

Muhammad Umar
23K-0023
BAI-5A

Assignment 2 Date:

QUESTION 1

A.

Entity Attributes

1. Film FilmID, Title, Budget
ReleaseDate, Director
2. Actor ActorID, Name,
PhoneNo.
3. ProductionCompanies CompanyID, Name

B.

Relationships Cardinality

1. Film - Actor (Casting) M:N
2. Film - Production Companies (Funding) M:N
3. Film - Director (Production) 1:N
(Director: Film)

Date: _____

C.

Associative Entity Attributes

Casting

- 1) FilmID (FK to Film)
- 2) ActorID (FK to Actor)
- 3) CharacterName

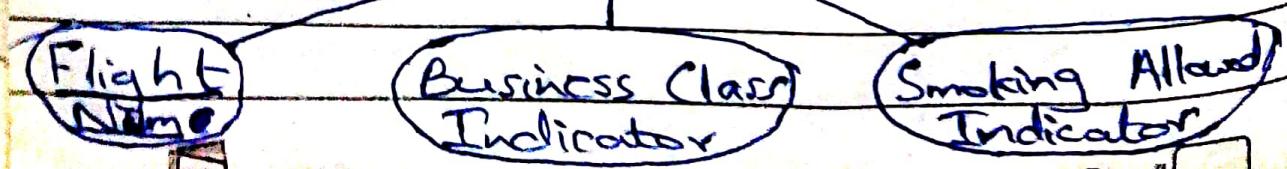
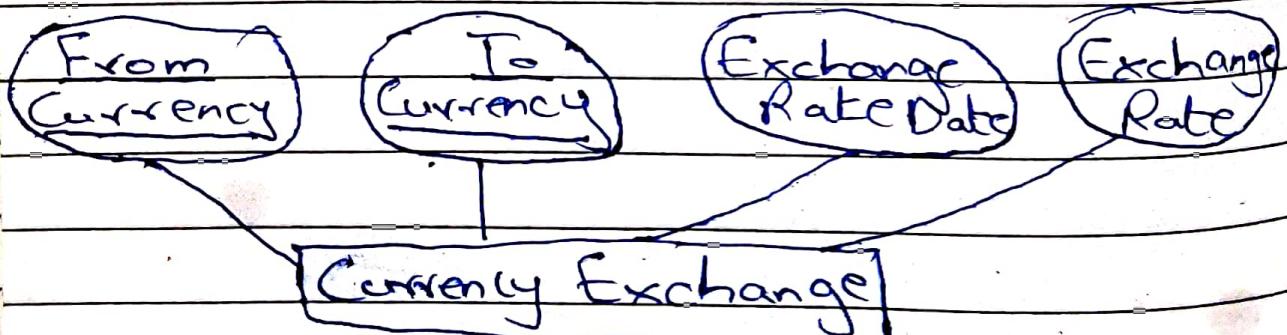
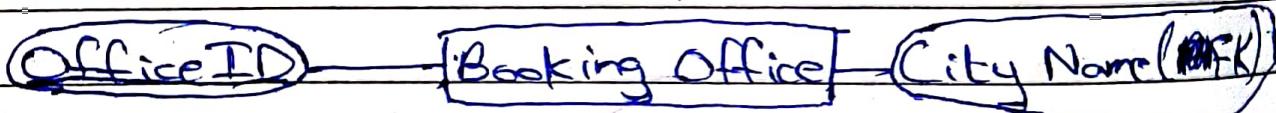
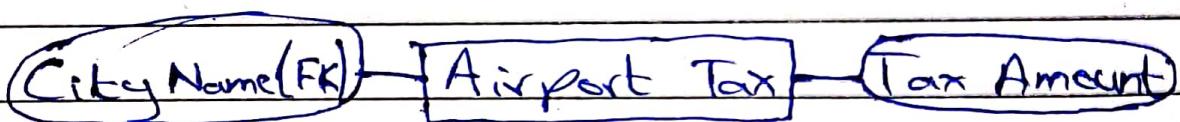
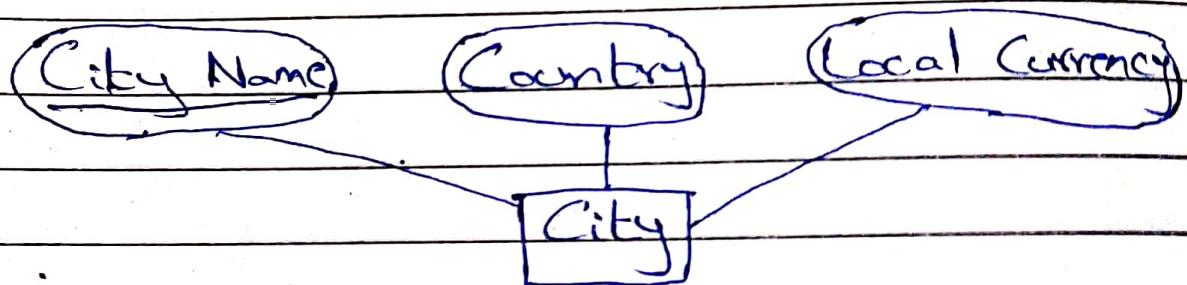
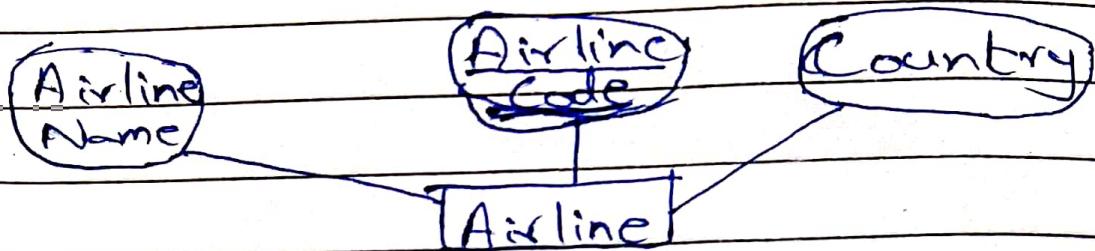
Primary Key = (FilmID, ActorID)

