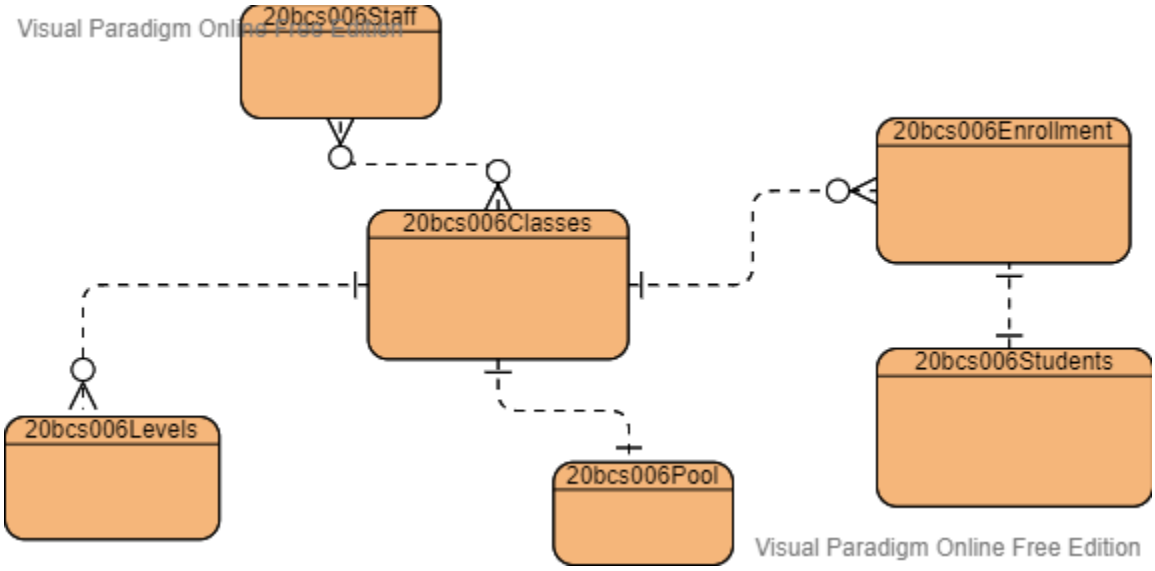
CS310-DBMS First Class Hackathon

Roll Number: 20bcs006

1. Conceptual ERD
Made using an online tool (before assuming the rules given in ques 3):



The above figure is the Conceptual ERD of the given database.

