is owned by only one airline.

- An airline is uniquely identified by its AirlineCode. For each airline, its name, country will be recorded. Each airline could have multiple phone numbers. The number of aircrafts belonging to this airline is needed.

- A pilot is uniquely identified by his/her PilotID. For each pilot, we also record his/her name, gender and DoB (Date of Birth).

- A flight is uniquely identified by its FlightID. For each flight, its flight number, route and time are recorded. The route is composed by an origin and a destination.

- A passenger is uniquely identified by his/her PassengerID. For each passenger, we also record his/her name and contact number.

- A passenger must book at least one flight, and a flight could have zero or more passengers. Whenever a passenger books a flight, the booking reference is recorded.

- A flight must be performed by at least one pilot, but a pilot may perform zero or more flights.

- A flight must be operated by one aircraft, but an aircraft may operate zero or more flights.

- An airline should own at least one aircraft and at least one pilot. Whenever a pilot starts to work in an airline, his employment date is recorded.

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 (10 marks)

Consider the following relational schemas:

Game (gID, gName, price)

Genre (gID, genre)

Player (pID, pName, age)

Play (pID, gID)

Developer (dID, dName, country)

Develop (dID, gID)

Write relational algebra expression to answer the following questions:

1) Find the *names* of the games developed by *Valve*. (2 marks)

2) Find the *names* of the players who have played at least *10* games. (2 marks)

3) Find the *names* of the cross-genre games which are both *simulation* and *sports*, but *Electronic Arts* is not in the developer list. (3 marks)

4) Find the *names* of the *American* developers who only developed **free games** (=$0) but have never developed any games with less than *1,000,000* players. (3 marks)

Note that, only the operators in the lecture slides can be used in your answer. Any attribute other than the primary key is not unique, such as the name of the games and the name of the players and the developers. The game price is saved as number in USD, such as $10 will be saved as 10. The country of developer is saved as country name, such as the country of an American developer is saved as America.

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.

The university regards plagiarism as a form of academic misconduct and has very strict rules regarding plagiarism. For UNSW policies, penalties, and information to help avoid plagiarism, please see: https://student.unsw.edu.au/plagiarism as well as the guidelines in the online ELISE tutorials for all new UNSW students: https://subjectguides.library.unsw.edu.au/elise

Late Submission Penalty

20% of the value of the submission will be deducted for each day (24 hours). Submissions with more than five days late will not be marked.