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.

$R_1$			
В	N	С	D
Neville Neville	227 120		cramped seating, blackboard nice chairs, whiteboard, videoconferencing
Neville	225	2	, ,
Neville East Annex	224 225	3 10	office lab
East Annex	_		

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  $[m] = \{1, 2, 3, ..., m\}$  for n = 0, 1, 2, 3, ... and m = 0, 1, 2, 3, ... (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.