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

2. Provide expressions for the minimum and maximum cardinalities of the result of each of the basic operators of the extended bag algebra as a function of the cardinalities of its operands. Justify your answers.
3. Provide standard SQL (or closest possible) expressions of the *best-profit* and *packet-grouping* queries described in Section 1.1 of the AQuery paper.¹

¹Alberto Lerner and Dennis Shasha, “AQuery: Query Language for Ordered Data, Optimization Techniques, and Experiments,” in *Proceedings of the 29th International Conference on Very Large Data Bases (VLDB)* (Berlin, Germany, 2003).
4. Recall the SQL query about TAs from the previous exercises *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). Comment on the correctness of the following solution by Anthony Naddeo, and suggest improvements or alternative expressions of the query.

```
cREATE VIEW ta_students AS
    SELECT c.ta, s.id, e.credits
    FROM courses c, students s, enrolls e
    WHERE s.id = e.student AND e.courses = c.id;

CREATE VIEW credits_responsible_for AS
    SELECT ta, sum(credits) AS num_credits
    FROM ta_students
    GROUP BY ta;

CREATE VIEW students_responsible_for AS
    SELECT ta, count(id) AS num_students
    FROM ta_students
    GROUP BY ta;

CREATE VIEW all_responsible AS
    SELECT ta, num_students, num_credits
    FROM students_responsible_for NATURAL JOIN credits_responsible_for;

CREATE VIEW distinct_credits AS
    SELECT max(num_students) AS num_students, num_credits
    FROM all_responsible
    GROUP BY num_credits;

CREATE VIEW answer AS
    SELECT ta, num_students, num_credits
    FROM distinct_credits natural join all_responsible;
```
5. Provide an algebra equivalent of the query of Question 4.