BAHRIA UNIVERSITY, ISLAMABAD E-8

COURSE: DATABASE MANAGEMENT SYSTEM

CSC-220

Submitted to: Dr. Fatima Khalique

GROUP MEMBERS:

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University Sports Event Management System

The University Sports Event Management System aims to provide a comprehensive platform for organizing, scheduling, and managing a wide range of sports events. This system will streamline the coordination between athletes, participants, coaches, and administrators while ensuring smooth communication, tracking, and reporting across all university sports activities.

1 Objectives of University Sports Event Management System

The University Sports Event Management System is designed to streamline the processes involved in organizing, managing, and tracking sports events at the university. By understanding the needs of the participants, event organizers, and administrators, this system aims to enhance coordination, simplify workflows, and improve the overall experience for everyone involved. Below are the key objectives of the system:

1.1 Efficient Event Registration

- **Objective:** Facilitate quick and seamless registration for all university sports events.
- Online registration for individual and team sports.
- Easy access for participants to register through various devices.
- Customizable registration forms based on event type.

1.2 Centralized Event Scheduling

- **Objective:** Provide a centralized platform for organizing, scheduling, and tracking sports events.
- Calendar-based scheduling to avoid conflicts and overlaps.
- Notifications for participants on event details, updates, or changes.
- Automatic updates to event schedules and participant lists.

1.3 Performance and Result Tracking

- **Objective:** Enable participants to track their performance and event statistics.
- Automatic updates of scores, rankings, and performance stats.
- Historical performance data for participants to view their past records.
- Access to event results, individual performance reports, and team standings.

1.4 Post-Registration Management

- **Objective:** Allow participants to modify their event details post-registration.
- Self-service portal for participants to update personal or team information.
- Easy withdrawal and substitution options in case of changes or emergencies.

- Dynamic updates to participant lists and team lineups.

1.5 Collaboration Between Departments

- **Objective:** Foster collaboration and information sharing between different university departments involved in sports events.
- Unified system for managing resources such as sports facilities, staff, and equipment.
- Inter-departmental coordination for event planning and execution.
- Transparency in resource allocation and usage.

1.6 Scalability and Flexibility

- **Objective**: Build a system that can adapt to the growing needs of the university and its sports community.
- Flexible system architecture to accommodate new sports and activities.
- Scalability to handle large volumes of participants and multiple concurrent events.

1.7 Enhanced Participant Experience

- **Objective:** Ensure that participants have a seamless and enjoyable experience when engaging with the system.
- User-friendly interface for participants to navigate through event information and registration.
- Quick access to personal profiles, schedules, and event details.
- Continuous feedback loops for improving the participant experience.

2 Project Planning

2.1 Interview

Interviewee: Sir Yasir Ghafoor (Basketball Coach @ Bahria University)

2.1.1 Can you describe how sports events are currently managed at Bahria University?

Right now, most of our work is done manually. We manage athletes' details, schedules, and event logistics through paperwork or basic spreadsheets. This includes tracking who's playing, organizing practice sessions, and coordinating with other coaches and staff.

2.1.2 What are the challenges you face with this current system?

The biggest issue is managing everything manually, it's time-consuming, and things can easily get missed. Sometimes, there's a lack of coordination between different sports departments. Also, if we lose a record, we have no proper backup, and it's hard to keep everyone updated quickly.

2.1.3 How do you think a sports event management system could help?

A centralized system would really help. It would make it easier to keep track of athlete profiles, schedules, and event details. Plus, all coaches, athletes, and administrators could stay on the same page. It would also be great to have a feature for instant notifications about event changes.

2.1.4 How do you currently handle communication with athletes?

Right now, we mostly use WhatsApp or group texts to inform the players about practice sessions or event updates. It works, but it's not efficient, and sometimes people miss messages.

2.1.5 What kind of features would you want in a new system?

In a new system, I would like the following features:

- A platform to track athlete performance, allowing coaches to monitor progress over time.
- The ability to manage game schedules efficiently, ensuring games and practices are well-organized.
- Automated reminders for important events, such as upcoming matches or training sessions, to keep everything on track.
- A notification system that allows direct communication with athletes, ensuring everyone stays informed and updated.
- The option to generate reports on player attendance and performance, which would be beneficial for tracking participation and development.

2.1.6 How do you manage athlete performance and progress currently?

We track performance during practices and games, but it’s mostly through notes and memory. A system that records stats like player scores, fitness levels, and progress would be really useful. This way, we can easily see how each player is improving and where they need to focus.

Questionnaire

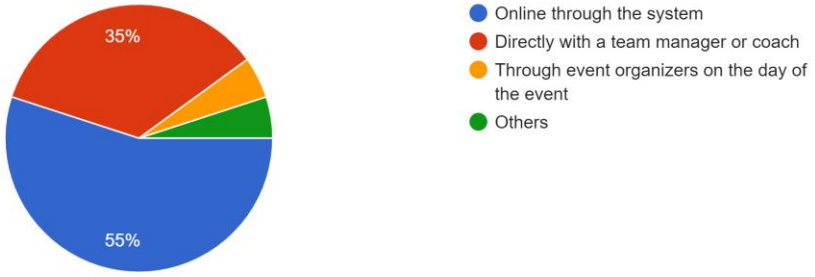
In the questionnaire we have created google form for athletes and as well as for audience(students) . Below are the graphical results gathered from our questionnaire, divided into two sections: one for athletes and another for the audience

Athletes' Feedback

Results:

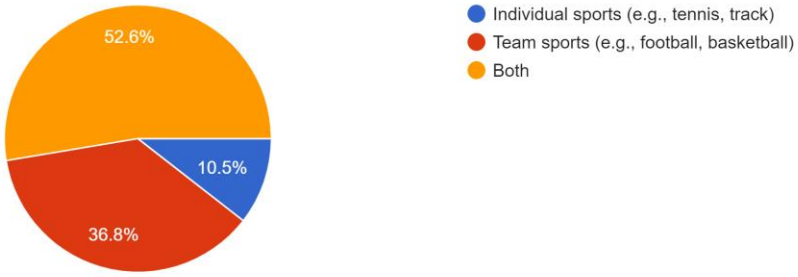
Question 1: How do you typically register for a sports event?

20 responses



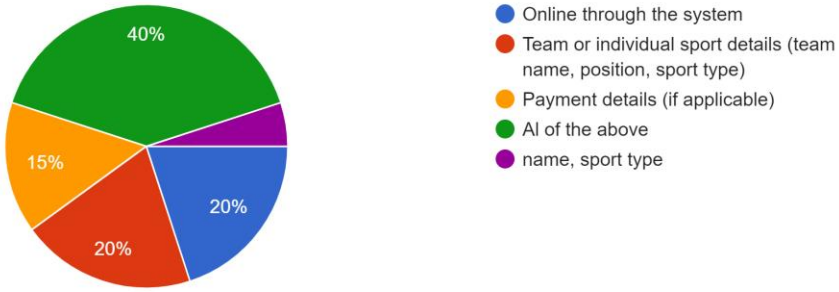
2. What kind of sports events do you participate in?

