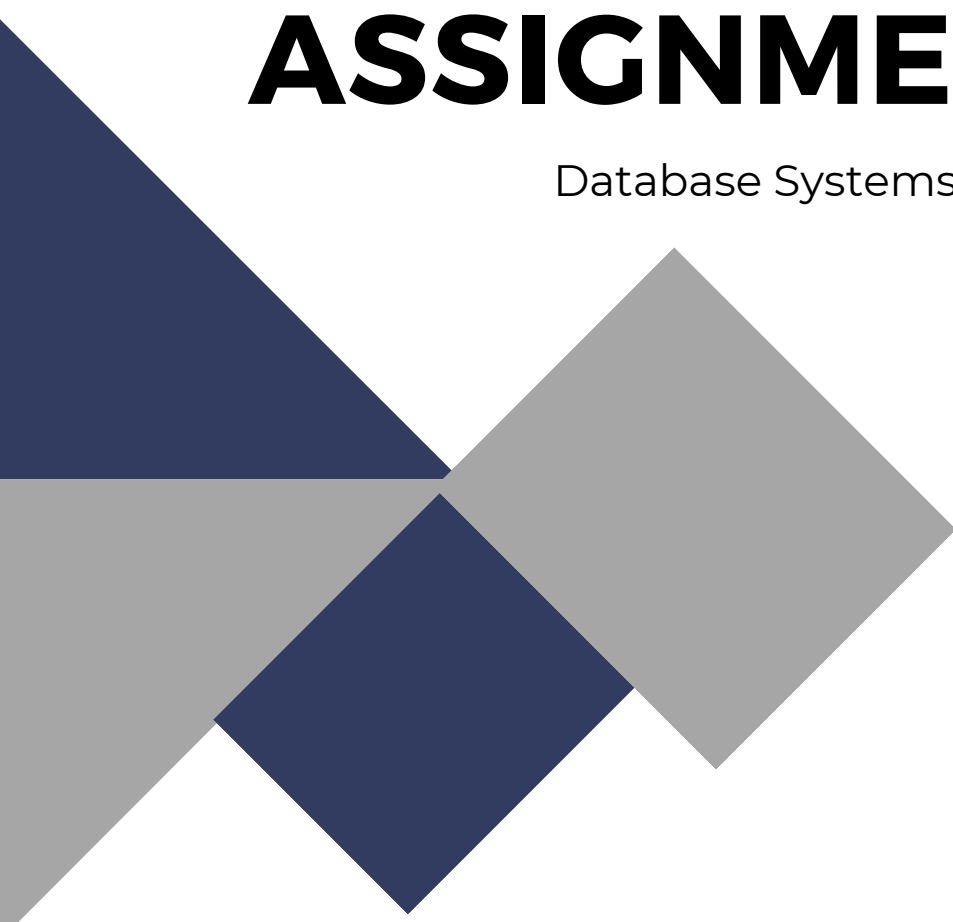


# ASSIGNMENT # 3

Database Systems



## ERD, EERD, SQL and Normalization

Section: D

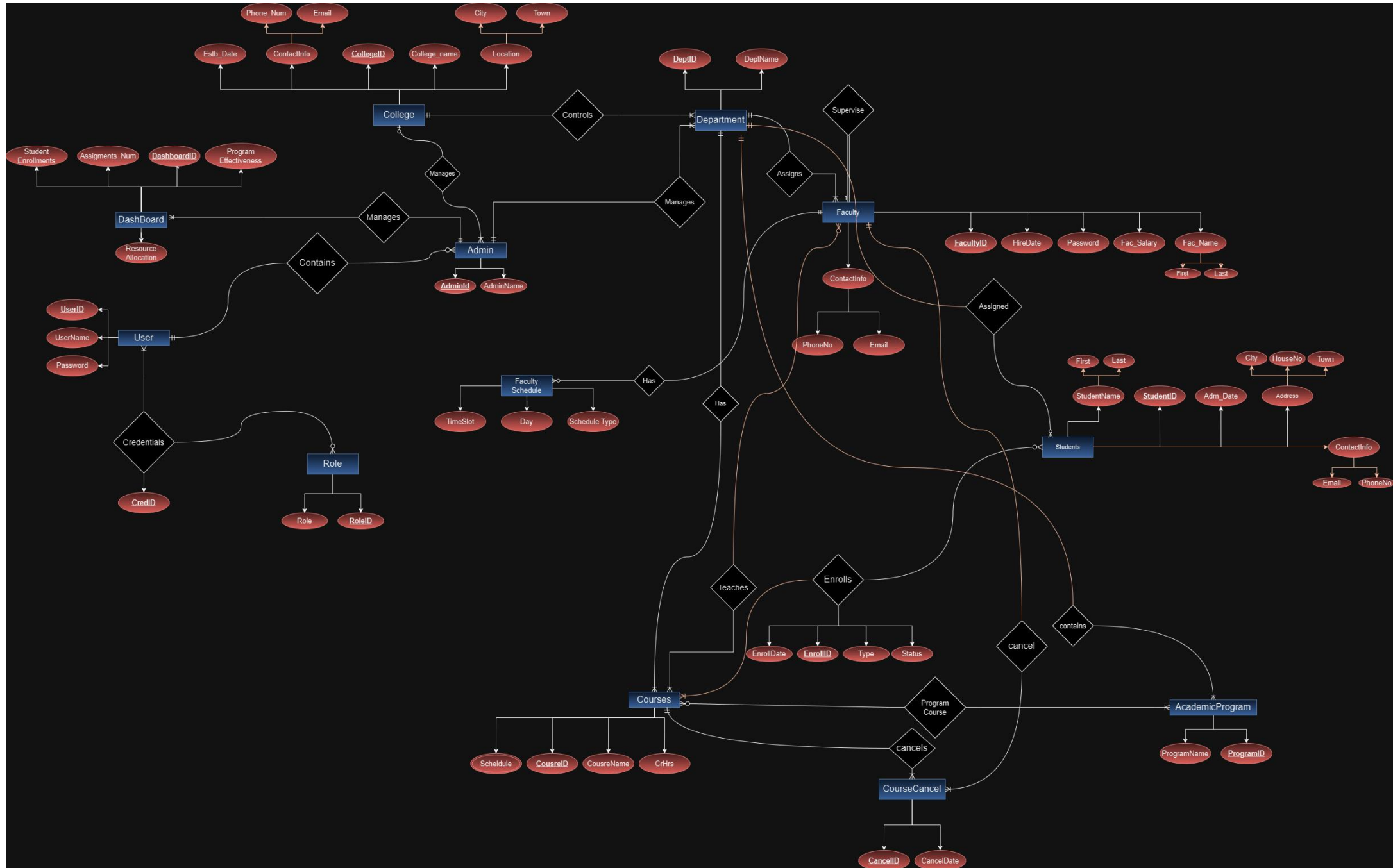
Muhammad Kashif

I21-0851

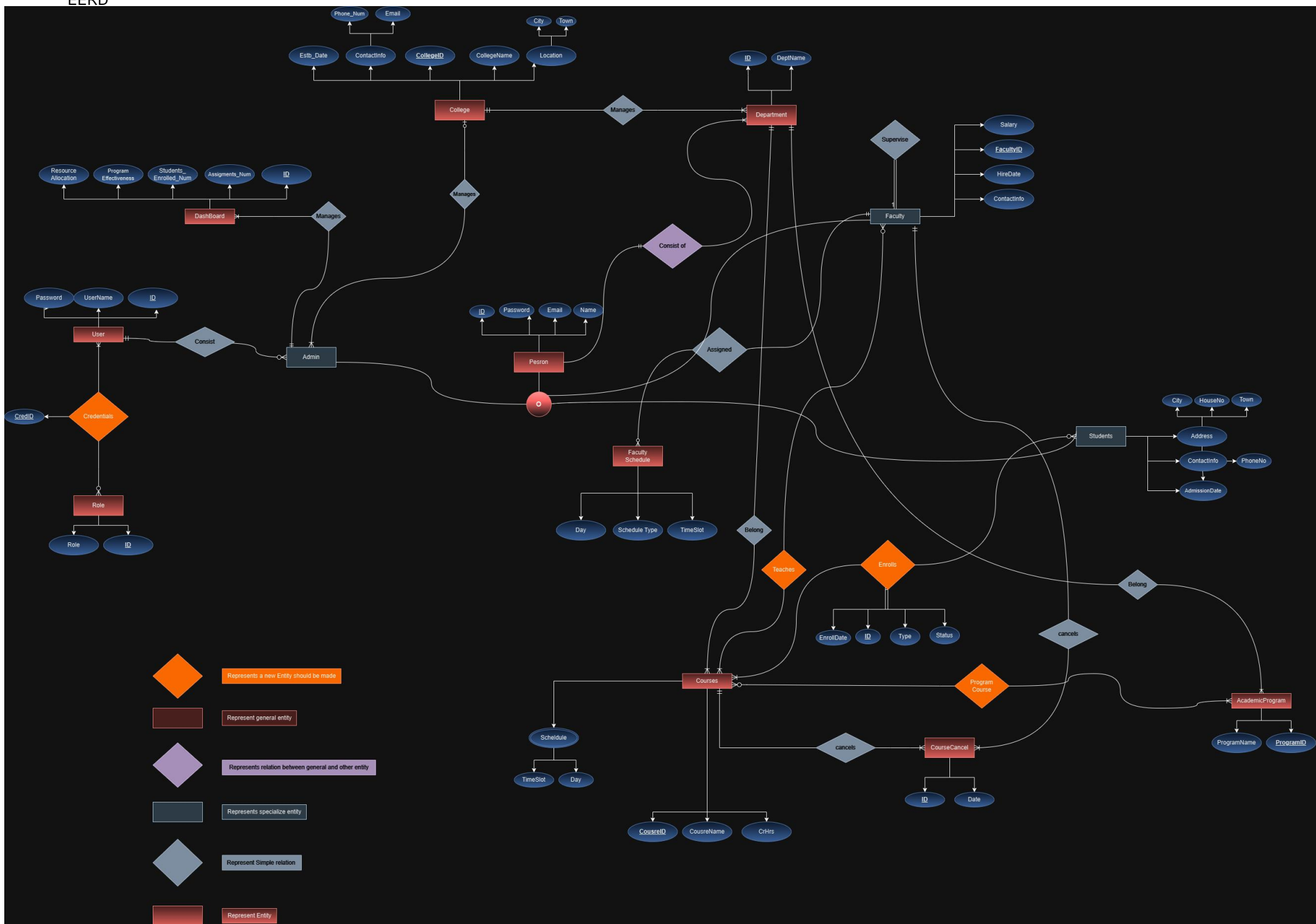
Muhammad Huzaifa

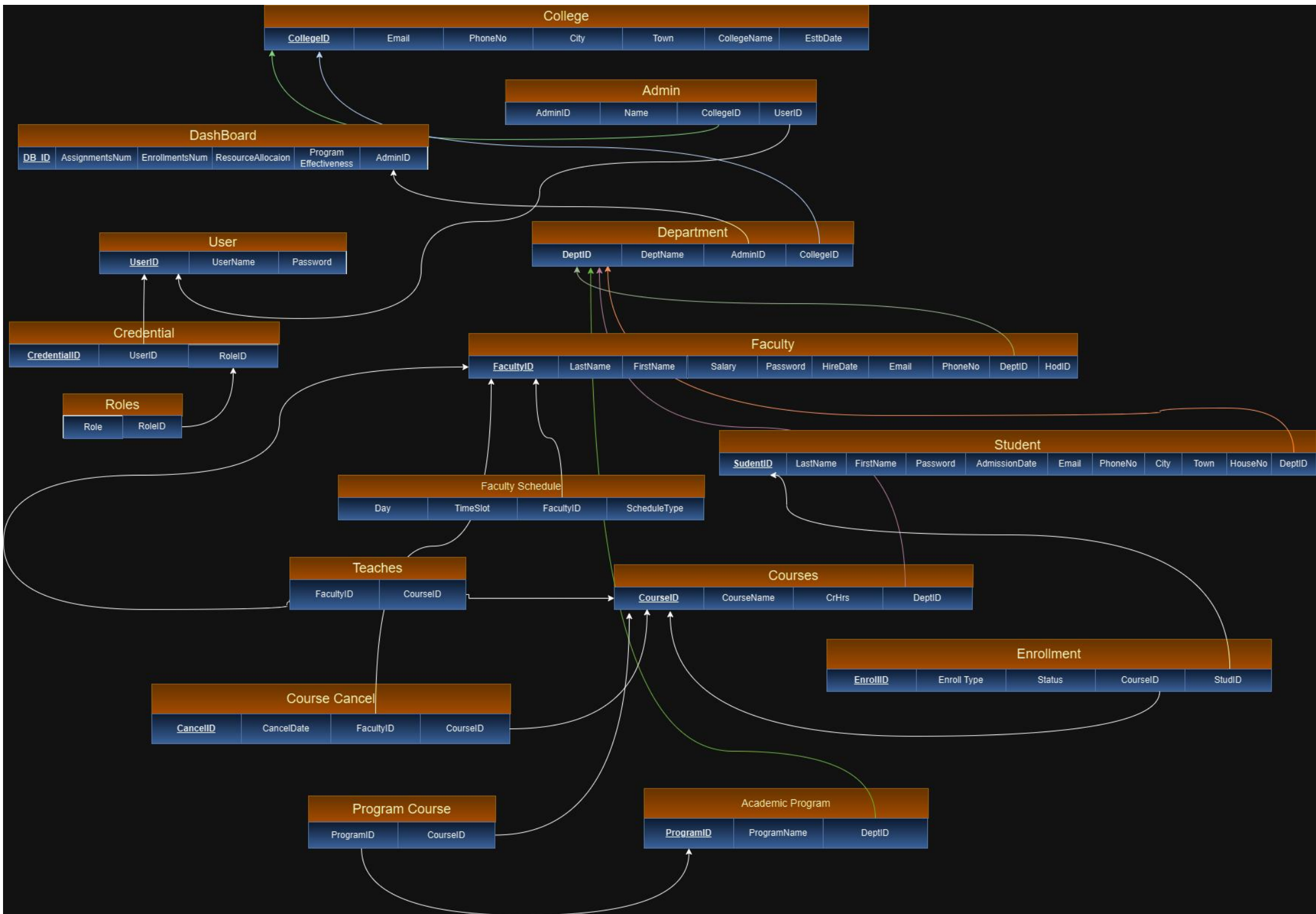
I21-2460

# ERD



# EERD





## Question 2

1. Provide one example of each of the following from the above table.

- **Insertion Anomaly:** If we want to insert a new student record for Aleena who has not taken any courses yet, we cannot do so because the Course Offered Year column is required. This is because the Course