

Write Relational-Algebra queries for the following 15 questions.

6 points/question

Task-1: Consider the following schema of Employee-Database, and answer questions 1 to 7.

Employee(employee_id, employee_name, street, city)
WorksFor(employee_id, company_id, salary, joinYear)
Company(company_id, company_name, city)

1. Find the id and name of all the companies located in city of “Grand Rapids”.
2. Find the id, name, and city of residence of each employee who works for the company “BigBank”.
3. Find the name of employees who joined before 2012, earn more than \$100000, and work for BigBank’s Boston branch.
4. Find the name of employees in this database who lives in the same city as the company for which she or he works.
5. Find the name of employees who don’t work for the company “Chase”.
6. Find the employees who share the same name and work for the same company.
7. Find the employees who earn more than employee named ‘John’ and work for ‘BigBank’.

Task-2: Consider the following schema of Bank-Database for “BigBank”, and answer questions 1 to 8.

Branch(branch_id, branch_name, manager_name, branch_city,
total_asset)

Customer(customer_id, name, street, city)

LoanInformation(loan_id, branch_name, loan_amount, loan_year)

Borrower(customer_id, account_number, loan_id)

Account(account_number, branch_name, balance)

Depositor(customer_id, account_number)

1. Find all the loan-ids with a loan amount of \$10000 or more.
2. Find the name of the managers for every branch located in “Chicago”.
3. Find all customer IDs who borrowed money between 2015 and 2018.
4. Find the customer ID of each depositor who has an account with a balance greater than \$6000 at the “Uptown” or “Downtown” branch.
5. Find customer-ids who are ‘depositors’ but not ‘borrowers’.
6. Find the names of all the managers who granted at least one loan to “Jack”.
7. Find the customers who have an account in the city that they live in.
8. Find which cities have at least one branch having at least one loan amount of more than \$100000.

Task-3: True or False (2 point/question)

1. Natural join works on a given logical expression.
2. These two schemas are different:
 - CoursesTaken(Student, Grade, Course)
 - CoursesTaken(Grade, Student, Course)
3. Select, Project, and Intersection are unary operators (requires only one relation)
4. To perform union or intersection, two relations must have the same number of attributes, but the attributes don’t need to be compatible (can have different domain types)
5. Candidate keys can not have NULL values.

Submission: Upload the word-document file through the submission link provided on blackboard.