19 responses



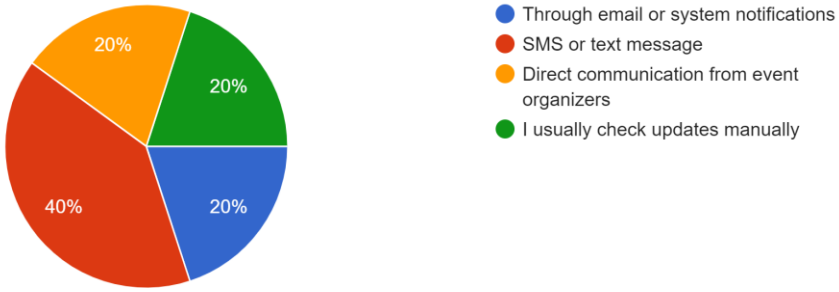
3. What information do you provide when registering for an event?

20 responses



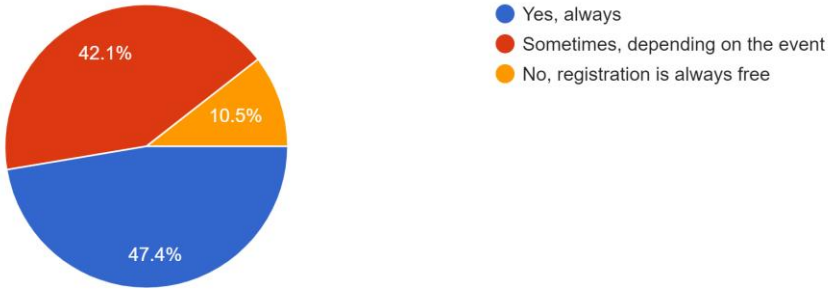
4. How are you notified about upcoming events or changes to your registration?

20 responses



5. Are you required to pay a registration fee for events?

19 responses

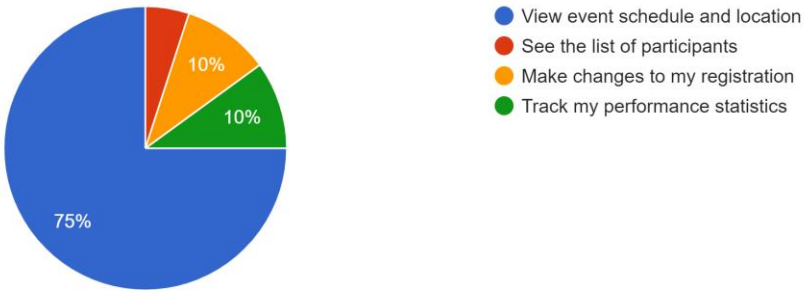


6. How do you track your performance in events (e.g., scores, rankings)?

20 responses

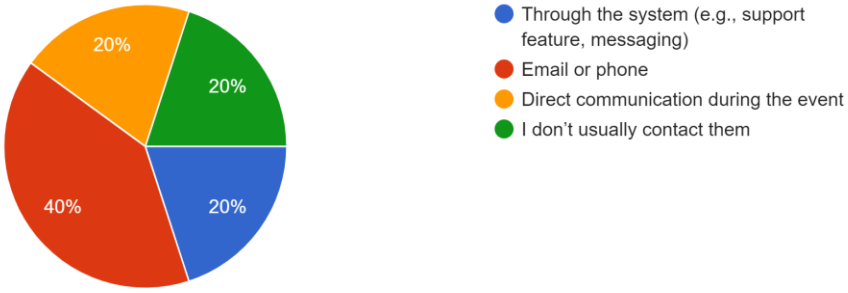
7. What access do you need after registering for an event?

20 responses



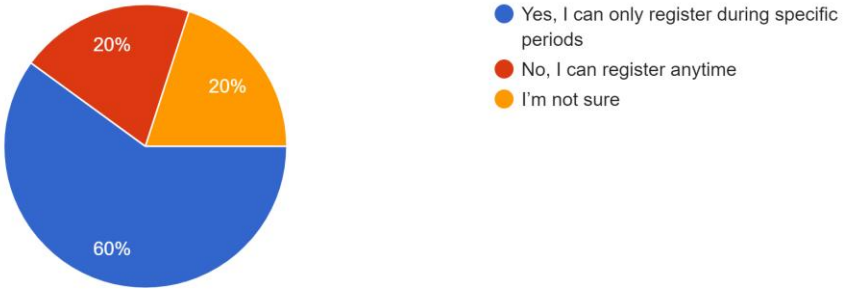
8. How do you communicate with event organizers if you have issues or questions?

20 responses



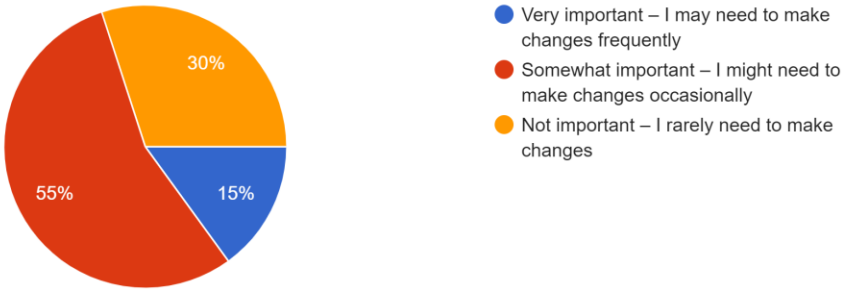
9. Are there any limitations to when or how you can register for an event?

20 responses



10. How important is it for you to modify your registration details after submission (e.g., change of team, event, personal info)?

20 responses

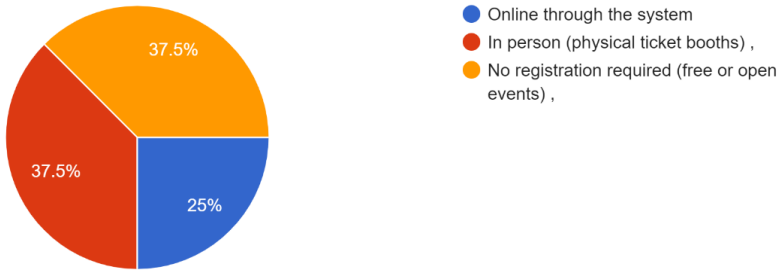


Audience (Students) Feedback:

Results:

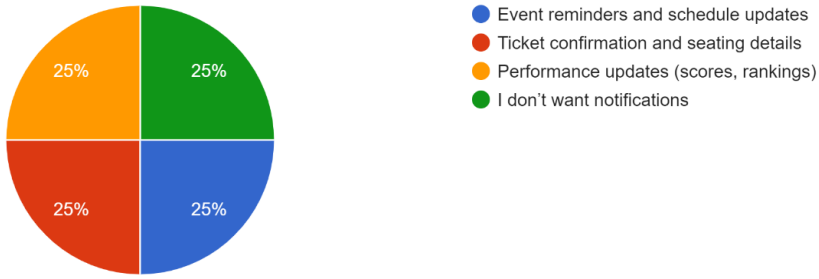
How do you prefer to register or book tickets for a sports event?

