Assignment 1: ER Diagram and Relational Model

Due: Oct 7, Sat, 11:59pm

Weight: 8%. Total=61 marks

Submission instruction:

- **This assignment must be done by each student independently.**
- **Hand-writing is acceptable but the student is responsible for the clarity.**
- **Submission is through coursys.sfu.ca in a single pdf file with maximum file size of 10MB. Late submission will not be accepted.**

Question 1 (18 marks, 3 marks each). For each of the following statements, represent it using CREATE TABLE statement:

1. Patients attend doctors. You want to store the attending information and the date of attending. Patients identified by pid. Doctors is identified by did.

2. Continue 1, each patient attends doctors at most once.

3. Continue 2, each patient attends doctors at least once.

4. Continue 1, only existing doctors can be attended by a patient.

5. Continue 1, every doctor must be attended by a patient.

6. Continue 1, each of (Name, Address) and (Name,Age) uniquely identifies a patient.

Question 2 (18 marks, 3 marks each) A university database contains information about professors (identified by ssn) and courses (identified by courseid). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each situation, draw an ER diagram that describes it (assuming that no further constraints hold) and using CREATE TABLE to model the information in the ER diagram.

1. Professors can teach the same course in several semesters, and each offering must be recorded.

2. Professors can teach the same course in several semesters, and only the most recent such offering needs to be recorded. (Assume this condition applies in all subsequent questions.)

3. Every professor must teach some course.

4. Every professor teaches exactly one course (no more, no less).

5. Every professor teaches exactly one course (no more, no less), and every course must be taught by some professor.

6. Now suppose that certain courses can be taught by a team of professors jointly, but it is possible that no one professor in a team can teach the course. Model this

situation, introducing additional entity sets and relationship sets if necessary.

Question 3 (25 marks). You are asked to set up a database, ArtBase, for art galleries. This database will capture all the information that galleries need to

Maintain:

- Galleries keep information about artists, their names (which are unique), birthplaces, age, and style of art.
- For each piece of artwork, the artist, the year it was made, its unique title, its type of art (e.g., painting, lithograph, sculpture, photograph), and its price must be stored.
- Pieces of artwork are also classified into groups of various kinds, for example, portraits, still lifes, works by Picasso, or works of the 19th century; a given piece may belong to more than one group.
- Each group is identified by a name (like those above) that describes the group.
- Finally, galleries keep information about customers. For each customer, galleries keep their unique name, address, total amount of dollars they have spent in the gallery (very important!), and the artists and groups of art that each customer tends to like.

(1) Draw the ER diagram for the database (10 marks)

(2) Represent the data in the ER diagram using CREATE TABLE statements (10 marks)

(3) If Artwork as a weak entity set with the partial key title and the owner entity set Artist, describe the changes needed in (1) and (2) (5 marks)