

MCS-274 Intra-term Exam 1

Serial #:

This exam is closed-book and mostly closed-notes. You may, however, use a single 8 1/2 by 11 sheet of paper with *hand-written* notes for reference. (Both sides of the sheet are OK.)

Please write your name only on this page. Be sure to look at all problems before deciding which one to do first. Some problems are easier than others, so plan your time accordingly. You have 50 minutes to work.

Write the answer to each problem on the page on which that problem appears. You may also attach additional paper, which should be labeled with your test number and the problem number.

You must sign the honor pledge below and abide by it.

Printed name: _____

On my honor, I pledge that I have not given, received, nor tolerated others' use of unauthorized aid in completing this work.

Signature for above honor pledge: _____

Problem	Page	Possible	Score
1	2	20	
2	3	20	
3	4	20	
4	5	20	
5	6	20	
Total		100	

1. [**20 Points**] A copy of the `create table` statements for the movies database is provided with this test. Write SQL queries that would answer each of the following questions using that database. Do not include any table in the `from` clause of a query unless the query makes use of the table.
 - (a) List all those combinations of a person's last name and a movie's title such that the person directed the movie and also acted in that same movie.
 - (b) List all those combinations of a person's last name and a movie's title such that the person directed the movie but did not act in it. Your answer should use the `NOT IN` operation.
 - (c) Again list all those combinations of a person's last name and a movie's title such that the person directed the movie but did not act in it. This time, your answer should use the `NOT EXISTS` operations.

2. [**20 Points**] A copy of the `create table` statements for the movies database is provided with this test. Write SQL queries that would answer each of the following questions using that database. Do not include any table in the `from` clause of a query unless the query makes use of the table.
- (a) List the id numbers for all persons who have directed movies, and for each one, how many movies they have directed.
 - (b) List the id numbers for all persons who have directed seven or more movies, and for each one, how many movies they have directed.
 - (c) List the id numbers for all persons who have directed movies, and for each one, how many movies they have directed. The list should be in order of decreasing number of movies. Within any given number of movies, the list should be in order of increasing id number of the director.

3. [**20 Points**] A copy of the `create table` statements for the movies database is provided with this test. Write SQL queries that answer the following question using that database: What are the titles of the movies that were made in the most recent year included in the database?
- (a) Give an answer that makes use of `MAX`.
 - (b) Give a different answer that makes use of `ALL`.
 - (c) Give a different answer that makes use of `ANY`.

4. [20 Points] Suppose R and S are as shown:

A	B	C
a1	b1	c1
a2	b2	c1
a1	b1	c2

C	D	E
c1	d1	e1
c2	d2	e2
c2	d3	e1
c3	d3	e3

- (a) Show a similar table for the relation $R \bowtie S$.
- (b) Write an SQL query that does not contain a JOIN operator but nonetheless as closely as possible replicates the meaning of the relational algebra expression.
- (c) Returning to the first part of this problem, what row(s), if any, would you add to your table if the \bowtie were changed to a natural full outer join?

5. [20 Points]

- (a) Draw a table, S, so that $R \bowtie S$ is the same as the selection $\sigma_{id=3}(R)$. All you know about the table R is that it has a column, id, containing integers. (It may have other columns too.)
- (b) Draw a table, T, so that $R \bowtie T$ is the same as the selection $\sigma_{id=3 \text{ OR } id=5}(R)$. R is as above.
- (c) Draw a table, U, so that $R \bowtie U$ is the same as the selection $\sigma_{id=3 \text{ AND } id2=5}(R)$. Now you should assume R has integer-valued columns called both id and id2. (It may have other columns too.)