D.

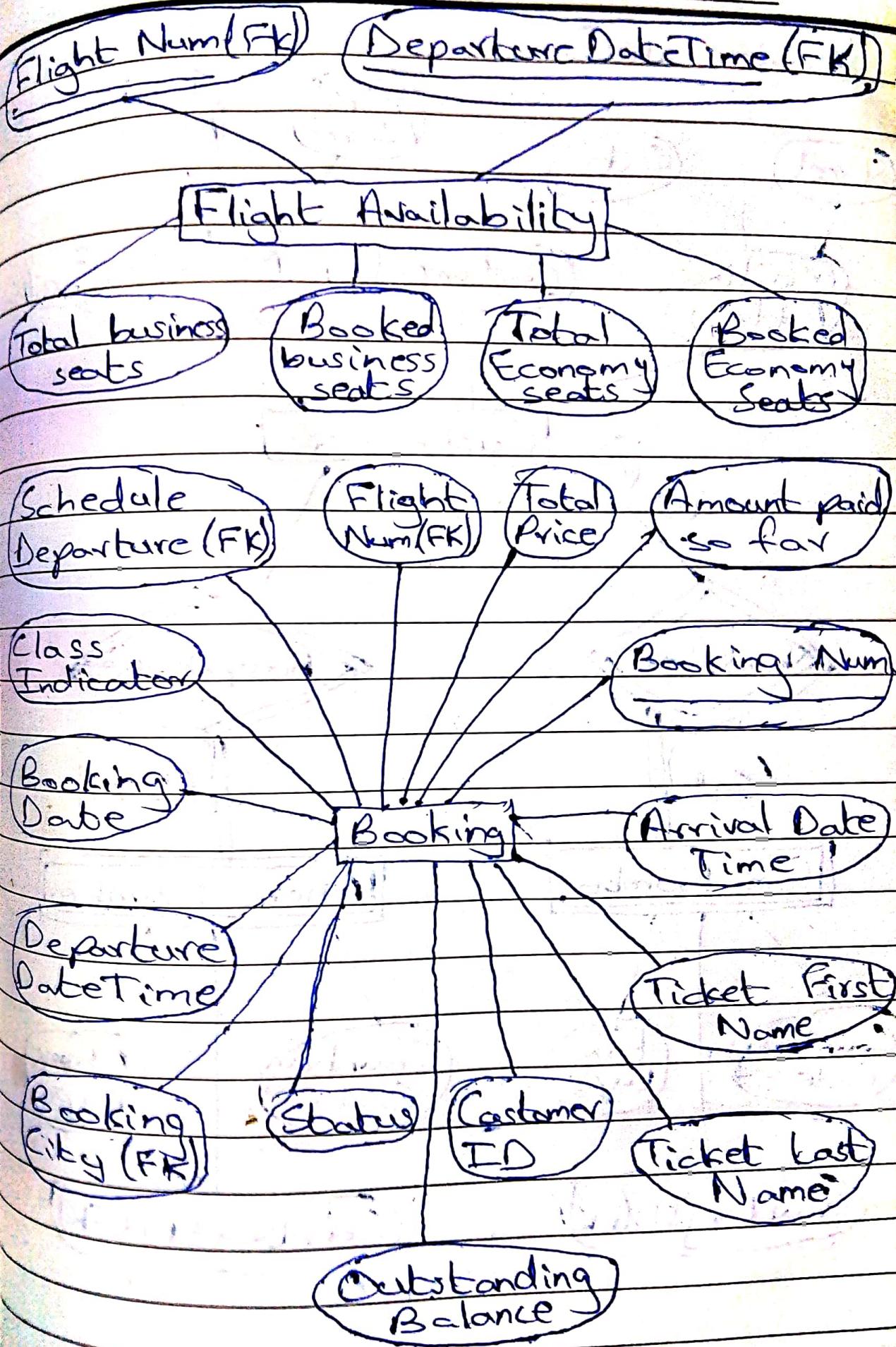
Director Name should not be made into a separate entity as we are only storing the name of director not any other info like DirectorID etc. Also each film is made by exactly one director so we don't need to make director a separate entity. If we make director a separate entity, this will make our database unnecessary complicated as then we will be storing only the name of director in director's entity (relation).

