SEMESTER PROJECT

DATABASE SYSTEMS

DELIVERABLE 1

Mohammad Haider Abbas (23I-2558)

Hamdul Haq (23I-0081)

Saif Shahzad (23I-2634)

NATIONAL UNIVERSITY
of Computer & Emerging Sciences

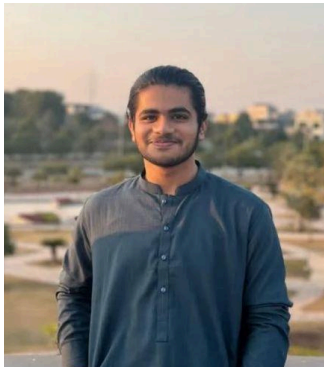
GROUP DETAILS

Mohammad Haider Abbas (23I-2558)

• Pursuing a bachelor's in Artificial Intelligence, currently in the 4th semester.

• Proficient in using ERD tools like Draw.io for database modeling.

• Experienced in SQL for managing databases in real-time and ensuring data integrity.

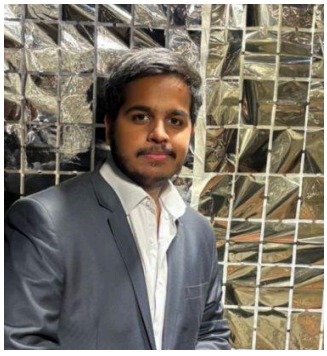


Hamdul Haq (23I-0081)

• Pursuing a bachelor's in Artificial Intelligence, currently in the 4th semester.

• Skilled in planning and designing ERDs for database systems.

• Experienced in normalizing databases and defining relationships for efficient data management.



Saif Shahzad (23I-2634)

• Pursuing a bachelor's in Data Science, currently in the 4th semester.

• Experienced in essential back-end development tools and database systems.

• Proficient in SQL and skilled in handling and integrating databases efficiently.

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DATABASE DETAILS

Entities

1. **User**
2. **Event**
3. **Venue**
4. **Team**
5. **Score**
6. **Sponsorship**
7. **Accommodation**
8. **Payment**

Entities and Attributes

1. User

- **User ID** (PK)
- Name
- Email
- Phone
- Role (Admin, Organizer, Participant, Judge, Sponsor)
- Address
- Registration Date

2. Event

- **Event ID** (PK)
- Name
- Description
- Category (Tech, Business, Gaming, General)
- Rules
- Max Participants
- Registration Fee
- Start Date & Time
- End Date & Time
- Status (Upcoming, Ongoing, Completed)
- **Venue ID** (FK → Venue)
- Round (Prelims, Semi-Finals, Finals)

3. Venue

- **Venue ID** (PK)
- Name
- Type (Auditorium, Hall, Lab, Outdoor)
- Capacity
- Status (Available, Booked, Maintenance)

4. Team

- **Team ID** (PK)
- Team Name
- **Leader ID** (FK → User)
- Team Size

5. Score

- **Score ID** (PK)
- Value
- **Judge ID** (FK → User)
- **Event ID** (FK → Event)
- **Participant ID** (FK → User, NULL if Team)
- **Team ID** (FK → Team, NULL if Individual)
- Round (Prelims, Semi-Finals, Finals)

6. Sponsorship

- **Sponsorship ID** (PK)
- **Sponsor ID** (FK → User)
- Package (Title, Gold, Silver, Media)
- Amount
- Description
- Start Date
- End Date
- Status (Pending, Active, Completed)

7. Accommodation

- **Accommodation ID** (PK)
- Name
- Type (Hostel, Hotel, Other)
- Address
- Room Number
- Capacity
- Price Per Night
- Status (Available, Occupied)