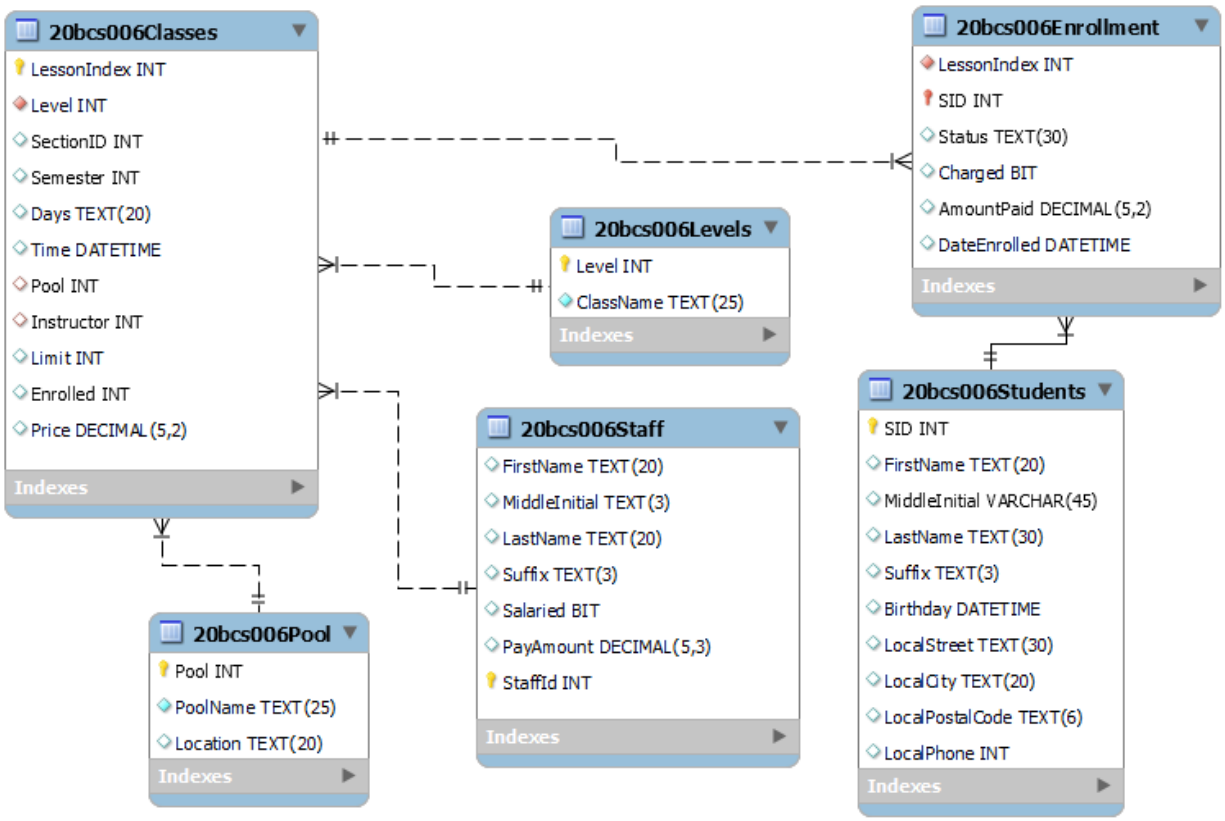
2. Degree: Degree of each relationship is binary i.e involves only two entities.

Cardinality:

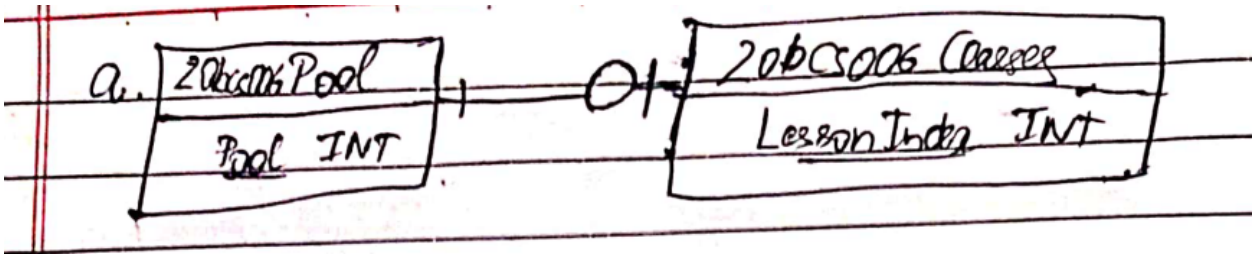
a. Classes to Pool: 1:1 (One class can have only one pool)
b. Class to Enrollment: 1:n (One class can have many enrollments)
c. Enrollment to student: 1:1 (One student can have only one enrollment and a enrollment can belong to only one student)
d. Class to Levels: 1:n (Class can have many levels)
e. Class to staff: n:n (Class can have multiple teachers, teachers can teach multiple classes)

