# HABIB UNIVERSITY
## Database Systems
### CS/CE 355/373 Fall 2023
### Instructor: Maria Samad

## Queries and Transactions

Student Name: _____

Consider the following UNIVERSITY database:

**STUDENT**

| Name | Student_number | Class | Major |
|------|----------------|-------|-------|
| Smith | 17 | 1 | CS |
| Brown | 8 | 2 | CS |

**COURSE**

| Course_name | Course_number | Credit_hours | Department |
|-------------|---------------|--------------|------------|
| Intro to Computer Science | CS1310 | 4 | CS |
| Data Structures | CS3320 | 4 | CS |
| Discrete Mathematics | MATH2410 | 3 | MATH |
| Database | CS3380 | 3 | CS |

**SECTION**

| Section_identifier | Course_number | Semester | Year | Instructor |
|--------------------|---------------|----------|------|------------|
| 85 | MATH2410 | Fall | 07 | King |
| 92 | CS1310 | Fall | 07 | Anderson |
| 102 | CS3320 | Spring | 08 | Knuth |
| 112 | MATH2410 | Fall | 08 | Chang |
| 119 | CS1310 | Fall | 08 | Anderson |
| 135 | CS3380 | Fall | 08 | Stone |

**GRADE_REPORT**

| Student_number | Section_identifier | Grade |
|----------------|--------------------|-------|
| 17 | 112 | B |
| 17 | 119 | C |
| 8 | 85 | A |
| 8 | 92 | A |
| 8 | 102 | B |
| 8 | 135 | A |

**PREREQUISITE**

| Course_number | Prerequisite_number |
|---------------|---------------------|
| CS3380 | CS3320 |
| CS3380 | MATH2410 |
| CS3320 | CS1310 |

And its meta-data as follows:

**RELATIONS**

| Relation_name | No_of_columns |
|---------------|---------------|
| STUDENT | 4 |
| COURSE | 4 |
| SECTION | 5 |
| GRADE_REPORT | 3 |
| PREREQUISITE | 2 |

**COLUMNS**

| Column_name | Data_type | Belongs_to_relation |
|-------------|-----------|---------------------|
| Name | Character (30) | STUDENT |
| Student_number | Character (4) | STUDENT |
| Class | Integer (1) | STUDENT |
| Major | Major_type | STUDENT |
| Course_name | Character (10) | COURSE |
| Course_number | XXXXNNNN | COURSE |
| ..... | ..... | ...... |
| ..... | ..... | ...... |
| ..... | ..... | ...... |
| Prerequisite_number | XXXXNNNN | PREREQUISITE |

Note: Major_type is defined as an enumerated type with all known majors.
XXXXNNNN is used to define a type with four alphabetic characters followed by four numeric digits.

Answer the following:

1. If the name of the "CS" (Computer Science) department changes to "CSSE" (Computer Science and Software Engineering) department, and the corresponding prefix for the course number also changes (CS to CSSE), identify the columns in the database that would need to be updated.

2. Can you restructure the columns in the COURSE, SECTION and PREREQUISITE tables so that only one column needs to be updated in Q1? Is this restructuring useful? Specify for which table it seems useful, if any, and which ones for not, if there aren't any.

3. How will the meta-data be updated after restructuring the columns? Specify only the rows for which data is modified/added.