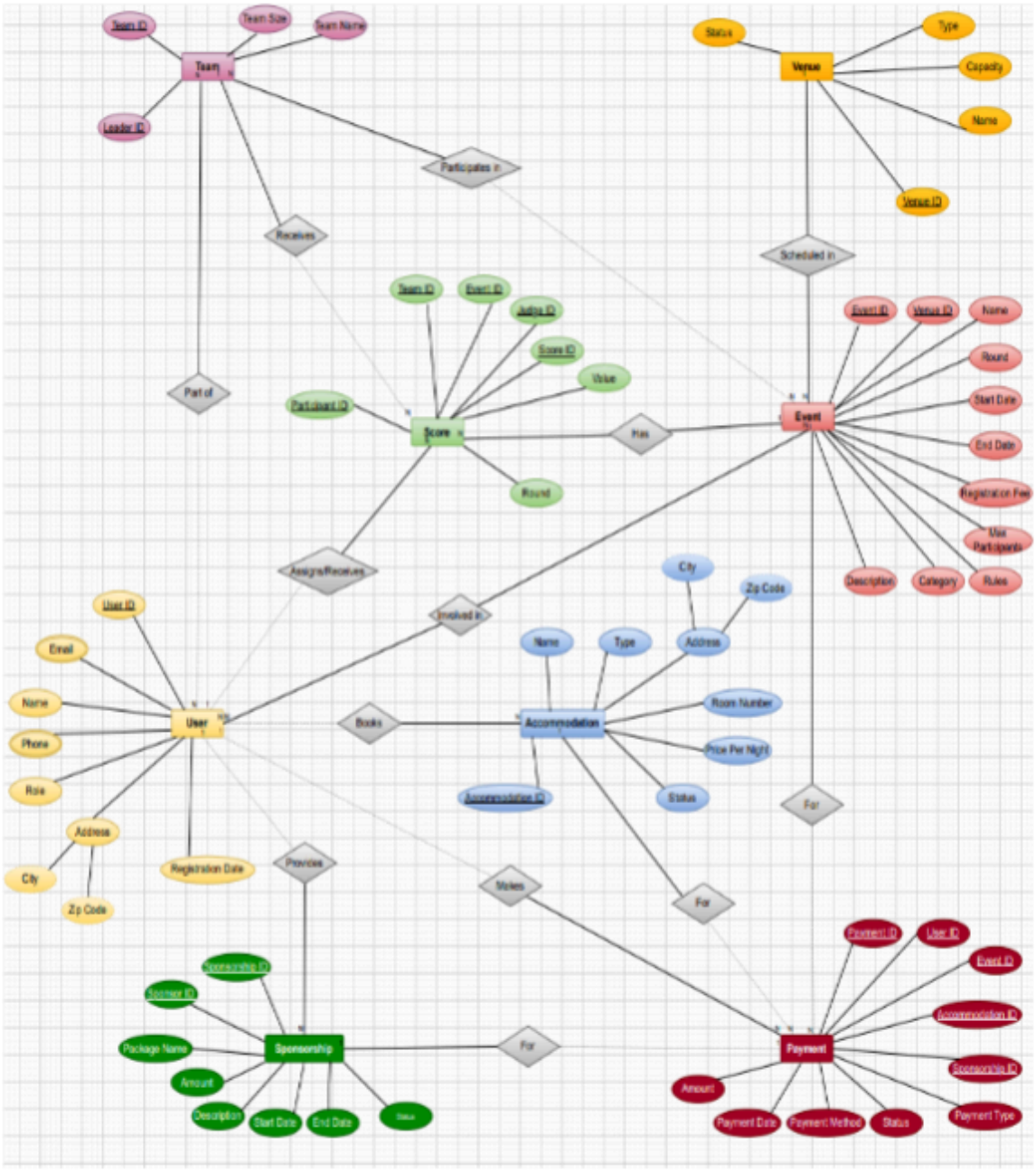
8. Payment

- **Payment ID** (PK)
- Amount
- Payment Date
- Payment Method
- Status (Pending, Completed, Failed)
- Payment Type (Registration, Sponsorship, Accommodation)
- **User ID** (FK → User)
- **Event ID** (FK → Event, NULL if not for an event)
- **Accommodation ID** (FK → Accommodation, NULL if not for accommodation)
- **Sponsorship ID** (FK → Sponsorship, NULL if not for sponsorship)

RELATIONSHIP TABLE

Entity #1	Entity #2	Relationship	Cardinality	Participation Constraint
User	**Event**	Involved in	M:N	Total, Total
User	**Team**	Part of	M:N	Partial, Total
Team	**Event**	Participates in	M:N	Total, Partial
Event	**Venue**	Scheduled in	M:1	Total, Total
User	**Score**	Assigns/Receives	1:M	Partial, Total
Event	**Score**	Has	1:M	Total, Total
Team	**Score**	Receives	1:M	Total, Partial
User	**Sponsorship**	Provides	1:M	Partial, Total
User	**Accommodation**	Books	M:N	Partial, Total
User	**Payment**	Makes	1:M	Partial, Total
Payment	**Event**	For	M:1	Partial, Total
Payment	**Accommodation**	For	M:1	Partial, Total
Payment	**Sponsorship**	For	1:1	Partial, Total

