EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Theoretical Assessment II (Online), Spring 2021 Semester

Course:	**CSE 302 Database Systems**
Instructor:	**Mohammad Rezwanul Huq, PhD, Associate Professor, CSE Department**
Full Marks:	**100 (15 will be counted for final grading)**
Submission Deadline:	**Thursday, 06 May 2021, 11:59 PM**

Note: There are **7** (**SEVEN**) 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. Consider the following schema diagram. [20]

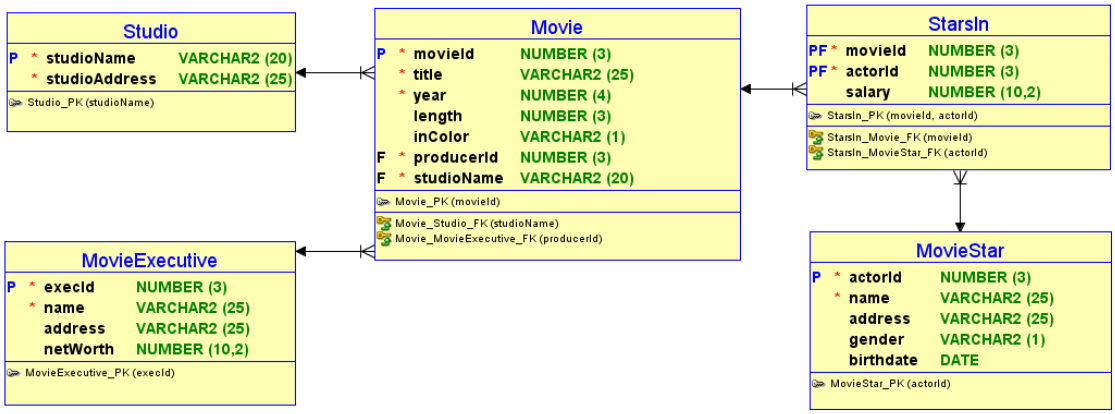


Figure 1: Schema Diagram for Question 1

Formulate SQL Statements to answer the following queries based on the schema diagram shown above.

a) Find the name of the actor who has been paid the lowest salary for acting in a movie. You must use ALL keyword but cannot use any aggregate functions.
b) Find the studio names of the movies of 'Sandra Bullock' (actor). Write the statement using subqueries in FROM clause.
c) Find the studio name and address which made at least 4 movies. Sort the result in alphabetical order of studio name. Write the statement without using HAVING clause.
d) Find the actor name and address who was born after 1980 and acted in more movies than at least one of the actors born after 1970.
e) Find actor name and gender who worked in the production of all studios.
f) Find those movie titles which have the total salaries paid to its actors is less than the net worth of its producer.

2. Write the output of the following SQL statement based on the relational instance as shown in Figure 2. [10]

a) SELECT * FROM Department RIGHT JOIN Employee USING (deptId);

b) SELECT * FROM Department LEFT JOIN Employee ON Department.deptId = Employee.deptId;

Employee

empId	Name	deptId
E-101	Alice	D-001
E-102	Bob	D-002
E-103	Charlie	D-001
E-104	Douglas	D-003
E-105	Elton	D-005
E-106	Flintoff	D-006

Department

deptId	deptName
D-001	Accounts
D-002	HR
D-003	Marketing
D-004	IT
D-005	Logistics

Figure 2: Instance of Employee and Department for Question 2

3. a) Given a relation MovieExecutive (execId, name, address, netWorth), write SQL statement to create a view named 'RichProducers' that includes executive (producer) id, name, address and net worth of the executives whose net worth is more than 100,000 USD. [15]

b) What will happen when you execute the following SQL statement?
INSERT INTO RichProducers VALUES (101, 'John Kilik', 'California', 90000);

c) Suppose, the user 'Alice' was allowed SELECT privilege only on the view 'RichProducers'. Alice has no other access on any database objects. Now, the user wants to create another view 'RichProducersLondon' which will contain the executive id and name of those executives (producers) who live in 'London'. Can she do that? If yes, write the SQL statement to create the view. Otherwise, explain your answer.

4. Consider the following authorization graph showing the users having `SELECT` privilege on the previously created `RichProducers` view. [15]

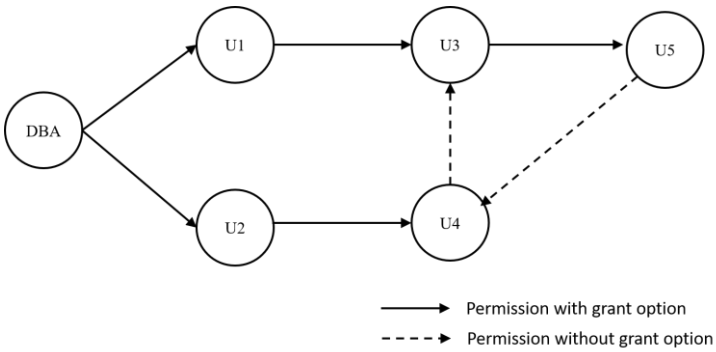


Figure 3: Authorization Graph for Question 4

a) If the user U3 executes the following SQL statement, what will be the output?