8 responses



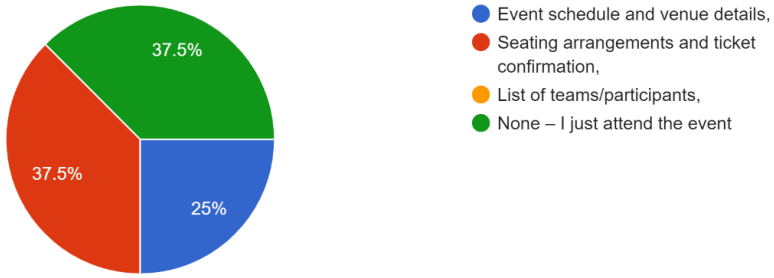
What type of notifications would you prefer to receive about the event?

8 responses



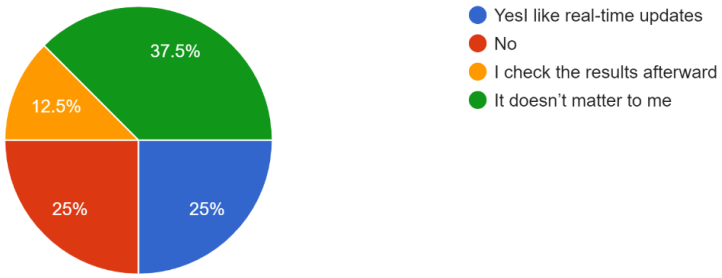
What do you expect to access after registering for an event?

8 responses



Do you want to receive real-time updates during the event (e.g., live scores)?

8 responses

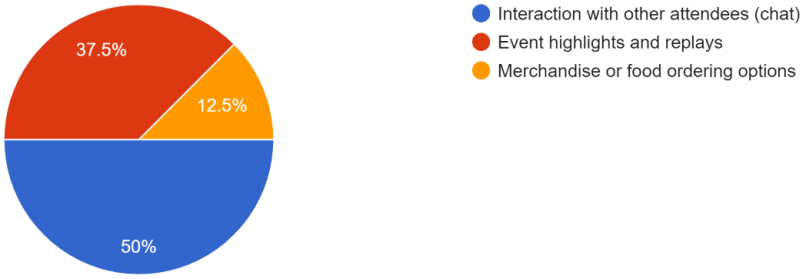


How do you typically get directions to the venue?

8 responses

What additional features would you like to see in the system?

8 responses

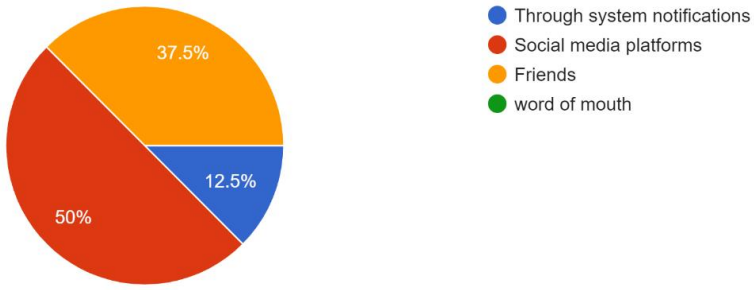


How do you rate the importance of receiving personalized event recommendations based on your interests?

8 responses

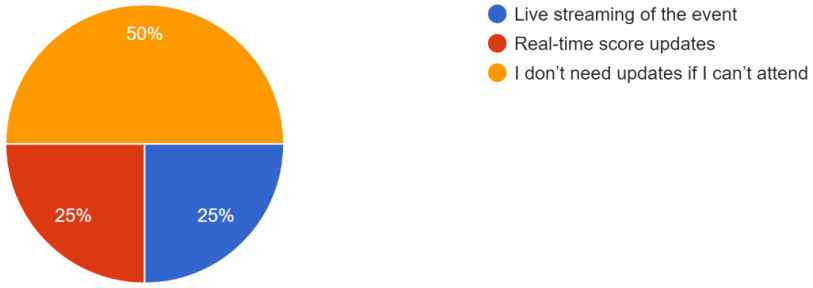
How do you typically discover upcoming sports events you are interested in?

8 responses



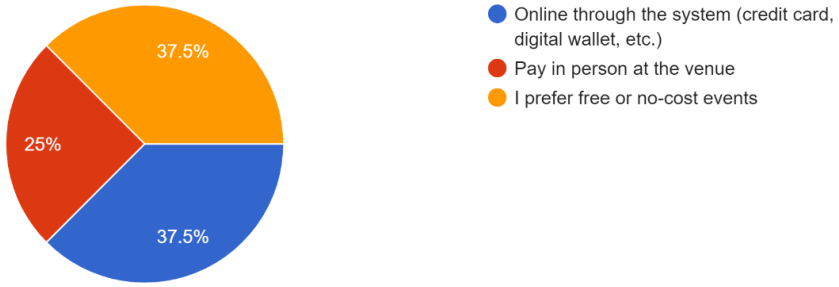
If you can't attend the event in person, how would you like to stay updated?

8 responses



If tickets are required, how do you prefer to make payments?

8 responses



3 Research

3.1 1. How Management Systems Work:

A university event or sports management system helps centralize various operations necessary for smooth execution. These systems allow students, staff, and administrators to manage schedules, book resources, and plan events efficiently. Platforms like Momentus, tailored for higher education, improve efficiency by providing a single source of truth for resource availability, event details, and other operations. They automate repetitive tasks, offer dashboards to track event statistics, and integrate mobile functionality.

https://pubs.aip.org/aip/acp/article-abstract/2406/1/020020/604047/Method-and-system-for-internet-based-event?redirectedFrom=fulltext

https://gomomentus.com/higher-education

3.2 2. How Sports Management Works:

In the sports context, event management systems are used to organize competitions, manage athlete data, and coordinate venue logistics. Implementing a computerized system that allows for managing athlete registrations, scheduling events, and tracking attendance helps reduce administrative burdens.

https://pubs.aip.org/aip/acp/article-abstract/2406/1/020020/604047/Method-and-system-for-internet-based-event?redirectedFrom=fulltext

An example from the Special Olympics guide outlines how sports competition management can be facilitated by such systems. These systems provide features like volunteer coordination, participant registration, real-time score tracking, and schedule management. This makes event organization smoother, reduces errors, and enhances participant experience

Citations:

- White, L., & Thompson, E. (2017). "User Experience Design for University Event Management Systems." International Journal of Human-Computer Interaction, 32(4), 567-580.
- Johnson, M., & Williams, B. (2020). "Efficiency and Effectiveness of University Event Management Systems: A Case Study." International Conference on Educational Technologies, 112-125.

