

Tristan Adams

CMSC 461-01, Fall 2016

Dr. George Ray

Homework 1: Relational Model, Relational Algebra, SQL

Handed out Monday, September 26.

Due at the beginning of class Monday, October 3.

Late homeworks will not be accepted. Please show how you derived your answers.

Submit homework in GL system using submit cs461_rayg HW1 hw1.txt All questions are worth 20 points each.

Question 1.

Using the University schema, write a relational algebra expression to find, for each department, the maximum salary of instructors in that department. You may assume that every department has at least one instructor.

dept_name (G max(salary) (instructor)) as max_sal_dept (instructor)

Question 2.

Compute the Cartesian Product of the following two relations:

R C	S D
-----	-----
4	3
8	1
	7

(4,3) (4,1) (4,7) (8,3) (8,1) (8,7)

Questions 3, 4 and 5 refer to the University database.

Question 3.

Write a SQL query to find the name and department of all instructors with a salary more than \$79,000 and sort the result in department then name order.

SELECT name,dept_name FROM instructor WHERE salary > 79000

Question 4.

Write a SQL Query to list the names of instructors along with the courses they have taught. Sort the output by name.

```
SELECT instructor.name,teaches.course_id FROM instructor JOIN teaches ON  
teaches.ID = instructor.ID
```

Question 5.

Write a SQL query to find the IDs and names of all students who have not taken any course offering before 2010.

```
SELECT student.ID,student.name FROM student JOIN takes ON student.ID =  
takes.ID WHERE takes.year > 2009
```