COMP 543

In this homework, you will write a few RA/RC programs. To help you get the hang of it, we've also provided some practice problems below.

**HOMEWORK PROBLEMS**

(1) Consider the following set of relations, which describe coffee and coffee drinkers:

DRINKS (PERSON, COFFEE)

HAS\_BEAN (COFFEE, BEAN\_NAME)

BEAN (BEAN\_NAME, FROM\_LOCATION)

The relation DRINKS tells us which people drink which coffees. The HAS\_BEAN relation tells us what coffee beans go into each type of coffee. And the BEAN relation tells us which location each coffee bean comes from.

Write RA expressions to compute each of the following. Note that you can abbreviate attribute names if you’d like to write less (you can use P for PERSON, C for COFFEE, BN for BEAN\_NAME, and FL for FROM\_LOCATION). Each is worth 10 points, except for 1(a), which is worth 5 points.

(a) Which beans are in the coffee named “Blend 101”?

(b) Which people drink a coffee that contains the “Pacas” coffee bean?

(c) Who does not drink a coffee containing a bean from the location “Rwanda”?

(2) Consider the same set of relations:

Write RC expressions to compute each of the following. Again, you can abbreviate attribute names. Each is worth 10 points, except for 2(a), which is worth 5 points.

(a) Which locations contribute a bean to the coffee named “Garuda blend”?

(b) Who has never tried a coffee containing a bean from the location “Hawaii”?

(c) Which people drink all of the coffees containing the bean “Caturra”?

**PRACTICE PROBLEMS**

Consider the following schema:

SALE (CUST\_NAME, ITEM\_NAME, WHEN)

CUST (CUST\_NAME, INDUSTRY)

ITEM (ITEM\_NAME, CATEGORY, PRICE)

Write both relational algebra and relational calculus expressions which will answer the following questions:

(1) Which customers bought something on 12-18-04?

(2) Which customers from the airline industry bought something on 12-18-04?

(3) Which customers have bought something from a category other than “transportation”?

(4) Which customers bought something costing more than $1,000,000 that was not in the category “doohicky”?

(5) Which customers from the airline industry did not buy something on 12-18-04?

(6) Which customers from the airline industry bought an item from the category “spare part” on 12-18-04?

(7) What categories has the customer “Widgets ‘R’Us” never purchased an item in? (8) Which customers are associated with more than one industry?

(9) What category has the most expensive item?

(10) Which customers have bought every item in the “spare part”category?

(11) Which customers have bought exactly the same set of items as “Chris’Lobster Shack”?