

UMass Lowell
Department of Computer Science
Fall 2016

Instructor: Prof. Chen
TA: Yan Li

COMP.5730 Midterm
Closed Book, 120 Minutes
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Problem	Score	
1	(30%)	26
2	(70%)	59
EC	(10%)	4
Total	(100%)	89

NOTE: Write clearly — if your handwriting can not be read easily,
your exam will not be graded.

Problem 1

(6 points each question)

Given the following schema:

```

movies (title, year, length, genre, studioName)
stars (name, address, gender, birthdate)
starsIn (title, year, name)

```

Write the following queries in Relational Algebra.

1. Find the title of movies Harrison Ford starred in.

$$\pi_{\text{title}} (\sigma_{\text{name} = \text{'Harrison Ford'}} (\text{starsIn}))$$

2. Find the name and address of stars who have starred in a movie made by MGM studio.

$$\pi_{\text{name}, \text{address}} (\sigma_{\text{studioName} = \text{'MGM'}} (\text{starsIn} \bowtie \text{stars} \bowtie \text{movies}))$$

3. Find the name of stars who have starred in both Disney movies and MGM movies.

$s \leftarrow \pi_{\text{name}} (\sigma_{\text{studioName} = \text{'Disney'}} (\text{starIn} \bowtie \text{movies}))$

$r \leftarrow \pi_{\text{name}} (\sigma_{\text{studioName} = \text{'MGM'}} (\text{starIn} \bowtie \text{movies}))$

$\text{result} \leftarrow s \cap r$



4. Find the name of stars who have only starred in comedy movies. (Note: genre may contain NULL value.)


~~W/did not~~ $s \leftarrow \pi_{\text{title}} (\sigma_{\text{genre} = \text{'comedy'}})$

$r \leftarrow \pi_{\text{title}, \text{name}} (\text{starIn})$

$\text{temp1} \leftarrow \pi_{\text{name}} (\text{starIn})$

$\text{temp2} \leftarrow \pi_{\text{name}} (s \bowtie \text{starIn} - r)$

$\text{result} \leftarrow \pi_{\text{name}} (\text{temp1} - \text{temp2})$



5. Find the name of stars who have starred in every movie that Harrison Ford has starred in.

8K Title VG ~~fine~~

凡此皆也

$$\pi_{\text{name}} (\sigma_{S.\text{name} = \text{'Harrison Ford'}} (\rho_S(\text{starsIn}) \times \rho_{S.\text{name}}(\text{starsIn})))$$


Problem 2

(7 points each question)

Using the same schema as in Problem 1, write the following query in SQL. Each query should be answered using a single SQL statement.

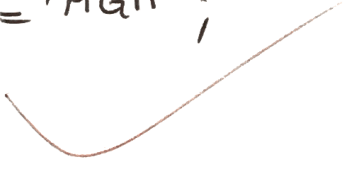
1. Find the title of movies Harrison Ford starred in.

select title from starsIn ~~where~~ name = 'Harrison Ford';
where



2. Find the name and address of stars who have starred in a movie made by MGM studio.

```
distinct
select name, address
from stars natural join stars_in natural join movies
where StudioName = 'MGM';
```



3. Find the name of stars who have starred in both Disney movies and MGM movies.

```

select distinct name as D
from stars natural join movies natural join stars
where studioName = 'Disney'

```

```

join intersect
distinct
select name as M
from stars natural join movies natural join stars
where studioName = 'MGM'

```

```

select name
from D join M

```

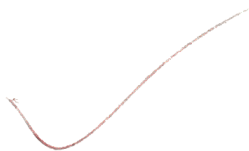
4. Find the name of stars who have only starred in comedy movies. (Note: genre may contain NULL value.)

select ~~name~~ T.name
 from (star in natural join movies ~~as~~ as T), (star in natural join movies as P)

where T.genre = 'comedy'
 and ~~T.genre~~ ^{not =} ~~P.genre~~
 and ~~T.title~~ ^{not =} ~~P.title~~

and T.name not in (select P.name
 from P)

where P.genre not = 'comedy'



5. Find the name of stars who have starred in every movie that Harrison Ford has starred in.

~~create view T as~~ ~~select title~~ ~~as T~~
~~from movies natural join stars~~ ~~in~~
~~where name = 'Harrison Ford'~~
 distinct
 select T.name
 from (movies natural join stars in as T),
 (movies natural join stars in as P)
 where P.name = 'Harrison Ford'
 and P.title = T.title.
 and P.name ~~not~~ = T.name.

-4

A

B

C.

(T) (S)
 A. A

B

C.

6. List the number of movies each star has starred in. Display the result in ascending order of stars' names.

```
select count(title)  
select count(title)  
from starsIn  
group by name.  
order by asc name.
```

7. Find the names of pairs of stars who have starred in the same movie. Display each pair in the result only once.

distinct
select T.name, P.name
from starsIn T, starsIn P
where T.name ~~not~~[<] P.name
and T.title = P.title
T.year = P.year

-2

8. Find the name of studio and the average length of movies it made in 2015 if the studio has made more than 3 movies in 2015.

select ~~name~~ studio Name, avg(length)
from movies.

~~where~~ ~~count~~ where year = 2015
group by studio Name

having count(title) > 3

and ~~year = 2015;~~

-1

9. Find the name of stars who have starred in the longest movie, and title, year, length of that movie.

```
select name, title, year, length.  
from (starsIn natural join movies)  
where length ≥ all (select length  
from starsIn natural join  
movies)
```

10. Find the name of studio and the title of movies it made in 2015 if the studio has produced the longest average length of movies in 2015.

select studioName, ~~title~~ title
from movies.
group by studioName
having avg(length) >= all (select avg(length)
from movies
group by studioName)
and year = 2015. - 3

Extra Credit Problem

(10 points)

Write an assertion to ensure that each movie must have at least two stars.

~~create table movies~~
~~check count(name)~~
~~from starsIn~~
~~group by title~~
~~where count(name) > 1~~
~~check~~

create assertion check-movie.

 check 2 <= (select count(name)
 from starsIn
 group by (title))

Title	Year
A	2015
A	2016

-6.