3. Physical database ERD is given below (made using mySQL workbench)

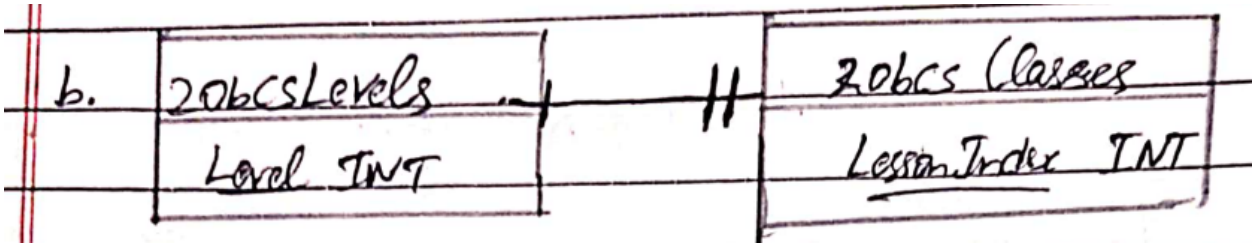
The primary key and foreign keys notation is the standard mysql notation. The relationships depicted do not take into account the optional nature of relationships (feature not available in mySQL workbench), which is why I have attached handwritten diagrams to take into consideration the rules given in this question.



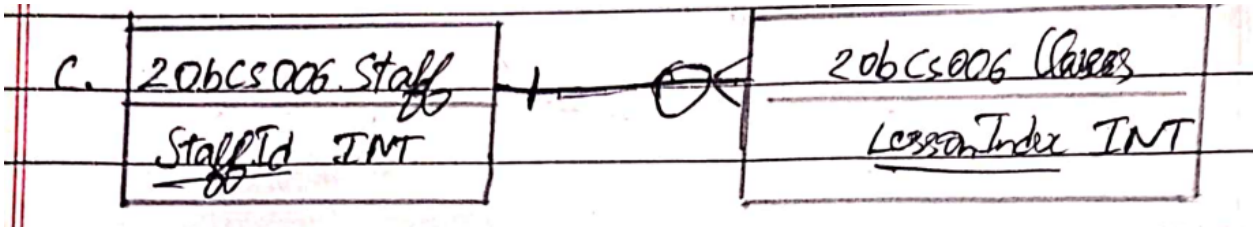
a. A pool may or may not ever have a class.



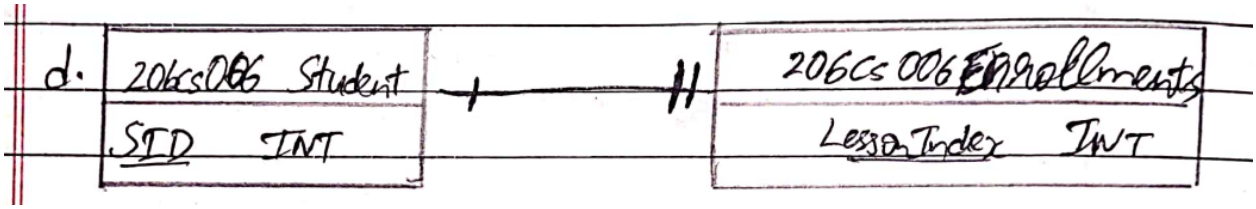
b. The levels table must always be associated with at least one class.



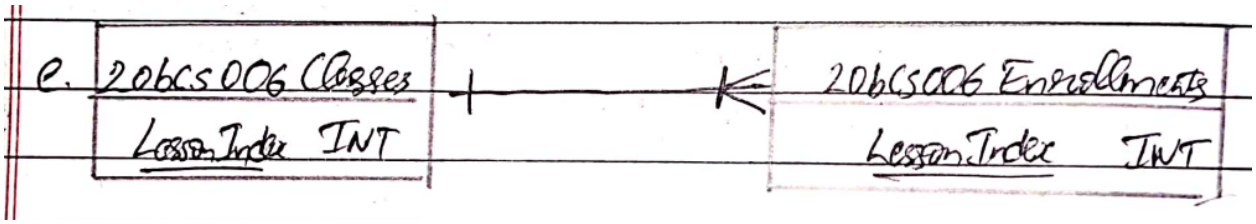
c. The staff table may not have ever taught a class.