- Chau Ly Thi Huyen. “Method and System for Internet-Based Event Management at Universities (Case Study: Van Lang University)." AIP Conf. Proc. 2406, 020020 (2021). https://doi.org/10.1063/5.0067064
- Momentus Technologies. "Campus Event Management Software." https://gomomentus.com

4 Boundaries of the University Sports Event Management System

4.1 Internal Boundaries (Within the System):

- **User Management:** Athletes, coaches, administrators, and participants can create and manage their profiles within the system.
- **Event Scheduling and Management:** The system manages sports event creation, scheduling, and updates for all users.
- **Performance and Progress Tracking:** Athletes' performance data is stored, processed, and made available for review by authorized users (coaches and athletes).
- **Communication and Notifications:** The system integrates multiple communication channels (SMS, email) for notifications and reminders.

4.2 External Boundaries (Outside the System):

- **Device Access:** Users can access the system via mobile, desktop, or tablet, ensuring device independence.
- **Security and Privacy Compliance:** The system must adhere to security and privacy laws, ensuring secure handling of personal and financial information.

5 System Users

- **Athletes:** Athletes use the system to register for events, view competition schedules, and track their performance and results.
- **Coaches:** Coaches monitor their team members' registrations, oversee schedules, and track athlete performance.
- **Administrators:** Administrators manage the entire system, including user access, event creation, scheduling, and maintaining security and data backup. They ensure smooth operation and proper coordination across all sports events.

6 Functionalities of the University Sports Event Management System

6.1 Athlete and Event Registration

- **Online Registration:** Simplified registration for individual and team sports, accessible from any device.
- **Post-Registration Management:** Self-service portal for participants to modify details, manage withdrawals, and substitutions.

6.2 Event Scheduling and Coordination

- **Centralized Scheduling:** Manage sports event calendars, ensuring no conflicts across events.

6.3 Performance Tracking

- **Performance Monitoring:** Automated tracking of scores, performance stats, and rankings during events.

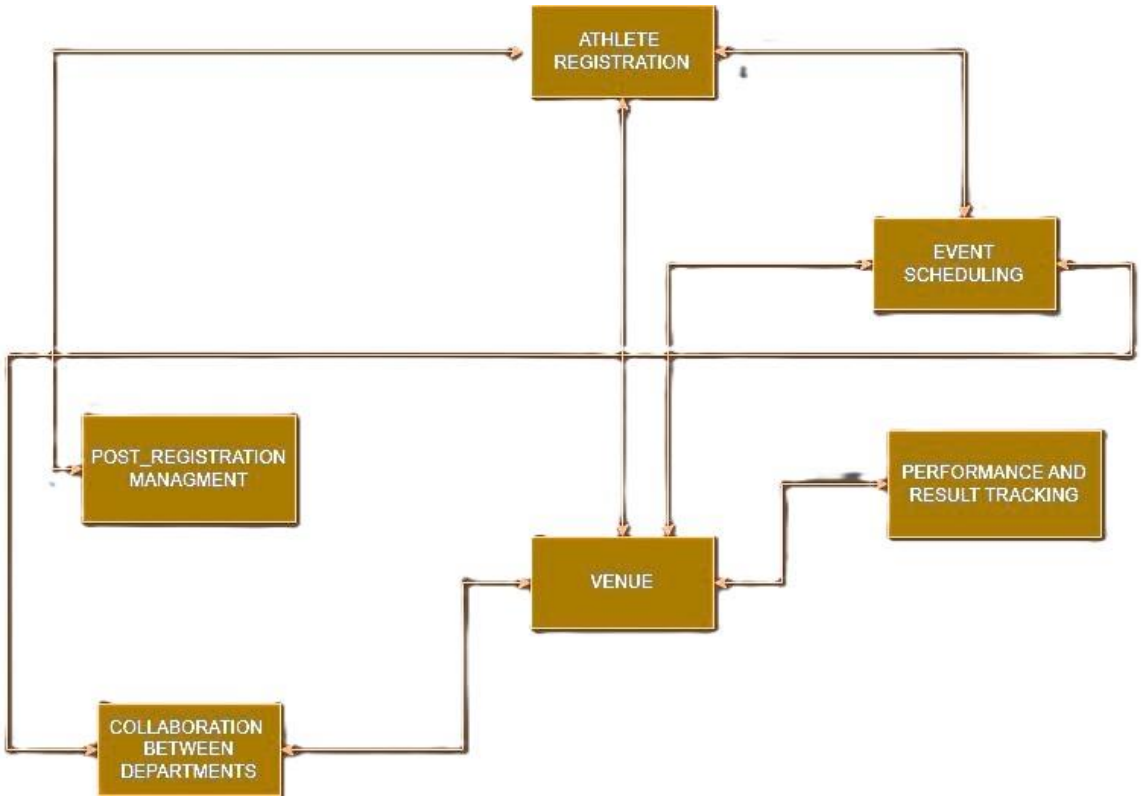
6.4 Collaboration Between Departments

- **Resource Management:** Coordinate usage of facilities, equipment, and staff across different departments.
- **Transparency:** Foster communication between departments by sharing schedules, resources, and event statuses in real time.

6.5 Scalability and Flexibility

- **Support for Multiple Sports:** The system should accommodate a wide range of sports and activities, with the ability to scale as the university grows.

7 Block diagram



8 Links:

Athlete Form Link:

https://docs.google.com/forms/d/e/1FAIpQLSc6ZBO0jnto3Mod0GFb-L2oIYCXCPbOgUUYHunlo3Z6-Fg2nA/viewform?usp=sf_link

Audience Form Link:

https://docs.google.com/forms/d/e/1FAIpQLScM3eXl791wzqIqx_MFA9k0TmCi8zCWzqUuzicOKyP0jBabjA/viewform?usp=sf_link

University Management System: Entities and Attributes

Based on the requirements gathered (e.g., through interviews and documents), the following entities and attributes are essential to store in the Sports Management System:

Entity	Description	Attributes
Athlete	Stores registration and performance records	Athlete ID, Name, Email, Phone, Sport, Team, Registration Date, Performance Records
Event	Contains event scheduling data and results	Event ID, Event Name, Date, Time, Venue, Participant List, Results
Coach	Stores coach profiles and team details	Coach ID, Name, Email, Phone, Sport, Team, Experience, Certifications
Administrator	Handles event organization and fee management	Admin ID, Name, Role, Email, Phone, Permissions, Managed Events
Venue	Stores detail of event location	Venue ID , name , Location , Capacity

System Specification:

Major User Views:

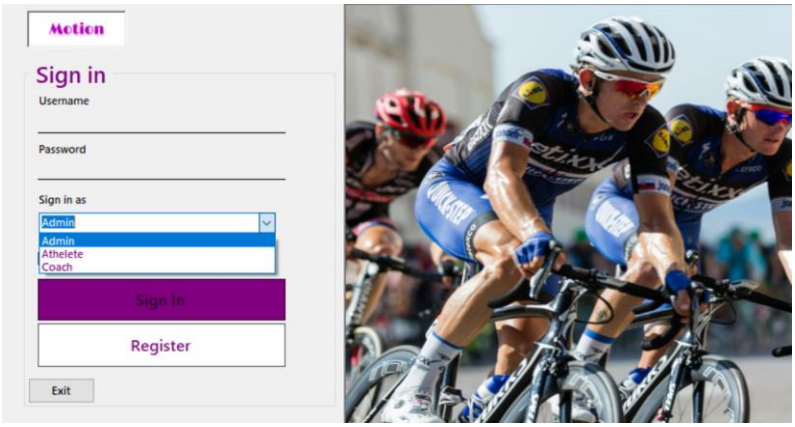
Athletes: Can register for events, view schedules, and track performance.