Date: _____

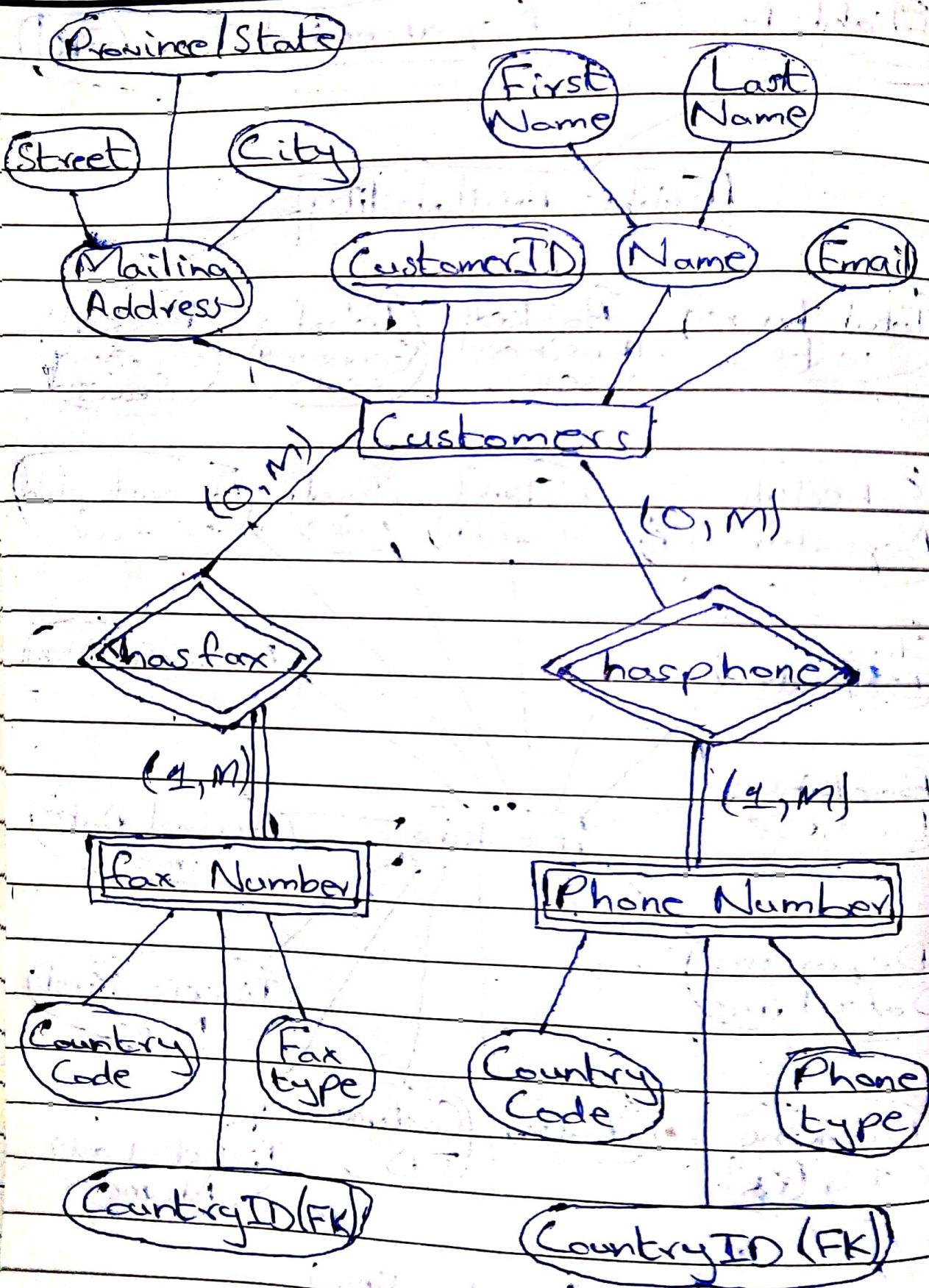
QUESTION 2



Date:



Date:



Date: _____

Relationships:

Airport Tax M

located in

Booking office

1

Office located

1

city

1

flies from/to

Airline

1

operated by

M

Flight M

1

has Availability

M

Flight Availability

1

Booked

for flight

M

M

Customer 1

makes

M Booking

Date: _____

QUESTION 3

a.

Insertion Anomaly:

If we have to insert any teacher who have not worked at any school, we can't do so unless that teacher worked at any school.

e.g. We cannot add teacher named "John" in database unless John worked at any school.

Deletion Anomaly:

Deleting any particular record causes loss of data.

e.g. If we delete the record for "Park School", we will also lose data for teacher "Khan R".

Updation Anomaly:

To update a particular record, we will need to update it at multiple places.

e.g. To update the ^{city} record for school "ParkSchool", we will need to update it at multiple tuples.

Date: _____

b.

Functional Dependencies:

NIN identifies exactly one teacher.
SchoolID identifies exactly one school.

Dependencies are :

- 1) NIN \rightarrow tName
- 2) SchoolID \rightarrow School Name, School City
- 3) (NIN, schoolID) \rightarrow contractNo, hours

① 1.NF:

Given table is already in 1.NF form as each cell contains a single atomic value.

