

Assignment#1

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Course: Database Management

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[CLO-C1] Suppose a new drama-rating website is being built for which a database designer has designed a database schema. The database contains data regarding reviewers' ratings of various drama serials. It contains only three relations.

- The first relation titled as Drama stores information related to various drama serials. It stores ID, title, release year, and director. ID must be unique and mandatory. In addition, the title is also mandatory.
- The second relation titled as Reviewer stores reviewer's ID and name. Both ID and name are mandatory while ID must also be unique.
- The third relation titled as rating stores information about reviewers' rating of drama serials on a certain date. It stores reviewer's ID, drama's ID, rating stars, and review date. The rating stars must be between 1 and 5. A drama can only be reviewed many times by a certain reviewer but on different dates. Reviewer's ID and drama's ID refer to ID attribute of Reviewer and Drama relations respectively. Since Rating contains attributes from other relations (Drama and Reviewer) too, so it is expected that any changes (Update, Delete) made to them in their relations will automatically be reflected here.

Identify the primary keys in each of the above relations. Also identify all other integrity constraints mentioned by the designer that must be imposed while writing a DDL script.

1. DRAMA RELATION:

- **Primary key** is the ID as it is unique.
- Primary key (ID) cannot be null as it is mentioned that it is mandatory which means that **Non-null constraint** is also applied to this attribute.
- The title of the drama is also mandatory which means that it cannot be null as well so, **Non-null constraint** is applied to this attribute.

2. REVIEWER RELATION:

- **Primary key** is the reviewer ID as it is unique.
- Primary key (ID) and reviewer's name cannot be null as it is mentioned that they are mandatory which means that **Non-null constraint** is applied to these attributes.

3. RATING RELATION:

- This relation will have **Multi Attribute Key** i.e., primary key (Reviewer's ID, Drama ID, Review Date).
- Rating stars has **Attribute based constraint**, as it says that it must be between 1 to 5.

- Review date has **Tuple based constraint** as a reviewer can review as many times he/she wants but on different dates.
- Reviewer ID refers to the ID in the reviewer relation and Drama ID refers the ID in the drama relation. So,

dramaID	title	year	director
101	Zindagi gulzaar hae	2013	Sultana Siddiqi
102	Tanhiyaan	1985	Shahzad Khalil
103	Maat	2011	Amna Nawaz Khan
104	Sunehray Din	1990	Shoaib Mansoor
105	Humsafar	2011	Sarmad Sultan Khoosat
106	Dhoop kinare	1987	<null>
107	Shehr-e-zaat	2012	Sarmad Sultan Khoosat
108	Alpha Bravo Charlie	1998	Shoaib Mansoor

ReviewerID	Name
201	Dawn
202	The news
203	Express
204	Syed Noor
205	Anwar Maqsood
206	Javid sheikh
207	Sarmad sultan Khoosat
208	Faisal Qureshi

to

Referential Integrity constraint is used on both of these attributes.

[CLO-C1] Consider the following instances of each of the above relations following the same schema as described in Question 1:

ReviewerID	DramaID	stars	reviewDate
201	101	2	22-Jan-14
201	101	4	27-Jan-14
202	106	4	<null>
203	103	2	20-Jan-14
203	108	4	12-Jan-14
203	108	2	30-Jan-14
204	101	3	9-Jan-14
205	103	3	27-Jan-14
205	104	2	22-Jan-14
205	108	4	<null>
206	107	3	15-Jan-14
206	106	5	19-Jan-14
207	107	5	20-Jan-14
208	104	3	2-Jan-14

For each of the following modifications, specify if they will violate any constraint? If yes, which constraint? In each of the following modifications, the order of attributes in tuples is same as depicted in the picture showing instances.

