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

2. Consider the following relational instance $R_1(B, N, C, D)$ representing the building name (B), room number (N), capacity (C), and description (D) of rooms on campus.

R_1

B	N	C	D
Neville	227	30	cramped seating, blackboard
Neville	120	25	nice chairs, whiteboard, videoconferencing
Neville	225	2	office
Neville	224	3	office
East Annex	225	10	lab
East Annex	227	3	office

   What is its arity? What is its cardinality?

3. Evaluate the following queries on the above instance.

   (a) $\pi_{B,N} R_1$

   (b) $\pi_{C} R_1$

(c) $\pi_B R_1 \times \pi_N R_1$

(d) $\pi_{B,N} \sigma_{C>20} R_1$

(e) $\sigma_{C>20} \pi_{B,N} R_1$

4. Provide relational algebra queries for the following.

   (a) Identifying information and descriptions of all rooms with capacity between 20 and 40.

   (b) All possible 2-room combinations.

5. Represent all distinct n-ary relations R_n whose attributes have the common domain $[m] = \{1, 2, 3, \ldots, m\}$ for $n = 0, 1, 2, 3, \ldots$ and $m = 0, 1, 2, 3, \ldots$ (as high as you can manage for both n and m).

[additional space for answering the earlier question]

6. Provide an algorithm to systematically generate all the relations from Question 5. Explain why your algorithm is correct.

7. Quantify the running time of your algorithm analytically.

8. (homework) Implement your algorithm and analyze its performance experimentally.