National University of Computer & Emerging Sciences

Karachi Campus

Database Systems (DB) – CS2005

"Coaching Management System"

Mid Evaluation

Class/Section: BAI-5A

Date: 13-Nov-2024

Instructor: Sir Omar Qureshi & Sir Sameer Faisal

GROUP MEMBERS

Student Name	*StudentID/RollNo*	*Class/Section*
Maisum Abbas	*22K-4129*	*BAI-5A*
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Raw Data & Step by Step transformation into 1NF, 2NF and 3NF

1. Row Data Table (Before Normalization):

- This is the initial unnormalized table containing all data in one large table with repeating groups and non-atomic values.

User ID	***User Name***	***User Type***	***Password***	***Student ID***	***Student Name***	***Student Father Name***	***Contact Details (Contact#1, Contact#2)***	***Enrolled in Class***
S-101	Nihal Ali	Student	nihal@32	S-101	Nihal Ali	Ayub Ali	03328765490, 03128956022	10th
T-201	Laiba Umair	Teacher	laiba006	-	-	-	-	-
A-301	Owais Raza	Admin	owais@raza43	-	-	-	-	-

Teacher ID	***Teacher Name***	***Teaching Subject***	***Attendance Date***	***Attendance Status***	***Timetable Day***	***Timetable Class***	***Duration Slot***	***Result ID***
-	-	-	09-10-24	Present	Monday	10th	9:00am to 12:00pm	S-101
T-201	Laiba Umair	English	09-10-24	Present	Tuesday	9th	8:00am to 11:00 am	-
-	-	-	-	-	-	-	-	-

Subject Name	Class	Result Marks	Result %	Notification ID	Notification Type	Notification Date	Course IDs (course1 ID - course7 ID)	Course Outline ID
Math	10th	84/100	84%	S-101	Email	19-07-24	(AI2003, CS1002, DS1003, AI2005, CS1005, CS2005, AI3001)	-
-	-	-	-	T-201	Email	30-08-24	(AI2003, CS2005)	CO-202
-	-	-	-	A-301	Email	13-11-24	-	-

Exercise Date	Member ID	Member Name	Member Role	Member Task
04-07-2024	-	-	-	-
09-07-2024	-	-	-	-
29-09-2024	A-301	Owais Raza	Database Manager	Manage Timetable

2. Converting into 1NF: (Separating columns approach)

- Each attribute must contain only atomic (indivisible) values.
- No repeating groups should exist in any row.

Approach to 1NF Conversion:

- Split the non-atomic columns (contacts and Courses IDs) into individual columns: contact1, contact2, course3 ID, course4 ID, course5 ID, course6 ID, course7 ID.
- This ensures that each attribute holds only one piece of information.

User ID	User Name	User Type	Password	Student ID	Student Name	Student Father Name	Contact #1	Contact #2	Enrolled in Class
S-101	Nihal Ali	Student	nihal@32	S-101	Nihal Ali	Ayub Ali	03328765490	03128956022	10th
T-201	Laiba Umair	Teacher	laiba006	-	-	-	-	-	-
A-301	Owais Raza	Admin	owais@raza43	-	-	-	-	-	-

Teacher ID	Teacher Name	Teaching Subject	Attendance Date	Attendance Status	Timetable Day	Timetable Class	Duration Slot	Result ID
-	-	-	09-10-24	Present	Monday	10th	9:00am to 12:00pm	S-101
T-201	Laiba Umair	English	09-10-24	Present	Tuesday	9th	8:00am to 11:00 am	-
-	-	-	-	-	-	-	-	-

Subject Name	Class	Result Marks	Result %	Notification ID	Notification Type	Notification Date	Course #1 ID	Course #2 ID	Course #3 ID
Math	10th	84/100	84%	S-101	Email	19-07-24	AI2003	CS1002	DS1003
-	-	-	-	T-201	Email	30-08-24	AI2003	CS2005	-
-	-	-	-	A-301	Email	13-11-24	-	-	-

Course#4 ID	Course #5 ID	Course #6 ID	Course #7 ID	Course Outline ID	Exercise Date	Member ID	Member Name	Member Role	Member Task
AI2005	CS1005	CS2005	AI3001	-	04-07-2024	-	-	-	-
-	-	-	-	CO-202	09-07-2024	-	-	-	-
-	-	-	-	-	29-09-2024	A-301	Owais Raza	Database Manager	Manage Timetable

Presented the revised table structured with atomic columns

3. Converting into 2NF:

- The table must be in 1NF.
- Every non-key attribute must be fully functionally dependent on the entire primary key (no partial dependency).