- a) **Inserting (109, Ehd-e-Wafa, null, Saif e Hassan) in Drama**
No it is not violating any constraint, ID is unique and non-null. Title is also non-null.
- b) **Inserting (208,104, 7, 23-Oct-20) into Rating**
Yes it is violating the attribute constraint over stars as the rating star cannot be more than 5 and less than 1.
- c) **Inserting (209,104, 5, 23-Oct-20) into Rating**
Referential Integrity (foreign constraint) is violated as the foreign key 209 (reviewer ID) is not a part of reviewer relation.
- d) **Inserting (208,Khalil-ur-Rehman Qamar) into Reviewer**
Yes the ID is violating the primary key constraint as it has to be unique and we already have a reviewer with ID 208.
- e) **Updating (208, Faisal Qureshi) in Reviewer to(209, Khalil-ur-Rehman Qamar)**
No it is not violating any constraint. ID is unique and title and ID are non-null.
- f) **Updating(206, 106, 5, 19-Jan-14) in Rating to (210, 106, 5, 19-Jan-14)**
- g) Referential Integrity (foreign key) is violated as the foreign key 210 (reviewer ID) is not a part of reviewer relation.
- h) **Updating(108, Alpha Bravo Charlie, 1998, Shoaib Mansoor) in Drama to (108, Alpha Bravo Charlie, null, Shoaib Mansoor)**
No it is not violating any constraint. ID is unique and non-null. Title is also non-null. It does not matter if year is mentioned null as no constraint was applied to this attribute.
- i) **Deleting (206, Javaid Sheikh) from Reviewer.**
No it won't violate any constraint. If we delete it from Reviewer it will automatically delete it from the rating's relation.

[CLO-C2] In Q.3-8, you are to write relational algebra queries over the drama-rating database of Question 1. You are going to use the same instance of the database depicted in Question 2. You are also provided the results for each of the queries. You need to figure out the query in relational algebra that must produce the same result.

To verify if your query would produce the same result, it is recommend to execute it using web-based relational algebra calculator -Relax to test your expressions. To be able to use RelaX, you will first have to create the database and add tuples to relations by writing and executing DDL script using syntax supported by RelaX.

4. Find the titles of all dramas directed by Shoaib Mansoor.

π Title (σ director = 'ShoaibMansoor' (Drama))

π Title (σ director = 'ShoaibMansoor' (Drama))

Drama.Title
'SunehreyDin'
'AlphaBravoCharlie'

5. Find all years that have a drama that received a rating of 4 or 5.

π year (σ Drama.dramaID = Rating.dramaID \wedge (stars = 4 \vee stars = 5) (Drama \times Rating))

Drama.year
2013
1987
2012
1998

6. Find the titles of all dramas that have no ratings.

π Title (Drama)

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$(\pi \text{ Title } (\sigma \text{ Drama.dramaID} = \text{Rating.dramaID } (\text{Drama} \times \text{Rating})))$

Drama.Title
'Tanhaiyaan'
'Humsafar'

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7. Some reviewers didn't provide a date with their rating. Find the names of all reviewers who have ratings with a NULL value for the date.

$(\pi \text{ Name } (\sigma \text{ Reviewer.reviewerID} = \text{Rating.reviewerID} \wedge \text{ratingDate} = \text{null } (\text{Reviewer} \times \text{Rating})))$

Reviewer.Name
'TheNews'
'AnwarMaqsood'

<	1	>
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8. Write a query to return the ratings data in a more readable format: reviewer name, drama title, stars, and rating Date.

$\pi \text{ Name, Title, stars, ratingDate } (\sigma \text{ Drama.dramaID} = \text{Rating.dramaID } (\sigma \text{ Reviewer.reviewerID} = \text{Rating.reviewerID } (\text{Rating} \times \text{Reviewer}) \times \text{Drama}))$

Reviewer.Name	Drama.Title	Rating.stars	Rating.ratingDate
'Dawn'	'ZindagiGulzarHai'	2	'22-Jan-14'
'Dawn'	'ZindagiGulzarHai'	4	'27-Jan-14'
'TheNews'	'DhoopKinare'	4	<i>null</i>
'Express'	'Maat'	2	'20-Jan-14'
'Express'	'AlphaBravoCharlie'	4	'12-Jan-14'
'Express'	'AlphaBravoCharlie'	2	'30-Jan-14'
'SyedNoor'	'ZindagiGulzarHai'	3	'9-Jan-14'
'AnwarMaqsood'	'Maat'	3	'27-Jan-14'
'AnwarMaqsood'	'SunehreyDin'	2	'22-Jan-14'
'AnwarMaqsood'	'AlphaBravoCharlie'	4	<i>null</i>

9. For all cases where the same reviewer rated the same drama twice and gave it a higher rating the second time, return the reviewer's name and the title of the drama.

π Reviewer.Name, Drama.Title (σ Rating2.dramaID = Rating.dramaID \wedge Rating2.stars < Rating.stars \wedge Rating2.reviewerID = Rating.reviewerID \wedge Rating2.ratingDate < Rating.ratingDate ((ρ Rating2 Rating \bowtie Drama) \times (Rating \bowtie Reviewer)))

Reviewer.Name	Drama.Title
'Dawn'	'ZindagiGulzarHai'

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