② 2.NF:

Table 1: Teacher

| NIN | tName |
|------|---------|
| 2103 | Brown A |
| 2198 | Khan R |
| 2205 | Lewis H |

Date: _____

Table 2: School

| schoolID | schoolName | schoolCity |
|----------|--------------|------------|
| S301 | Park School | Manchester |
| S114 | Green School | Birmingham |

Table 3: Teacher School

| NIN | schoolID | contractNo. | hours |
|------|----------|-------------|-------|
| 2103 | S301 | T9001 | 10 |
| 2198 | S301 | T9001 | 18 |
| 2205 | S114 | T9001 | 20 |
| 2103 | S114 | T9001 | 12 |

③ 3: NF

As there is no transitive dependency in any table, all tables are already in 3 NF.

Assumptions:

I assumed that the contract will always be held between teacher and school so both NIN and schoolID will be required to identify the contractNo.

Date: _____

QUESTION 4

A.

Primary key = (FilmID, ActorID)

B.

Partial Dependency exists,
 $\text{FilmID} \rightarrow \text{FilmTitle}, \text{DirectorName}$
 $\text{ActorID} \rightarrow \text{ActorName}, \text{AgentID}$

So, given table violates 2NF.

Although this table ~~also violates 3NF~~ has transitive dependency
($\text{ActorID} \rightarrow \text{AgentID}$ and $\text{AgentID} \rightarrow \text{AgentPhone}$),
but though the highest normal form
which table violates is still 2 NF
because we only consider 3 NF if
the table satisfies 2 NF.

Date: _____

C.

New tables will be,

- 1) Film (FilmID, FilmTitle, DirectorName)
- 2) Actor (ActorID, ActorName, AgentID, AgentPhone)
- 3) Casting (FilmID, ActorID)

Dep Partial dependencies removed:

FilmID \rightarrow FilmTitle, DirectorName

ActorID \rightarrow ActorName, AgentID

- Final tables will be,

Table 1: Film

- 1) FilmID (PK)
- 2) FilmTitle
- 3) DirectorName

Date:

Table 2: Actor

- 1) Actor ID (PK)
- 2) Actor Name
- 2) Agent ID (FK to Agent)

Table 3: Agent

- 1) Agent ID (PK)
- 2) Agent Phone

Table 4: Casting

- 1) Film ID (FK to Film)
- 2) Actor ID (FK to Actor)

Primary key = (Film ID, Actor ID)

E.

If agent's phone number changes, this will cause the update anomaly as we will need to update it in each and every tuple where the information of that agent was stored.

Date: _____

QUESTION 5

1.

functional dependencies will be,

1) StudentID \rightarrow FirstName, LastName, Address

2) CourseID \rightarrow CourseName, Credits, InstructorName

3) (StudentID, CourseID) \rightarrow Enrollment Date

Assumptions that I have made are,

- ① Enrollment Date is assigned only when any student enrolls in any course.
- ② Each course will always be taught by single teacher.

2.

1 NF:

This table is already in 1 NF form as each cell contains atomic value.

Date: _____

2 NF:

Partial dependencies are:

- ① StudentID \rightarrow FirstName, LastName, Address
- ② CourseID \rightarrow CourseName, Credits, InstructorName

Now split tables:

Table 1: Student

~~StudentID~~

- ① Student(StudentID, FirstName, LastName, Address)
- ② Course(CourseID, CourseName, Credits, InstructorName)
- ③ Enrollment(StudentID, CourseID, EnrollmentDate)

3 NF:

Tables are already in 3NF form due to no transitive dependency.

Date: _____

Final tables are:

- ① Student (StudentID, FirstName, LastName, Address)
- ② Course (CourseID, CourseName, Credits, InstructorName)
- ③ Enrollment (StudentID, CourseID, EnrollmentDate)

3.

Table Primary Key Foreign Key

- ① Student (StudentID)
- ② Course (CourseID)
- ③ Enrollment (StudentID, StudentID(FK to Student), CourseID, CourseID(FK to Course))