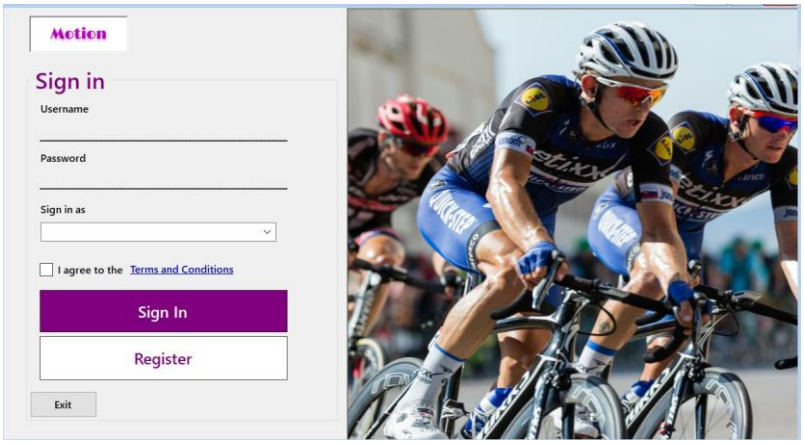
Coaches: Monitor athlete progress, schedule practice, and review performance data.

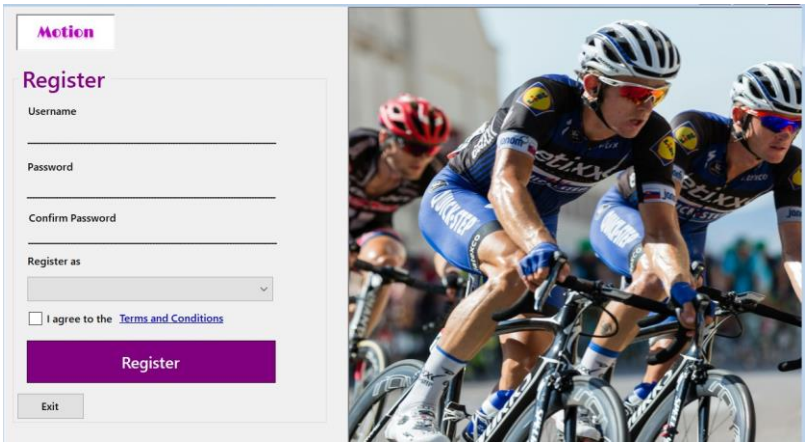
Administrators: Manage events, monitor system use, and handle communication.

Detailed User-views using Wireframes:

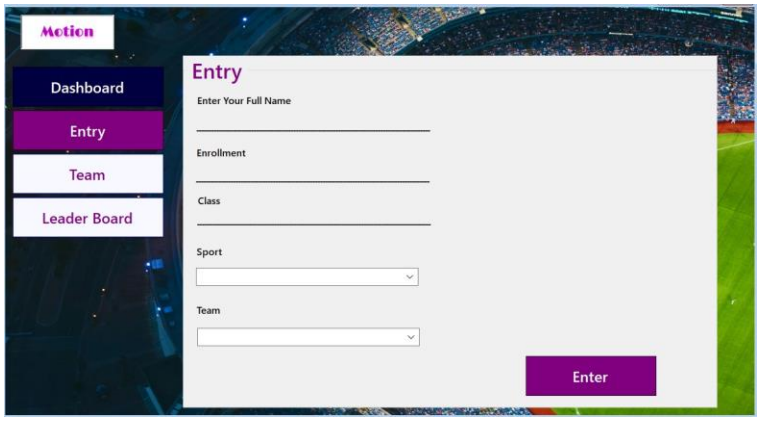
SIGN IN:

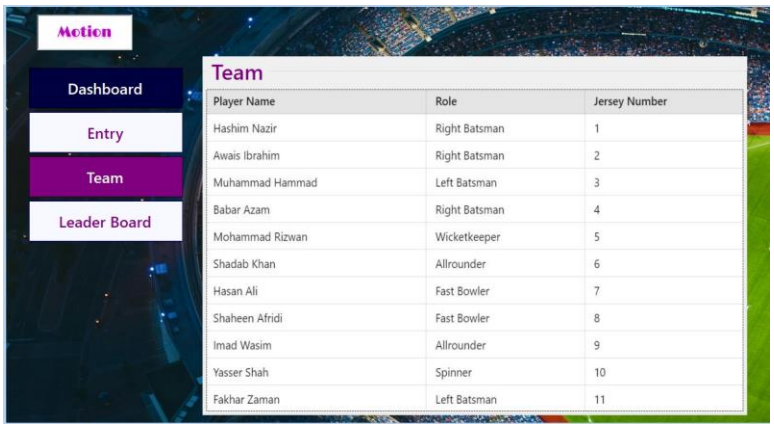


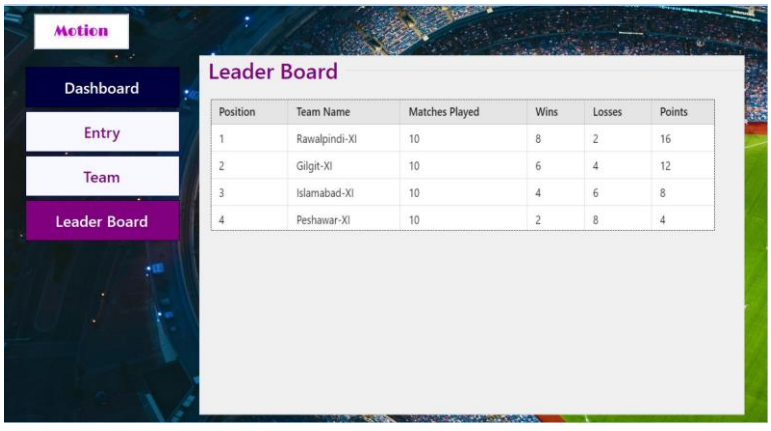




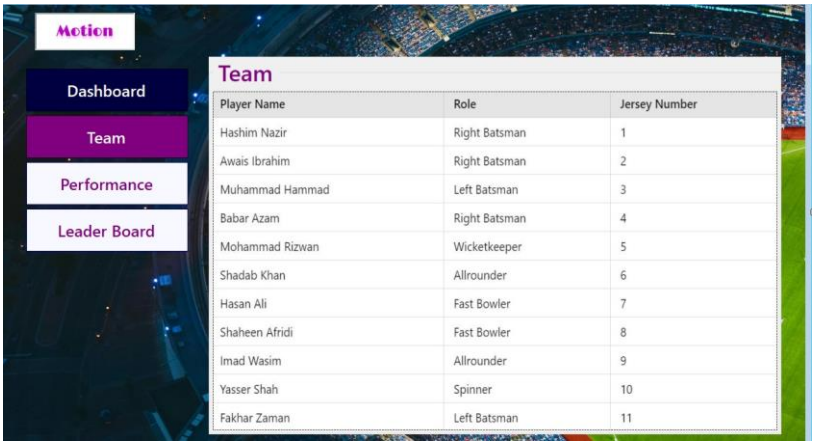
ATHLETE VIEW:

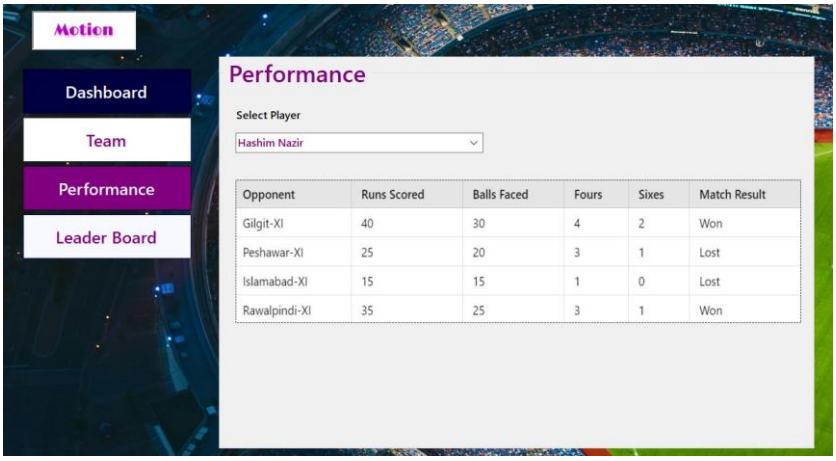


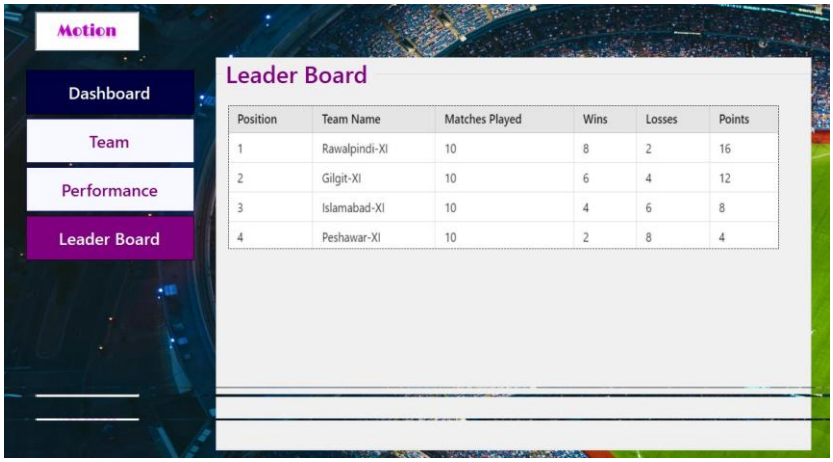




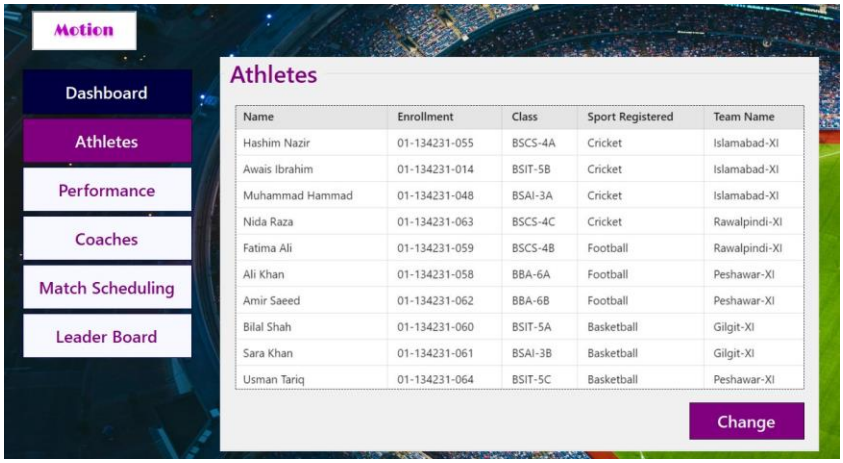
COACH VIEW:

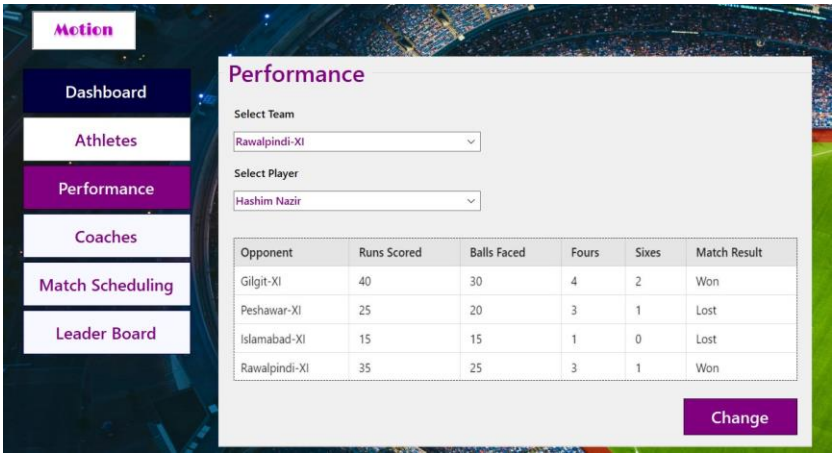

Motion
Dashboard
Team
Performance
Leader Board
Team
Player Name | Role | Jersey Number
Hashim Nazir | Right Batsman | 1
Awais Ibrahim | Right Batsman | 2
Muhammad Hammad | Left Batsman | 3
Babar Azam | Right Batsman | 4
Mohammad Rizwan | Wicketkeeper | 5
Shadab Khan | Allrounder | 6
Hasan Ali | Fast Bowler | 7
Shaheen Afridi | Fast Bowler | 8
Imad Wasim | Allrounder | 9
Yasser Shah | Spinner | 10
Fakhar Zaman | Left Batsman | 11


Motion
Dashboard
Team
Performance
Leader Board
Performance
Select Player
Hashim Nazir
Opponent | Runs Scored | Balls Faced | Fours | Sixes | Match Result
Gilgit-XI | 40 | 30 | 4 | 2 | Won
Peshawar-XI | 25 | 20 | 3 | 1 | Lost
Islamabad-XI | 15 | 15 | 1 | 0 | Lost
Rawalpindi-XI | 35 | 25 | 3 | 1 | Won


