

# CS 430 - Database Systems

## Homework Assignment 2

(Due February 13, Thursday)

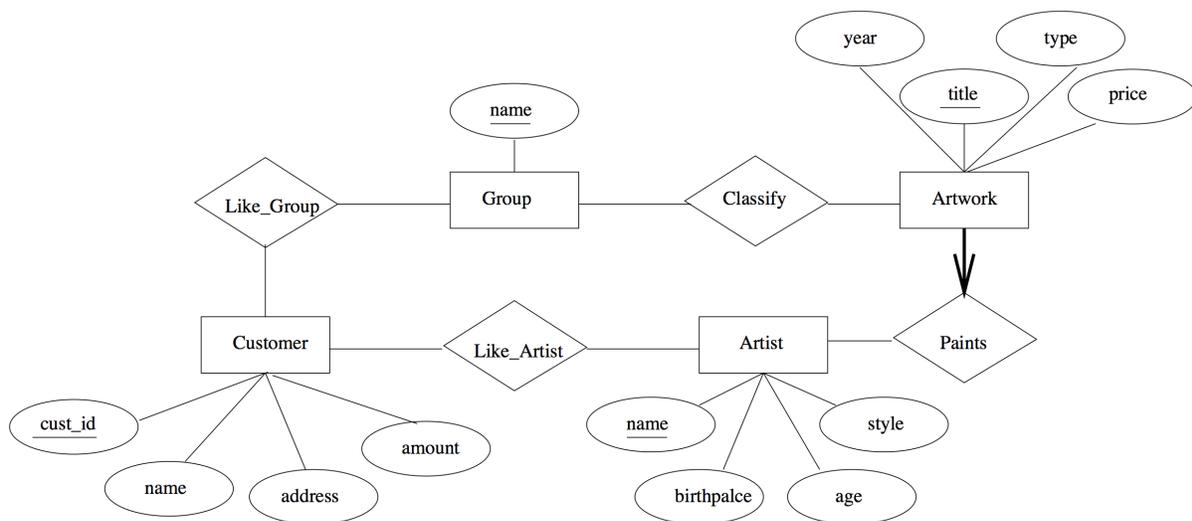
1. Answer each of the following questions briefly. The questions are based on the following relational schema:

```
Emp(eid: integer, ename: string, age: integer, salary: real)
Works(eid: integer, did: integer, pct_time: integer)
Dept(did: integer, dname: string, budget: real, managerid: integer)
```

*(Please note that primary key constraints are underlined.)*

- i. Give an example of a foreign key constraint that involves the **Dept** relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple ?
  - ii. Write the SQL statements required to create the preceding relations, including appropriate versions of all primary and foreign key integrity constraints.
  - iii. Define the Dept relation in SQL so that every department is guaranteed to have a manager.
  - iv. Write an SQL statement to add John Doe as an employee with *eid* = 101, *age* = 32 and *salary* = 1500
  - v. Write an SQL statement to give every employee a 10 percent raise.
  - vi. Write an SQL statement to delete the Toy department. Given the referential integrity constraints you chose for this schema, explain what happens when this statement is executed.
2. A database company called ArtBase builds a product for art galleries. The core of this product is a database with a schema that captures 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 just given) that describes the group. Finally, galleries keep information about customers. For each customer, galleries keep that person's unique name, address, total amount of dollars spent in the gallery, and the artists and groups of art that the customer tends to like.

The ER diagram for this application is as follows.



Define the relational schema corresponding to the above ER diagram. (Use the same notation as in Question 1 to represent a schema.)

3. Implement the schema you derived for Question 2 in PostgreSQL. Use your default database in the PostgreSQL instance in the department for this task.

After the schema is implemented, using the tool `psql`:

- i. Get the list of tables in your database.
- ii. Description of each table (using `\d+` command).

Paste the output produced by the above commands into a text file. This text file should be named as per the format `lastname_firstname.txt`. For example, for the student John Doe, this file should be named as `doe_john.txt`.

### Submission Instructions

Answers for Questions 1 and 2 should be typed and exported as a single **PDF** file. This PDF file along with the text file with answers for Question 3 should be compressed in to a single **Zip** archive and submitted through RamCT. This Zip file should be named as `lastname_firstname.zip`. If the student name is John Doe, the Zip archive should be named as `doe_john.zip`.

Please keep in mind:

- This assignment is to be done individually. The honor code is in effect.
- Submission must be made through **RamCT** by **Thursday, February 13**.
- No late work will be accepted except in exigent situations.
- Please strictly follow the submission instructions mentioned above.