ERD DIAGRAM


Team
Team ID
Team Size
Team Name
Leader ID
Participates in
Receives
Part of
Venue
Status
Type
Capacity
Name
Venue ID
Scheduled in
Score
Team ID
Event ID
Judge ID
Score ID
Value
Participant ID
Has
Round
Event
Event ID
Venue ID
Name
Round
Start Date
End Date
Registration Fee
Max Participants
Description
Category
Rules
Assigns/Receives
Involved in
User
User ID
Email
Name
Phone
Role
Address
City
Zip Code
Registration Date
Provides
Books
Accommodation
Name
Type
Address
City
Zip Code
Room Number
Price Per Night
Accommodation ID
Status
For
Makes
For
Sponsorship
Sponsorship ID
Sponsor ID
Package Name
Amount
Description
Start Date
End Date
Status
For
Payment
Payment ID
User ID
Event ID
Accommodation ID
Sponsorship ID
Amount
Payment Date
Payment Method
Status
Payment Type

ERD DIAGRAM DESCRIPTION

Color Representation:

- **Yellow: User Entity** (Attributes: User ID, Name, Email, Phone, Role, Address, City, Zip Code, Registration Date)
- **Red: Event Entity** (Attributes: Event ID, Name, Description, Category, Rules, Registration Fee, Start Date, End Date, Round, Venue ID, etc.)
- **Orange: Venue Entity** (Attributes: Venue ID, Name, Type, Capacity, Status)
- **Pink: Team Entity** (Attributes: Team ID, Team Name, Leader ID, Team Size)
- **Green: Score Entity** (Attributes: Score ID, Value, Judge ID, Event ID, Team ID, Round)
- **Light Blue: Accommodation Entity** (Attributes: Accommodation ID, Name, Type, Address, Room Number, Price Per Night, Status, City, Zip Code)
- **Dark Green: Sponsorship Entity** (Attributes: Sponsorship ID, Sponsor ID, Package Name, Amount, Description, Start Date, End Date, Status)
- **Dark Red: Payment Entity** (Attributes: Payment ID, Amount, Payment Date, Payment Method, Status, Payment Type, User ID, Event ID, Accommodation ID, Sponsorship ID)

PROJECT OVERVIEW

Concept

The primary objective of this project is to design an efficient **Database Management System (DBMS)** for **NASCON (National Student Convention)**.

The **first phase** of our project, Deliverable 1, focuses on designing the **Entity-Relationship Diagram (ERD)**, which serves as the **foundation** for the entire database. The ERD visually represents how different entities interact within the system, ensuring logical structuring and optimized relationships for seamless data management.

Motivation

The motivation behind this project stems from the challenges faced in organizing large-scale student conventions. By developing a robust database model, we aim to:

- **Enhance Efficiency** – Automate event registrations, sponsorship management, accommodation allocation, and financial transactions.
- **Improve Accuracy** – Reduce manual errors by implementing well-structured relationships and constraints.
- **Streamline Operations** – Enable organizers to manage different aspects of the event smoothly.
- **Ensure Scalability** – Provide a scalable structure that can be expanded to handle future event growth.

By implementing this system, we are not just improving event management but also gaining practical experience in real-world **database design and management**.

CONCLUSION

Our Understanding of the Deliverable

Our approach to developing the ERD involved:

1. **Identifying Key Entities** – We defined major components such as **Users, Events, Venues, Teams, Scores, Sponsorships, Accommodations, and Payments**.

2. **Establishing Relationships** – Ensuring correct **one-to-many (1:M), many-to-many (M:N), and one-to-one (1:1) relationships** among entities.

3. **Defining Attributes** – Assigning appropriate attributes, data types, and constraints to maintain data integrity.

4. **Ensuring Logical Consistency** – Implementing **primary keys (PK), foreign keys (FK), and participation constraints** to reflect real-world event management operations accurately.

5. **Color-Coding for Clarity** – Using different colors to distinguish entities and their attributes for better visualization and understanding.

Through this process, we have built a **comprehensive and well-structured ERD** that will facilitate **seamless conversion into a relational schema in the next phase (Deliverable 2)**.

Conclusion

This deliverable marks an essential milestone in our **Database Systems** project. With a strong ERD in place, we are now well-prepared to proceed with the **schema conversion and database implementation**. This experience has reinforced our knowledge of database structuring and provided us with valuable insights into **real-world database applications**. We look forward to the next phase, where we will transform our conceptual design into an operational database system. Thank You!