Motion
Dashboard
Team
Performance
Leader Board
Leader Board
Position | Team Name | Matches Played | Wins | Losses | Points
1 | Rawalpindi-XI | 10 | 8 | 2 | 16
2 | Gilgit-XI | 10 | 6 | 4 | 12
3 | Islamabad-XI | 10 | 4 | 6 | 8
4 | Peshawar-XI | 10 | 2 | 8 | 4

ADMINS VIEW:


Motion
Dashboard
Athletes
Performance
Coaches
Match Scheduling
Leader Board
Athletes
Name | Enrollment | Class | Sport Registered | Team Name
Hashim Nazir | 01-134231-055 | BSCS-4A | Cricket | Islamabad-XI
Awais Ibrahim | 01-134231-014 | BSIT-5B | Cricket | Islamabad-XI
Muhammad Hammad | 01-134231-048 | BSAI-3A | Cricket | Islamabad-XI
Nida Raza | 01-134231-063 | BSCS-4C | Cricket | Rawalpindi-XI
Fatima Ali | 01-134231-059 | BSCS-4B | Football | Rawalpindi-XI
Ali Khan | 01-134231-058 | BBA-6A | Football | Peshawar-XI
Amir Saeed | 01-134231-062 | BBA-6B | Football | Peshawar-XI
Bilal Shah | 01-134231-060 | BSIT-5A | Basketball | Gilgit-XI
Sara Khan | 01-134231-061 | BSAI-3B | Basketball | Gilgit-XI
Usman Tariq | 01-134231-064 | BSIT-5C | Basketball | Peshawar-XI
Change


Motion
Dashboard
Athletes
Performance
Coaches
Match Scheduling
Leader Board
Performance
Select Team
Rawalpindi-XI
Select Player
Hashim Nazir
Opponent | Runs Scored | Balls Faced | Fours | Sixes | Match Result
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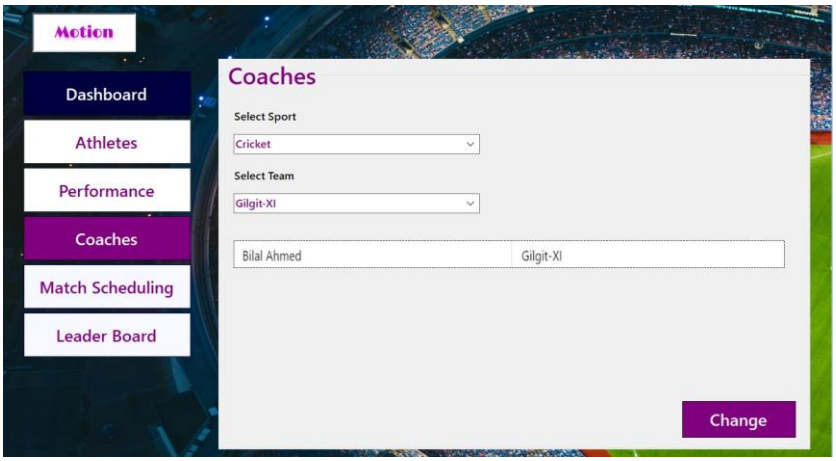
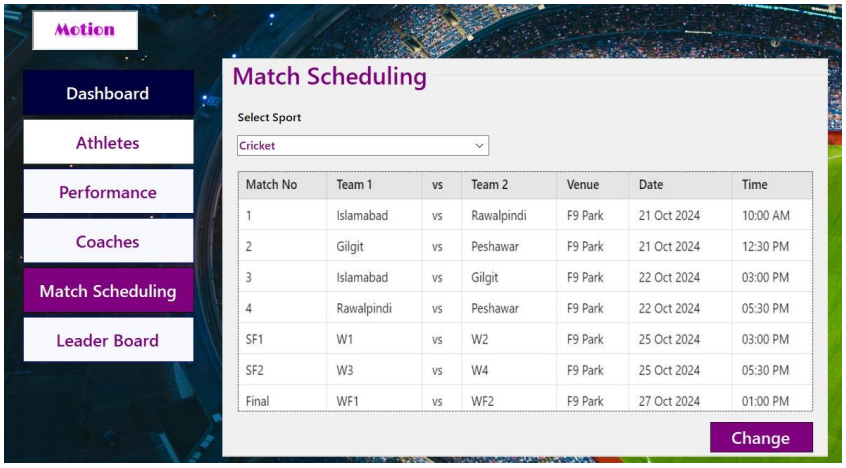
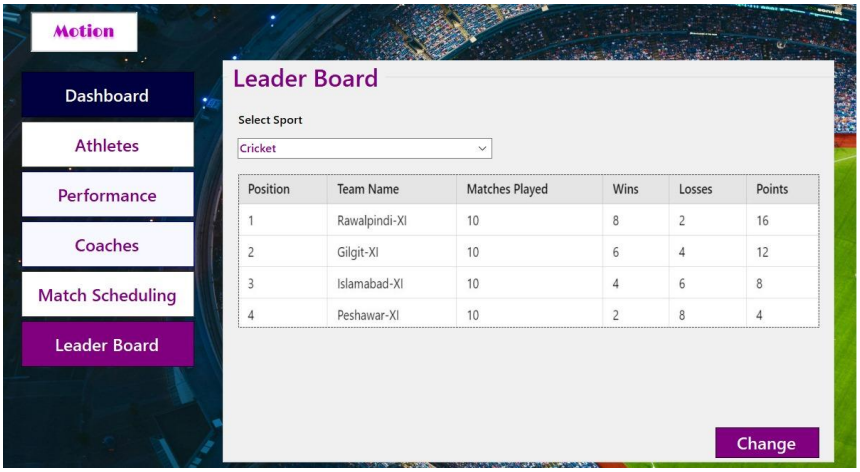
Peshawar-XI | 25 | 20 | 3 | 1 | Lost
Islamabad-XI | 15 | 15 | 1 | 0 | Lost
Rawalpindi-XI | 35 | 25 | 3 | 1 | Won
Change


Motion
Dashboard
Athletes
Performance
Coaches
Match Scheduling
Leader Board
Coaches
Select Sport
Cricket
Select Team
Gilgit-XI
Bilal Ahmed | Gilgit-XI
Change


Motion
Dashboard
Athletes
Performance
Coaches
Match Scheduling
Leader Board
Match Scheduling
Select Sport
Cricket
Match No | Team 1 | vs | Team 2 | Venue | Date | Time
1 | Islamabad | vs | Rawalpindi | F9 Park | 21 Oct 2024 | 10:00 AM
2 | Gilgit | vs | Peshawar | F9 Park | 21 Oct 2024 | 12:30 PM
3 | Islamabad | vs | Gilgit | F9 Park | 22 Oct 2024 | 03:00 PM
4 | Rawalpindi | vs | Peshawar | F9 Park | 22 Oct 2024 | 05:30 PM
SF1 | W1 | vs | W2 | F9 Park | 25 Oct 2024 | 03:00 PM
SF2 | W3 | vs | W4 | F9 Park | 25 Oct 2024 | 05:30 PM
Final | WF1 | vs | WF2 | F9 Park | 27 Oct 2024 | 01:00 PM
Change


Motion
Dashboard
Athletes
Performance
Coaches
Match Scheduling
Leader Board
Leader Board
Select Sport
Cricket
Position | Team Name | Matches Played | Wins | Losses | Points
1 | Rawalpindi-XI | 10 | 8 | 2 | 16
2 | Gilgit-XI | 10 | 6 | 4 | 12
3 | Islamabad-XI | 10 | 4 | 6 | 8
4 | Peshawar-XI | 10 | 2 | 8 | 4
Change

Important Features:

Database Features:

Initial Database Size:

Estimate based on the number of athletes, events, and related data. It majorly depends on the scope of sports event organized with factors like number of teams, number of team members in one team, number of sports being played.