Approach to 2NF Conversion:

- Identify the composite key (UserID, UserType) and remove partial dependencies.
- Separate data into two tables to eliminate partial dependencies:

- *User Table:* Store attributes that depend on UserID and UserType, such as UserName, Password, StudentName, etc.
- *Scheduling Table:* Store attributes partially dependent on the composite key, like attendance details, timetable, and results.
    - ***User Table (all non-key attributes are Completely dependent on Composite Primary Key)***

User ID	***User Name***	***User Type***	***Password***	***Student ID***	***Student Name***	***Student Father Name***	***Contact #1***	***Contact #2***	***Enrolled in Class***
S-101	Nihal Ali	Student	nihal@32	S-101	Nihal Ali	Ayub Ali	03328765490	03128956022	10th
T-201	Laiba Umair	Teacher	laiba006	-	-	-	-	-	-
A-301	Owais Raza	Admin	owais@raza43	-	-	-	-	-	-

Teacher ID	***Teacher Name***	***Teaching Subject***	***Result ID***	***Subject Name***	***Class***	***Result Marks***	***Result %***	***Member ID***	***Member Name***
-	-	-	S-101	Math	10th	84/100	84%	-	-
T-201	Laiba Umair	English	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	A-301	Owais Raza

Member Name	Member Role	Member Task
-	-	-
-	-	-
Owais Raza	Database Manager	Manage Timetable

- ***Scheduling Table (all non-key attributes are partially dependent on Composite Primary Key)***

Attendance Date	***Attendance Status***	***Timetable Day***	***Timetable Class***	***Duration Slot***	***Notification ID***	***Notification Type***	***Notification Date***
09-10-24	Present	Monday	10th	9:00am to 12:00pm	S-101	Email	19-07-24
09-10-24	Present	Tuesday	9th	8:00am to 11:00 am	T-201	Email	30-08-24
-	-	-	-	-	A-301	Email	13-11-24

Course#1 ID	***Course#2 ID***	***Course#3 ID***	***Course#3 ID***	***Course #3 ID***	***Course #3 ID***	***Course #3 ID***	***Course Outline ID***	***Exercise Date***
AI2003	CS1002	DS1003	AI2005	CS1005	CS2005	AI3001	-	04-07-2024
AI2003	CS2005	-	-	-	-	-	CO-202	09-07-2024
-	-	-	-	-	-	-	-	29-09-2024

Present both the *User Table* and ***Scheduling Table*** with attributes and keys.

4. Converting into 3NF:

- The table must be in 2NF.
- No transitive dependencies (all non-key attributes must depend only on the primary key).

Approach to 3NF Conversion:

- Further divide the tables to remove transitive dependencies.
- Identify tables and relationships based on dependencies, such as USER TABLE, STUDENT TABLE, COURSE TABLE, ATTENDANCE TABLE, RESULTS TABLE, etc.
- Define relationships using primary and foreign keys for efficient data retrieval and integrity.

1. User Table

User ID (PK)	User Name	User Type	Password
S-101	Nihal Ali	Student	nihal@32
T-201	Laiba Umair	Teacher	laiba006
A-301	Owais Raza	Admin	owais@raza43

2. Student Table

Student ID (PK)	Student Name	Student Father Name	Contact #1	Contact #2	Enrolled in Class	Course ID (FK)
S-101	Nihal Ali	Ayub Ali	03328765490	03128956022	10th	AI2003
S-102	Muneeb	Ahmed	03030004909	03020232122	-	CS1003
S-103	Basim Baqai	Ali Baqai	03438788590	-	-	AI3002

3. Course Table

Course ID (PK)	Course Name	Teacher ID (FK)	Student ID
AI2003	Programming in AI	T-201	S-101
CS1003	Data Structures	T-202	S-101
AI3002	Knowledge Representation and Reasoning	T-203	S-105

4. Teacher Table

Teacher ID (PK)	Teacher Name	Teaching Subject
T-202	Shafaq Hussain	Economics
T-201	Laiba Umair	English
T-203	Iqbal Parveez	Maths

5. Attendance Table

Attendance ID (PK)	Attendance Date	Attendance Day	Attendance Status	Student ID (FK)
Att-100	09-10-24	Thursday	Present	S-101
Att-101	10-10-24	Friday	Absent	S-102
Att-102	20-10-24	Monday	Present	S-103

6. Timetable Table

Timetable Day	Timetable Class	Duration Slot	Course ID (FK)
Monday	10th	9:00am to 12:00pm	AI2003
Tuesday	9th	8:00am to 11:00 am	CS1003
Timetable Day	Timetable Class	Duration Slot	AI3002

7. Result Table

Result ID (PK)	Subject Name	Class	Result Marks	Result%	Course ID (FK)
S-101	Math	10th	84/100	84%	AI2003
S-102	Data Structures	9th	70/100	70%	CS1003
S-103	Programming in AI	10th	54.5/100	54.5%	AI3002

8. Notification Table

Notification ID (FK)	Notification Type	Notification Date
S-101	Email	19-07-24
T-201	Email	30-08-24
A-301	Email	13-11-24

9. Course Outline Table

Course Outline ID (FK)	Exercise Date	Exercise	Status
S-101	04-07-2024	Ex : 3.2	Completed
S-102	09-07-2024	Topic : 'Loops in Python'	Completed
S-105	29-09-2024	Ex : 5.3	Completed

10. Member/Admin Table

Member ID (PK)	Member Name	Member Role	Member Task
A-303	Asad Ullah	Frontend Manager	Frontend
A-302	Gul Ahmed	Backend Programmer	Programming (SQL)
A-301	Owais Raza	Database Manager	Manage Timetable