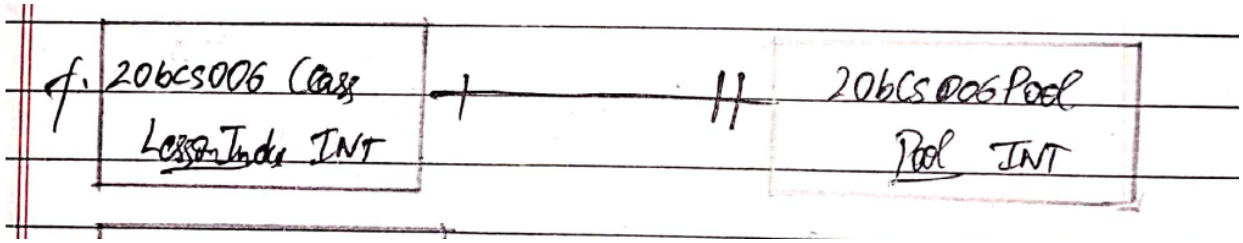
d. All students must be enrolled in at least one class.



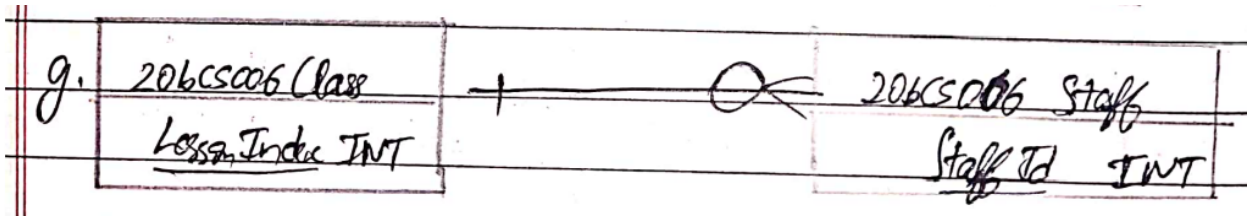
e. The class must have students enrolled in it.



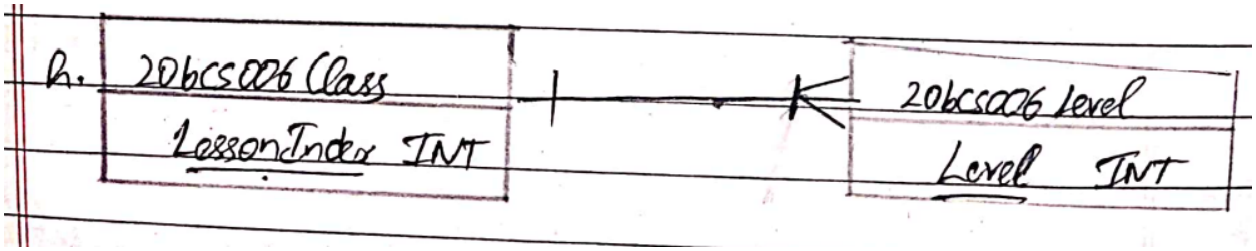
f. The class must have a valid pool.



g. The class may not have an instructor assigned.



h. The class must always be associated with an existing level.



4. Since Enrollments by itself does not have a primary key, the Enrollments table can be considered a weak entity. However, the foreign key SID(which is the primary key of the Students table) and LessonIndex(which is the primary key of the Classes table) references this Enrollments table, and (using a foreign key) SID in conjunction with its attribute, it creates this primary key of its own.

5.
The Charged bit in the Enrollments table means that the amount has been completely paid. Which means that the AmountPaid attribute of the Enrollments table is equal to the Price attribute of the classes table. This could be considered as redundant.
The Levels table could be considered redundant, as we could replace this table by an attribute in the Classes table. i.e. the Classes table can have an attribute level name.