

Worksheet 3 - CIS3530

Instructions:

- Submit a text file or a pdf file with your answers. Name your file as lastnameFirstnameW2.fileExtension (e.g. chaturvediRituW3.txt). Hand-written answers will not be accepted.
- For question 1, you may find the following link to a relational algebra calculator very useful and convenient to test the queries you write. The following link (same as what was given in Worksheet2) takes you to the calculator and has the 3 tables Movies, Roles and Actors created and populated:

<https://dbis-uibk.github.io/relax/calc/gist/2ac385f07594b0e4431a441f2e454352>

- For question 2 and 3, for this worksheet, you may use the same relational algebra calculator. If time permits, I encourage you to read instructions given in the attached file called create_and_populate_movies.txt and follow the instructions to create and populate the 3 relations on postgres on our school server. You will be required to use the postgres DBMS for labs 2, 3 and 4 and for assignments in future.

Movies Schema and Instance required for questions 1, 2 and 3

Movies Schema

Movies(mID, title, director, year, length)
Artists(aID, aName, nationality)
Roles(mID, aID, character)

Movies Instance

Movies:

mID	title	director	year	length
1	Shining	Kubrick	1980	146
2	Player	Altman	1992	146
3	Chinatown	Polaski	1974	131
4	Repulsion	Polaski	1965	143
5	Star Wars IV	Lucas	1977	126
6	American Graffiti	Lucas	1973	110
7	Full Metal Jacket	Kubrick	1987	156

Artists:

aID	aName	nationality
1	Nicholson	American
2	Ford	American
3	Stone	British
4	Fisher	American

Roles:

mID	aID	character
1	1	Jack Torrance
3	1	Jake 'J.J.' Gittes
1	3	Delbert Grady
5	2	Han Solo
6	2	Bob Falfa
5	4	Princess Leia Organa

Questions

1. Write a query in RA to list all actors who play a role in every movie in which Nicholson has acted.

Your Answer:

```
RO = π mID (σ aName = 'Nicholson' (Artists ⋈ Roles))
LO = π mID, aID (Roles)
LO ÷ RO
```

- 2a. Write a query in RA to list the names of all characters in movies directed by 'Lucas'.

Your Answer:

```
π character (σ director = 'Lucas' Movies ⋈ Roles)
```

- 2b. Write a query in SQL to list names of all characters in movies directed by 'Lucas'.

Your Answer:

```
SELECT character
FROM movies NATURAL JOIN roles
WHERE director = 'Lucas';
```

- 3a. What is the resulting relation when the following SQL query is executed?

```
SELECT aName
FROM Artists NATURAL JOIN Roles NATURAL JOIN Movies
WHERE nationality = 'American'
AND director = 'Kubrick';
```

Your Answer:

```
  aName
-----
Nicholson
(1 row)
```

- 3b. Rewrite 3a using a subquery.

Your Answer:

```
SELECT aName
FROM Artists
WHERE nationality = 'American'
AND aID IN (SELECT aID
            FROM Roles
            WHERE mID IN (SELECT mID
                        FROM Movies
                        WHERE director = 'Kubrick'));
```

4. Write a query in SQL to report the various nationalities in the database - display them in alphabetical order.

Your Answer:

```
SELECT DISTINCT nationality FROM Artists ORDER
BY nationality ASC;
```

```
Artists.nationality
-----
'American'
'British'
```

5. Write a query in SQL to report pairs of movies that have the same director. Expected Result:

m1.title	m2.title
Chinatown	Repulsion
Star Wars IV	American Graffiti
Shining	Full Metal Jacket

Your Answer:

```
select a.title,b.title from Movies as a, Movies as b
where a.director = b.director and a.title < b.title;
```