1. List the members of your group below. Underline your name.

2. Answer the following based on Codd's paper.[1]

   (a) How many paths are needed to support symmetric exploitation of an n-ary relation? Explain your answer.

   (b) Provide a relational algebra expression (using the algebra defined in class) for the active domain of a database composed of a single relation $R(A, B, C)$.

[1] Edgar F. Codd, "A Relational Model of Data for Large Shared Data Banks," *Communications of the ACM* 13/6 (1970).

3. Consider a database with relations `Students(id, name, year)`, `Courses(id, title, ta)`, and `Enrolls(student, course, credits)`. A tuple $(i, n, y) \in$ `Students` denotes a student with student-identifier i, name n, and year y. A tuple $(i, t, a) \in$ `Courses` denotes a course with course-identifier i, title t, and whose teaching assistant's student-identifier is a. A tuple $(s, c, r) \in$ `Enrolls` denotes the enrollment of the student with identifier s in the class with identifier c, for r credits.

   We say student t *is a TA of* student s, for r credits, if s is enrolled for r credits in a course whose TA is t. Write a SQL query for the names and IDs of all students who are TAs of 100 or more students.

4. Write an extended algebra query that is equivalent to the query of Question 3.

5. We say a *TA* t *is responsible for* r *credits* if r is the sum of credits of all student enrollments in all courses whose TA is t. Write a SQL query that generates a list of the names and IDs of TAs who are responsible for the maximum number of credits.

6. Write an extended algebra query that is equivalent to the query of Question 5.

7. Write a SQL query for the names and IDs of the TAs who are the TAs of the maximum number of students for r credits, for each distinct value of r occurring in the database.

8. Write an extended algebra query that is equivalent to the query of Question 7.