EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Mid Term II Assessment (Online), Fall 2020 Semester

Course:	**CSE 302 Database Systems**
Instructor:	**Mohammad Rezwanul Huq, PhD, Associate Professor, CSE Department**
Full Marks:	**40 (15 will be counted for final grading)**
Time:	**1 Hour and 30 Minutes (including answer uploading time)**

Note: There are **6** (**SIX**) questions, answer ALL of them. Course Outcome (CO), Cognitive Level and Mark of each question are mentioned at the right margin.

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1. **Write SQL Statements** for the following queries based on the 'Pizza' database schema, as given in the Appendix. [CO2, C3, Mark: 10]

a) Find the average price of pizza at each pizzeria. Do not include a pizzeria in the result if the type of pizza served by that pizzeria is less than 3. The result must be sorted in the alphabetical order of pizzeria.
b) Rewrite the same query as mentioned in question 1.(a) using the concept of the nested subquery.
c) Find the persons who have tasted all pizza types, which are in the menu list of the pizzeria, where the he/she is a frequent customer. You must use NOT EXISTS keyword to solve this query.
d) Find the name of the pizzeria and pizza that has the second highest price.
e) Find pizzerias (pizza shops), of which the highest-priced pizza that they serve is less than the average price of pizzas of the same type considering all the pizzeria. You must use a WITH clause to solve the query.

2. **Create a view** named **`SupremeLovers`** that contains the name of persons who had supreme pizza. [CO1, C4, Mark: 4]
Now, assume that appropriate foreign key constraints are defined in the Pizza database. **Discuss and explain** the outcome if the following SQL statement is executed.

```
insert into SupremeLovers values ('Alice');
```

3. Consider the following authorization graph showing the users having `SELECT` privilege on the previously created `SupremeLovers` view. [CO2, C4, Mark: 6]

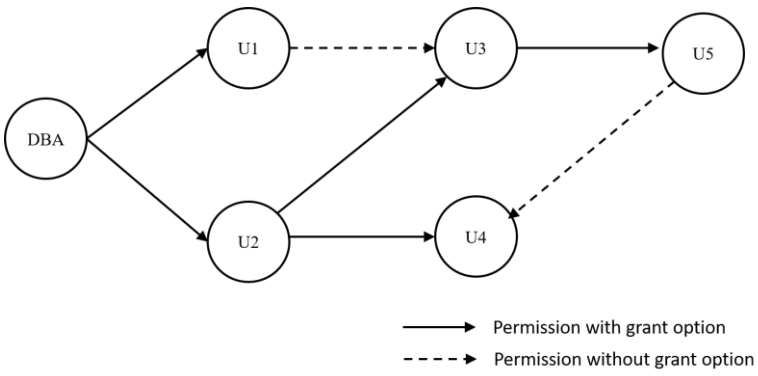


Figure 1: Authorization Graph for Question 3

a) If the user U2 executes the following SQL statement, what will be the output?

```
SELECT grantor, grantee, grantable
from user_tab_privs
where table_name = 'SupremeLovers';
```

b) If DBA revokes privilege from U2, does U5 still have access to the view? Draw the changed authorization graph in support of your answer.

4. Consider a **MOVIE** database in which data is recorded about the movie industry. The data requirements are summarized as follows: [CO3, C6, Mark: 10]

- Each movie is identified by title and year of release. Each movie has a length in minutes and a plot outline.
- Each movie has a production company, and one or more directors and one or more actors appear in it. A movie may have a number of roles. Roles are existentially dependent on Movies. Finally, each movie has zero or more quotable quotes, each of which is spoken by a particular actor appearing in the movie.
- Actors are identified by name and date of birth and appear in one or more movies. Each actor has a role in the movie.
- Directors are also identified by name and date of birth and direct one or more movies. It is possible for a director to act in a movie (including one that he or she may also direct).
- Production companies are identified by name and each has an address. A production company produces one or more movies.

