Assignment 2: Relational Algebra and SQL

Due: Oct 28 (Sat), 11:59pm

Mark = 70 marks. Weight=10%

Submission instruction: (1) This assignment must be done by each student independently. (2) Handwriting is acceptable but the student is responsible for deduction of marks due to clarity issue. Consistent indentation and use of capitalized keywords are important skills for writing clear and correct SQL answers, and are helpful with marking. (3) Submission is through coursys.sfu.ca in a single pdf file with maximum file size of 10MB. Late submission will not be accepted. As a reminder, the student is responsible for submitting the assignment successfully before the deadline (for example, by incremental submission multiple times well ahead of the deadline, instead of one submission at the last minute). We only accept the submission that is in the system before the deadline.

This assignment will use two databases, "Department-Store Database" and "Drinker-Beer Database". Underlined fields are the attributes of primary keys. The records in the tables only serve as examples. The tables may contain more records. For your own practices, more queries on these databases can be found in the file "sample-db-query" on Canvas.

Note: Please note the updates in red.

Department Store Database

Employee relation:

eid	name	salary	dept
111	Jane	8000	Household
222	Anderson	8000	Toy
333	Morgan	10000	Cosmetics
444	Lewis	12000	Stationery
555	Nelson	6000	Toy
666	Hoffman	16000	Cosmetics

Sales relation:

dept	item
Stationery	pen
Cosmetics	lipstick
Toy	puzzle
Stationery	ink
Household	disk
Sports	skates
Toy	lipstick

Types relation:

item	color
pen	red
lipstick	red
pen	black
puzzle	black
ink	red
ink	blue

Drinker-beer Database

Frequents relation:

drinker	bar
Ullman	Manuel's
Ullman	Orchard Night
Ullman	Faculty Clue
Ullman	Dynasty
Graham	Dynasty
Sam	Manul's
Sam	Orchard Night
Smith	Dynasty

Serves relation:

bar	beer
Manuel's	Miller Lite
Manuel's	Tiger
Orchard Night	Busch
Manuel's	Qindao
Faculty Club	Tiger
Faculty Club	Miller Lite
Dynasty	Anchor

Likes relation:

drinker	beer
Ullman	Miller Lite
Ullman	Tiger
Ullman	Anchor
Jane	Anchor
Sam	Anchor

Question 1 (25 marks, 5 marks each). Express the following queries in Relational Algebra. Both the correctness and the simplicity count.

1. List items available in both "red" and "blue".
2. List the name of the employees making at least as much as "Jane". If there are several employees named "Jane", which Jane's salary is used in this comparison in your answer?
3. Find the largest salary paid to any employees.
4. What departments sell every item with a red color.
5. What departments sell only items with only red color, in other words, what departments do not sell any item with a non-red color.

Question 2 (25 marks, 5 marks each). Express the queries in Question 1 in SQL.

1. List items available in both "red" and "blue".
2. List the name of the employees making at least as much as "Jane". If there are several employees named "Jane", which Jane's salary is used in this comparison in your answer?
3. Find the largest salary paid to any employees.
4. What departments sell every item with a red color.
5. What departments sell only items with only red color, in other words, what departments do not sell any item with a non-red color.

Question 3 (20 marks, 5 marks each) This question refers to the queries in Question 1.

(a) Express query 1 in SQL without using INTERSECT

(b) Express query 2 in SQL using nested query

(c) Express query 3 without using EXCEPT

(d) Express query 5 without using EXCEPT