Database Systems

Assignment 2: ER-Relational Mapping, Relational Algebra, and SQL

Deadline: At the end of the day, November 9 (Thur), 2006
This is an individual assignment, that is, no group submissions are allowed.

Cheating Policy: If you are caught cheating, your grade is 0.
Late Policy: **We will not accept any late assignment submission**.

Questions

1. Translate the following ER model into a relational schema, and show the SQL statements needed to create the relations, using only key and null constraints. If your translation cannot capture any constraints in the ER diagram, explain why. (Exercise 2.6 in the textbook)
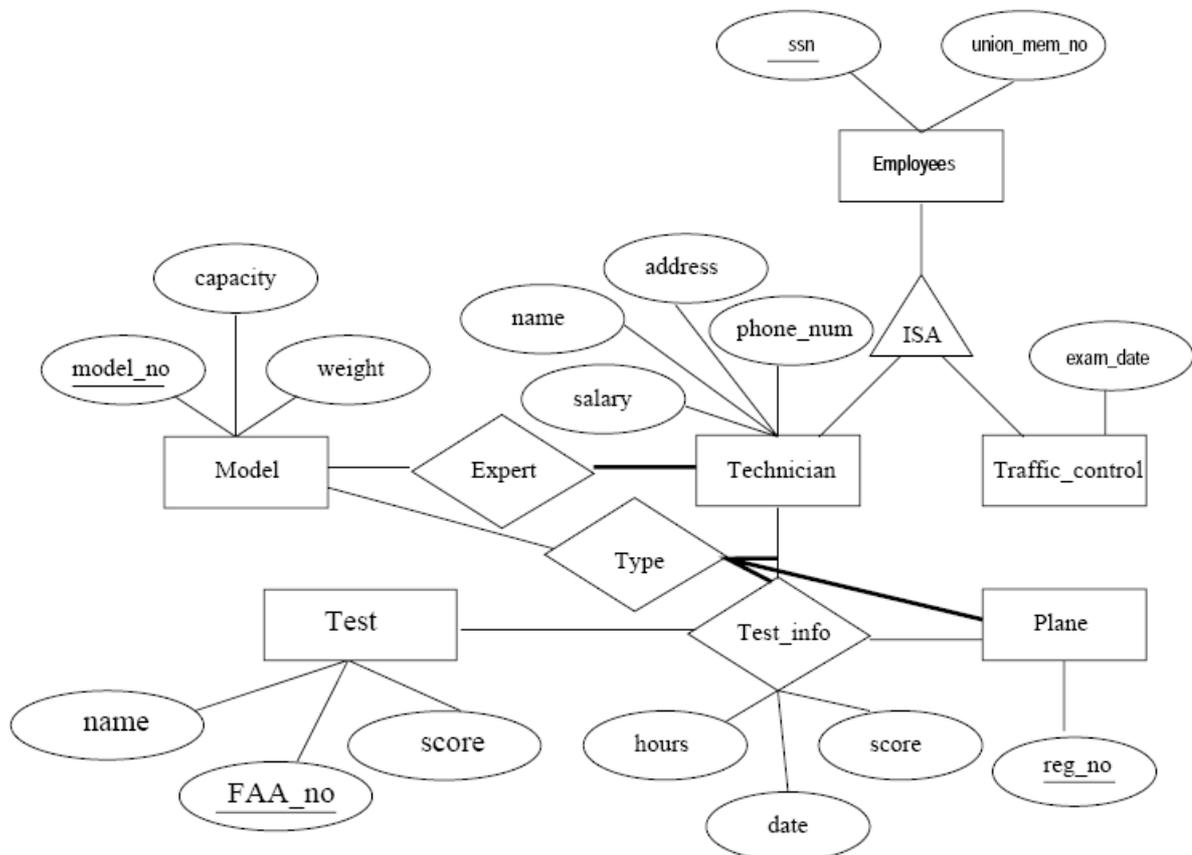
2. Exercise 4.5 in the textbook (write the queries with only relational algebra). If you cannot write the queries in relational algebra, please explain why not.

3. You have two choices here. Choice 1: Exercise 5.4 in the textbook. Choice 2 gives you practical

experience using SQL on a real database (Microsoft Access). Below is the information for the choice 2.

On World Wide Web there are more than 100 different web pages dedicated to Star Wars. However, the answer to a specific trivia question is sometimes difficult to find, precisely because of the abundance of information. In this assignment we will be creating a new Star Wars Trilogy database for the trivia lovers. We decided to begin with the time tables - who went where and when. We have started to input the information into the database. Your task will be to create SQL queries that answer some of the often asked questions.(or questions that we found most fascinating and asked often)

A database has been created using Microsoft Access in the UGLab. The database currently contains:

Characters: contains information about the character's Name (primary key), Race (if known), Homeworld (if known) and Affiliation(rebels/empire/neutral/free-lancer).

Planets: contains information about the planet's Name (primary key), it's Type (gas/swamp/forest/handmade/ice/desert), and it's Affiliation (rebels/empire/neutral)

TimeTable: contains Character's Name, Planet's Name, Movie in which the character visited the planet and the time of arrival and departure from the planet.The primary key is Character's Name, Planet's Name and Movie. Movie 1 represents The Star Wars, Movie 2 represents Empire Strikes Back, Movie 3 represents Return of the Jedi. Each movie has been divided into 10 time chunks and these chunks are used to define time of arrival and departure. So that, if Darth Vader visited Bespin (Cloud City) in Empire Strikes Back from the middle of the movie till it's end, the record of it will look like this:

Character's Name	Planet's Name	Movie	Time of Arrival	Time of Departure
Darth Vader	Bespin	2	5	10

Query

Write SQL queries that answer the questions below (one query per question) and run them on the Microsoft ACCESS Database System using its SQL interpreter. The query answers must not contain duplicates, but you should use the SQL keyword distinct only when necessary. You should copy the database from the class directory into your personal directory before you start writing queries.

After you open the ACCESS file 'StarWars.mdb'with ACCESS 2000, you'll see the 'StarWars:資料庫' database control panel (the ACCESS XP does the same work). The main frame default shows all the tables contained in this database. At this time, you may check the tables by double clicking on it. To add a new query, you should first change the frame to '查詢' and then click on '使用設計檢視建立新查詢'. Then, a GUI-based control panel will appear on the screen. To get to the SQL interpreter, close the dialog, right click the title bar, and then select the 'SQL 檢視'. Then, you may write your SQL command on this form.

The SQL interpreter in ACCESS is not quite the same as the one described in the textbook. If the query you write is not accepted by ACCESS (usually it gives you some strange errors), try different ways until you get one that works with ACCESS. For this assignment, creation of temporary tables is not allowed, i.e., for each question you have to write exactly one SQL statement.

Query Commands

select, from, where, not, in, exists, distinct, group by, order by, [field name]

Write the following SQL queries:

a. Which planet does R2-D2 go to in movie3?

b. How many characters visited Tatooine in movie 3?

c. On which planets and in which movies has Luke been at the same time on the planet as Darth Vader.

d. Find humans that visited desert planets and droids that visited swampy planets. List the movies when it happened and the names of the characters. The output should be sorted by the movie and the character's name.

e. In each movie 1, 2, and 3, which character goes to the most planets (numbers of planets)?

f. For each movie, find the planet which has been traveled by the most characters (number of characters)

g. For each race, find the character that travels the most (number of time slots) in each movie 1, 2, 3.

h. Which planet has not been visited in either movie 1 or 2?

Submission

Hand in PAPER PRINTOUT that contains your answers to these questions. Please include your name and ID.