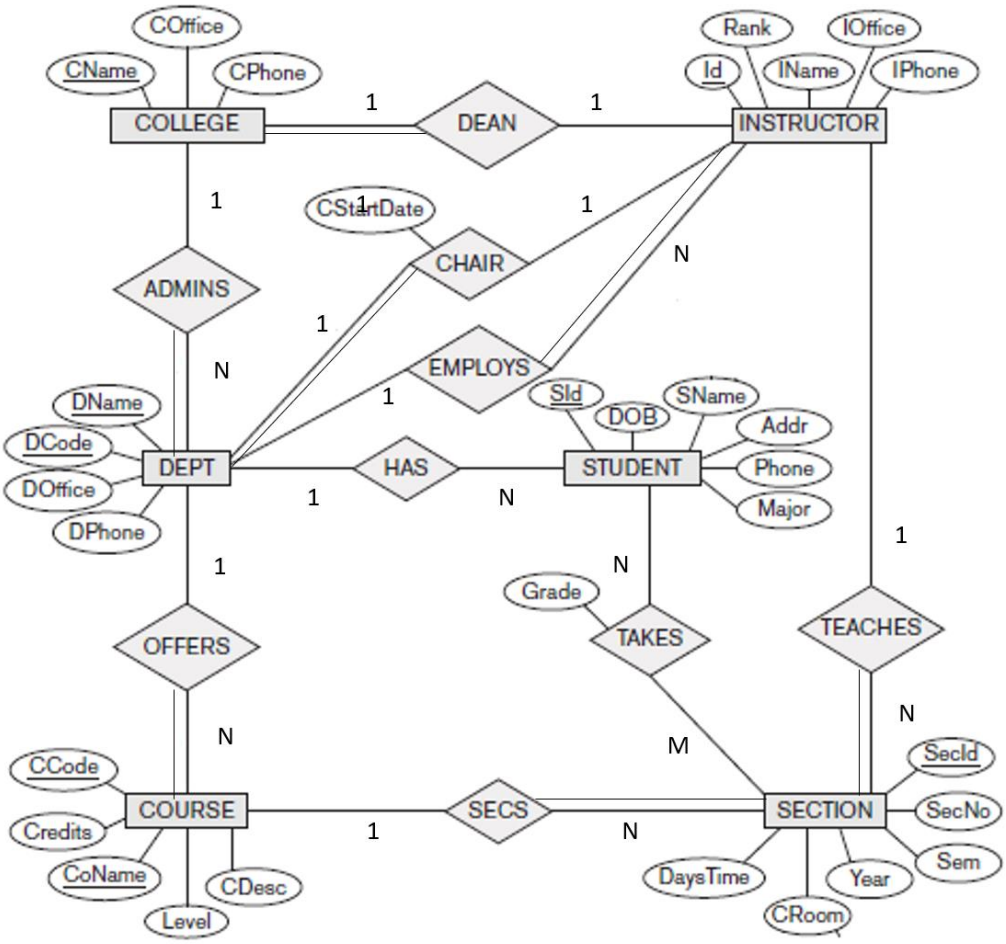
Design an entity-relationship model (ER diagram) for the MOVIE database. Please note that the information is not complete and you are free to make reasonable assumptions. Write down your assumptions if you have made any with your design. Your design must be legible and clear.

5. Assume that there are 3 entity sets: Division, Branch, and Staff. A single division operates one or more branches and has one or more staff. A branch is associated with exactly one division, and a branch may have many staff. [CO3, C4, Mark: 4]

Draw the partial ER diagram in such a way so that the resulting database schema can answer the query - "which staff work at which branch".

You do not need to consider any attributes but must show mapping cardinalities of a relationship set.

6. **Reduce** the following ER model into a set of relational schemas. Justify your answer briefly. [CO3, C3, Mark: 6]



Please note that, in the diagram, ellipses represent simple attributes, dashed ellipse represents derived attributes and double ellipse represents multi-valued attributes. 1 indicates 'one' side and N indicates 'many' side in a relationship set.

Appendix: Pizza Database

The following database schema keeps information on several pizza-lovers, pizza shops known as a pizzeria and different types of pizzas.

- **Person (name, age, gender)**
- **Frequents (name, pizzeria)**
- **Eats (name, pizza)**
- **Serves (pizzeria, pizza, price)**

Person relation stores information related to a person. The *Frequents* relation keeps the information about the membership of a person to a particular pizzeria (pizza shop). The *Eats* relation holds information about the consumption of different types of pizza by all persons. The *Serves* relation contains information about the menu of a particular pizzeria (pizza shop).

Person

name	age	gender
Amy	16	female
Ben	21	male
Cal	33	male
Dan	13	male
Eli	45	male
Fay	21	female
Gus	24	male
Hil	30	female
Ian	18	male

Frequents

name	pizzeria
Amy	Pizza Hut
Ben	Chicago Pizza
Ben	Pizza Hut
Cal	New York Pizza
Cal	Straw Hat
Dan	New York Pizza
Dan	Straw Hat
Eli	Chicago Pizza
Eli	Straw Hat
Fay	Dominos
Fay	Little Caesars
Gus	Chicago Pizza
Gus	Pizza Hut
Hil	Dominos
Hil	Pizza Hut
Hil	Straw Hat
Ian	Dominos
Ian	New York Pizza
Ian	Straw Hat

Eats

name	pizza
Amy	mushroom
Amy	pepperoni
Ben	cheese
Ben	pepperoni
Cal	supreme
Dan	cheese
Dan	mushroom
Dan	pepperoni
Dan	sausage
Dan	supreme
Eli	cheese
Eli	supreme
Fay	mushroom
Gus	cheese
Gus	mushroom
Gus	supreme
Hil	cheese
Hil	supreme
Ian	pepperoni
Ian	supreme

Serves

pizzeria	pizza	price
Chicago Pizza	cheese	7.75
Chicago Pizza	supreme	8.5
Dominos	cheese	9.75
Dominos	mushroom	11
Little Caesars	cheese	7
Little Caesars	mushroom	9.25
Little Caesars	pepperoni	9.75
Little Caesars	sausage	9.5
New York Pizza	cheese	7
New York Pizza	pepperoni	8
New York Pizza	supreme	8.5
Pizza Hut	cheese	9
Pizza Hut	pepperoni	12
Pizza Hut	sausage	12
Pizza Hut	supreme	12
Straw Hat	cheese	9.25
Straw Hat	pepperoni	8
Straw Hat	sausage	9.75