Offered Year column is functionally dependent on the Course\_Offer\_id column, which is also a primary key column.
- **Deletion Anomaly:** If we delete the course record for PF, we will also lose the information about the students who took PF in 2006. This is because the Student\_id column is functionally dependent on the Course\_Offer\_id column, which is also a primary key column.
- **Updation Anomaly:** If we update the Course Grade for Ali in course C1 from 3.5 to 4.0, we will also need to update the Course Grade for Aleena in course C1, even if Aleena did not get a grade of 3.5 in course C1. This is because the Course Grade column is partially functionally dependent on the Course\_Offer\_id column.

2- Normalize the above data to 3NF.

- **1NF**

Student Table

Student_id	Student_City	Student_Name
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Course Table

Course_id	Course_Name
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Course Offered Table

Student_id	Course_id	Course_Offer_id	Semester	Grade	Year
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- **2NF**

Student Table

Student_id	Student_City	Student_Name
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Course Table

Course_id	Course_Name
-----------	-------------

Course Offered Table

Course_Offer_id	Semester	Year
-----------------	----------	------

Enrollment Table

Student_id	Course_id	Course_Offer_id	Grade
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- **3NF**

Student Table

Student_id	Student_City	Student_Name
------------	--------------	--------------

Course Table

Course_id	Course_Name
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Course Offered Table

Course_Offer_id	Semester	Year
-----------------	----------	------

Enrollment Table

Student_id	Course_id	Course_Offer_id	Grade
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