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

b) If U3 revokes privilege from U5, does U4 still have access to the view? Draw the changed authorization graph in support of your answer.

c) If DBA revokes privilege from U1, does U5 still have access to the view? Draw the changed authorization graph in support of your answer.

5. Assume that you have two entity sets A and B. Using appropriate notations of ER model, express the followings: [10]

a) An entity in A can be associated with several entities in B whereas an entity in B can be associated with exactly one entity in A and not all entities in A are participating in this relationship.

b) An entity in A can be associated with several (at least 1) entities in B whereas an entity in B can be associated with several (possibly 0) entities in A.

c) Entity set A has two roles: role1 and role2 participating in a one-to-many relationship.

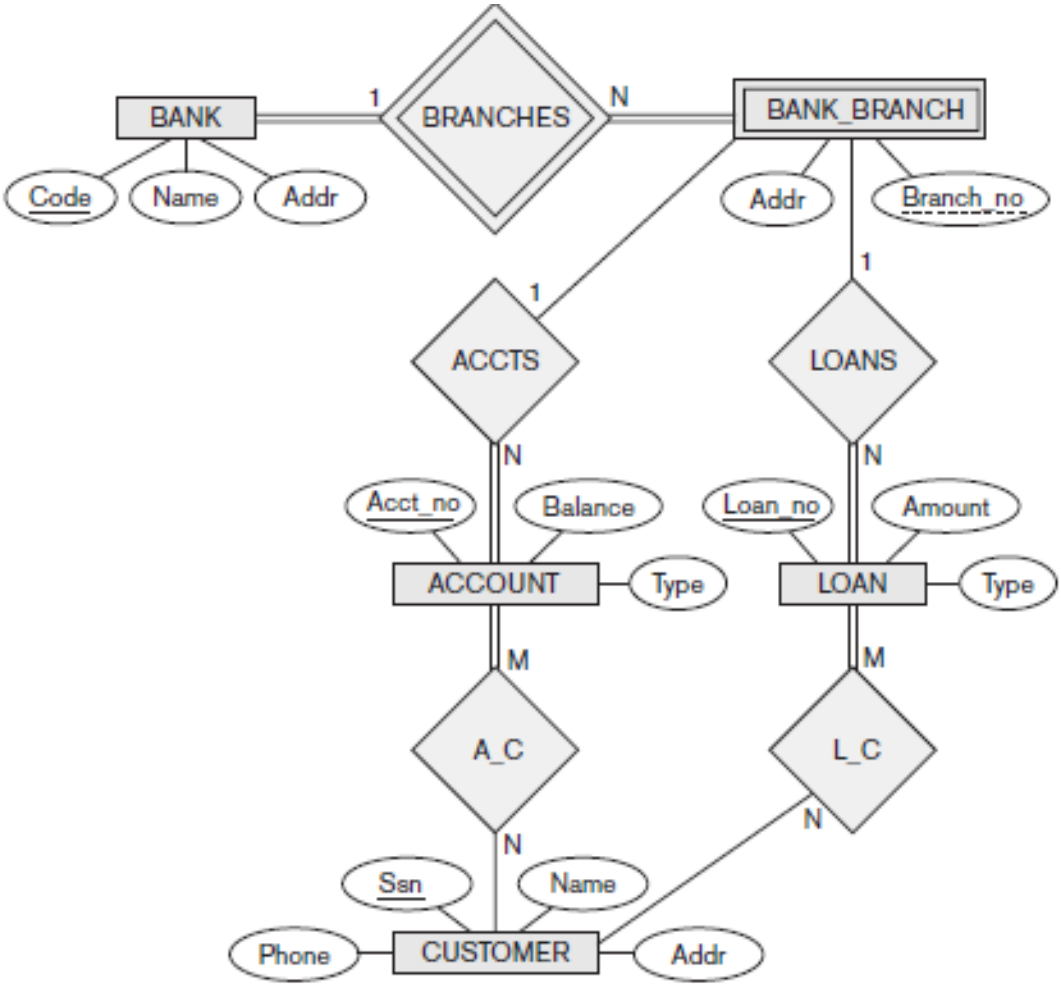
6. Consider the following scenario that contains information on a hospital and its patients. Your job is to build an ER model based on this scenario. Please note that the information is not complete, and you are free to make any reasonable assumptions. Your assumptions must be included in your answer. [20]

In a hospital, the doctor attends patients. A doctor is characterized by a unique identifier, name, specialization, phone number, and salary. A patient is described by a unique identifier, name, age, gender, and phone number. A patient may visit many doctors while a doctor may treat many patients (possibly 0). The database must record the visiting date of the patient to a doctor.

Each time, a patient visits a doctor, a prescription will be given by the doctor. Therefore, prescription is existentially depending on the visit of a patient to a doctor. Each prescription must be identified by a unique identifier, and further, it contains a description of the disease along with other advices.

Each prescription may include multiple medicines. A medicine is described by an identifier which is unique, name and unit price. After receiving the treatment from a doctor, the patient must pay the bill for medicine costs and doctors consultation fee. A payment has an identifier, amount, date, and payment method (e.g., card or cash). Patients can provide feedback to the hospital management authority each time they visit. Feedback must have a feedback number, feedback comment and patient satisfaction rating from 1 to 10.

7. **Reduce** the following ER model into a set of relational schemas. Justify your answer briefly. [10]



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.