

## MIDSEM

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1. Convert following SQL statements into Relational Algebra-

```
SELECT r1.a2, r2.b2 FROM r1, r2
WHERE r1.a3 = r2.b1;
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SELECT r1.* FROM r1 JOIN r2 ON (r1.a5 = r2.b2)
WHERE r1.a1 > 1000;
```

```
SELECT * FROM r1 WHERE r1.a3 NOT IN (SELECT b1 FROM b2);
```

```
SELECT r1.a3, count (r1.a2) FROM r1
WHERE r1.a1 > 1000
GROUP BY r1.a3
HAVING count (r1.a2) > 3;
```

2. Suppose following schema has been designed for storing information of Hall of Residence at an institute like IIITV. Considering this set of relations write down queries given below in Relational Algebra.

STUDENT(id, name, email, prog\_code, batch)

–Batch is like 2009, 2010, or so

–Prog\_code is like '01' for B.Tech(cs), or so

CourseTaken(stud\_id, course\_no, sem, acad\_yr, grade)

–attribute sem value is one of three - Autumn, Winter, and Summer

–attribute acad year is start year of the academic year

Result(stude\_id, sem, acad\_yr, SPI)

–Here attribute SPI is Semester Performance Index of “the student” for “the semester”.

ROOM(rno, wing, floor)

–the relation stores details of rooms

–floors are represented by numbers 0(Ground), 1(First), and 2(Second); values for wings is single letter and drawn letters ‘A’ through ‘K’.

ALLOT(sid, rno)

–This relation records all allotments; students(sid) not having entry in this relation means - they are not residing in the HOR

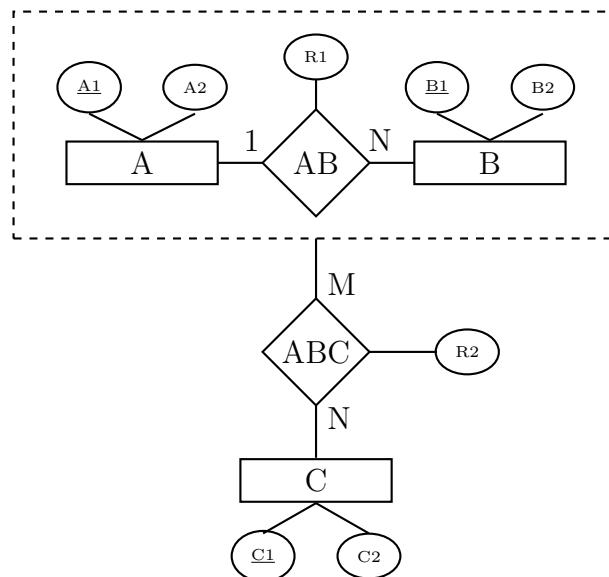
–rno(FK) refers to Room relation, and can not be null.

HMC(wing, floor, sid)

–sid is student id of floor representative of Hostel Management Committee(HMC), and can not be null.

- (a) List ID Name of students residing in wing ‘C’ first floor.
- (b) List room nos’ along with ID and Name of resident that are singly occupied in wing ‘C’ first floor.
- (c) Give wing-floor wise count of fully vacant rooms in HoR.
- (d) Give prog-batch wise count of residents in wing ‘C’ first floor.
- (e) List ID, Name of B.Tech(cs) students (prog code ‘01’) who are not residing in HoR.
- (f) List HMC representatives(wing, floor, ID and name) for all floors(should output null if there is no representation for a floor)
- (g) List wing-floors that do not have HMC representative.
- (h) List ID Name of students of BTech(cs) 2008 (prog-code ‘01’) batch having  $SPI \geq 6.0$  in every semester, s/he has studied.
- (i) List ID, Name of students BTech(cs) 2008 (prog-code ‘01’), who are living in ‘E’ second floor and taken cs304, and passed with ‘AA’ or ‘AB’ grade.

3. Consider following Entity Relationship Diagram:



- a) Discovery and find out minimal set of Functional Dependencies from semantics of ERD.
- b) Map it to equivalent Relational Schema indicating FK and PK and other constraints.

“The goal is to turn data into information, and information into insight.”

Carly Fiorina

## Answers