Roll Number_____

CS3400 Database Systems

Quiz 2 - 4th Dec 2006

A. For the questions given below, write the corresponding relational algebra expression. The primary keys for each of the relations are underlined.

Movie (MovieId, MovieName, ReleaseYear, Rating, Genre)
FilmPersonality (PID. Name, DOB, Gender, Country)
WorkedIn (MovieID, PID, Role)
Award (AwardName, PID, MID, Category, Year)

The foreign key, primary key relationships:
WorkedIn (MovieID) references Movie (MovieId)
WorkedIn (PID) references FilmPersonality (PID)
Award (PID) references FilmPersonality (PID)
Award (MID) references Movie (MovieId)

1. Retrieve all the tuples of 'Movie' which belong to 'Action' genre with a rating of atleast 7.

$$\sigma_{Genre = 'Action' \text{ AND } Rating >= 7}(Movie)$$

2. Retrieve the names of all female Film Personalities of 'England'.

$$\pi_{Name}(\sigma_{Gender = 'F' \text{ AND } Country = 'England'}(FilmPersonality))$$

3. Find name and country of 'Best Actor' award recipient in 'Oscar' 2000.

$$\pi_{Name, Country}((\sigma_{AwardName = 'Oscar' \text{ AND } Year = 2000 \text{ AND } Category = 'Best Actor'}(Award)) * FilmPersonality)$$

4. Retrieve the names and ratings of movies in which 'Johnny Depp' is the 'Actor'.

$$M \leftarrow \pi_{MovieID}((\sigma_{Name = 'Johnny Depp'}(FilmPersonality)) * (\sigma_{Role = 'Actor'}(WorkedIn)))$$

$$\pi_{MovieName, Rating}(Movie \bowtie_{MovieId = MovieID} M)$$

5. For the movie 'Black', find the names of Filmfare Award Recipients and the category in which they received award.

$$BlackMID \leftarrow \pi_{MovieId}(\sigma_{MovieName = 'Black'}(Movie))$$

$$\pi_{Name, Category}(((\sigma_{AwardName = 'Filmfare'}(Award)) \bowtie_{\substack{MID \\ = MovieId}} BlackMID) * FilmPersonality)$$

6. Retrieve the names of Film Personality and movie in which he has played the role of 'producer' as well as 'director'.

7. For each movie that received atleast 8 'Oscar', find the number of people involved in it.

$$\rho\, R_{(MovieID, OscarCount)}(MID\, \mathcal{F}\, COUNT_{PID}(\sigma_{\substack{AwardName \\ = 'Oscar'}}(Award)))$$

$$R1 \leftarrow (\sigma_{OscarCount >= 8}(R)) * WorkedIn$$

$$\rho\, S_{(MovieId, PeopleCount)}(MovieID\, \mathcal{F}\, COUNT_{PID}(R1))$$

Rough Work

$$\pi_{MovieName, PeopleCount}(Movie * S)$$

6. $$Producers \leftarrow \pi_{Name, PID, MovieID}((\sigma_{Role = 'producer'}(WorkedIn)) * (\sigma_{Gender = 'M'}(FilmPersonality)))$$

$$Directors \leftarrow \pi_{Name, PID, MovieID}((\sigma_{Role = 'director'}(WorkedIn)) * (\sigma_{Gender = 'M'}(FilmPersonality)))$$

$$Result \leftarrow \pi_{Name, MovieName}((\pi_{Name, MovieID}(Producers * Directors)) \bowtie_{\substack{MovieID \\ = MovieId}} (Movie))$$

B. For each of the following updates, determine if it violates any integrity constraint. If so, what would you do to handle it.

Movie

MovieId	**MovieName**	**ReleaseYear**	**Rating**	**Genre**
001	DON	2006	4	Action
002	Black	2005	5	Drama
003	Lagaan	2001	5	Drama
004	Paheli	2005	4	Drama

FilmPersonality

PID	**Name**	**Gender**	**DOB**	**Country**
P11	Amitabh	M	11-10-42	India
P23	Brad Pitt	M	18-12-63	US
P3	Priyanka	F	2-11-81	India
P40	Aamir	M	14-3-65	India

WorkedIn

MovieId	**PID**	**Role**
002	P11	Actor
003	P40	Actor
003	P40	Producer
001	P3	Actor
004	P3	Actor

Award

AwardName	**PID**	**MID**	**Category**	**Year**
Filmfare	P11	002	Best Actor	2005
ZeeCine Award	P40	003	Best Actor	2001
ZeeCine Award	P40	003	Best Film	2001

1. Insert

a. Insert <004, ‘P2’, ‘Director’> into WorkedIn.

Violates referential integrity constraint; PID of the tuple to be inserted must exist in FilmPersonality relation.

<004, ‘P11’, ‘Director’> is valid insertion

b. Insert <’Filmfare’, ‘P3’, 001, null, 2006> into Award.

Violates entity integrity constraint; ‘Category’ is part of primary key and can’t be null.

<’Filmfare’, ‘P3’, 001, ‘Best Actress’, 2006> is valid.

2. Delete

a. Delete the FilmPersonality tuple with PID = ‘P23’

No constraint violation.

b. Delete the Movie tuples with Rating = 4

Violates referential integrity constraint, since WorkedIn references tuples with MovieId 001 and 004.

One way of handling this is to cascade deletion. We’ll delete those tuples from WorkedIn which reference ‘Movie’ tuples with MovieId 001 and 004

3. Update

a. Modify the Category of the Award tuple with Year = 2001 to ‘Best Actor’

Violates key constraint, as 2 tuples in ‘Award’ will have same key.
One way of handling this is to reject this update as such a tuple already exists in table.

b. Modify the MID of the WorkedIn tuple with PID = ‘P11’ to 011

Violates referential integrity constraint. No tuple with MovieId as 011 exists in ‘Movie’ relation. One way of handling this is to do the following modification:

Modify MID to 004 for PID = ‘P11’