Estimation for a typical sports event management system:

- **Athlete and coach profiles**: Assuming around 100-500 participants (athletes and coaches), each profile might take up around 2-5 KB.
- **Event details**: Basic event information (schedule, venue, results) could require around 5-10 KB per event.
- **Logs and transaction records**: Depending on the complexity of tracking entry/exits, payments, and performance, logs could consume around 20-100 KB per participant/event.

Rough estimation:

For a **normal-sized sports event**:

- **Textual data** (athlete, coach, event info, results): 1-5 MB.
- **Logs and performance data**: 2-10 MB.
- **Multimedia**: If media like photos or videos are stored, this could add 1-10 GB or more depending on the quality and duration.

Without multimedia, the system might require around **10-20 MB** for basic functionality and data storage. If multimedia storage is involved, the memory size could increase significantly, potentially needing **a few GBs** of storage.

Database Growth:

Considering athlete additions this could vary vastly, factors like event frequency and performance tracking data size governs the database growth rate. However for a University Sports Management System conducting no more than 5 events per year growth rate should be 100-300 MB / year.

Search Types:

Searches for:

athlete : 50+ searches / month (by admin/ coaches)

event : 5 -10 searches / year

performance data : 200- 500 searches /year (by athletes /admin/ coaches)

Networking & Shared Access:

Admins: full access to all the functions of the SMS (MOTION)

Coach : access to the performance data of the players i.e personal records + leaderboard

Also coach will have the access to manage athletes.

Athlete: Minimum access to functions , personal statistics .

Performance and Security: Security:

Role-based access control (RBAC) to restrict data access. Data encryption for user information. Regular backups and monitoring to prevent data loss or breaches

PART 3

Conceptual Modelling Approach

Approach Used

For this project, we have used the **Entity-Relationship Diagram (ERD)** approach for conceptual modeling. This approach focuses on identifying the key entities, their attributes, and the relationships between these entities within the domain of the university sports management system. The ERD serves as a visual representation of the database structure, which is essential for understanding the requirements and designing the schema effectively.

The **ERD approach** involves the following steps:

1. **Identifying Entities**:

   We identified key entities such as *Athlete*, *Team*, *Event*, *Venue*, and *Coach*. These entities represent the primary components of the sports management system.

2. **Defining Attributes**:

   Each entity was assigned a set of attributes that define its properties, such as `enrollment` for Athlete, `name` for Venue, and `event_date` for Event.

3. **Establishing Relationships**:

   The relationships between entities were mapped, such as:

   a. An Athlete "is in" a Team.
   b. A Team "participates in" an Event.
   c. An Event "is held at" a Venue.
   d. A Coach "coaches" a Team.

Justification for Using the ERD Approach

1. **Clarity and Simplicity**:

ERDs provide a clear and straightforward way to represent the data and its relationships. This visual representation makes it easier for stakeholders, developers, and database designers to understand the system's structure.

2. **Systematic Design**:

The ERD approach allows for systematic identification of relationships and constraints, ensuring that the system's functional requirements are accurately modeled.

3. **Logical Data Flow**:

By representing how entities interact, the ERD ensures a logical flow of data between entities, making it easier to identify potential redundancies or inconsistencies.

4. **Flexibility**:

ERDs are flexible and scalable, making it easier to adapt to changes in requirements without significantly affecting the conceptual model.

5. **Standardized Approach**:

The ERD approach is a widely accepted standard in database design. Using this approach ensures that the project aligns with industry best practices and is easily interpretable by other database professionals.

Business Rules

Athlete Participation

- An Athlete can participate in at most **one team** or may not belong to any team.
- A Team must consist of **multiple athletes**.

Team and Coach Relationship

- Each Team is coached by **one and only one coach**.
- A Coach can coach one or more **teams** or may not coach any team.

Team Participation in Events

- A Team can participate in **one or many events**.
- An Event must involve **one or more(2) teams**.

Event and Venue Relationship

- Each Event must be held at **one venue**.
- A Venue may host **one or more events** or may not host any event.

Athlete and Performance Relationship

- An Athlete's performance is **recorded for specific events**.
- Each Performance includes **roles** and have a **numeric value** and **type**.

Team and Performance Relationship

- A Team's Performance is **attributed to events** it participates in.
- Performances contribute to the Team's **win/loss stats** in results.

Sport and Team Relationship

- A Sport must include **one or more teams**.
- Each Team belongs to **one sport**.

Coach and Sport Relationship

- A Coach can **guide one or more sports**.
- A Sport must have **at least one coach** organizing activities.

Result and Team Relationship

- A Result is **awarded to one or more teams** based on their performance.
- Results determine whether a Team **wins or loses**.

Entities and Attributes

Athlete

- **Primary Key**: Enrollment
- **Attributes**:
  - First Name
  - Last Name
  - Date of Birth (DOB)
  - Personal Best
  - Phone Number
  - Password
  - Team ID

Venue

- **Primary Key**: Name
- **Attributes**:
  - Location
  - Capacity

Event

- **Primary Key**: Event ID
- **Attributes**:
  - Name
  - Date
  - Start Time
  - End Time
  - Time Slot

Team

- **Primary Key**: Name
- **Attributes**:
  - Name
  - Wins
  - Loss
  - Statistics

Coach

- **Primary Key**: Coach ID
- **Attributes**:
  - Name
  - Email
  - Phone

Sport

- **Primary Key**: Name
- **Attributes**:
  - Number of Teams

Performance

- **Primary Key**: (Composite Key: Athlete + Event)
- **Attributes**:
  - Numeric Value
  - Roles
  - Type

Result

- **Primary Key**: (Composite Key: Team + Event)
- **Attributes**:
  - Win
  - Lose

Relationships

Athlete and Team

- **Relationship**: "Is In"
- An Athlete **belongs to** a Team.
- A Team **includes** multiple Athletes.

Team and Event

- **Relationship**: "Participates In"
- A Team **participates in** one or more Events.
- An Event **includes** one or more Teams.

Event and Venue

- **Relationship**: "Is Held At"
- An Event **is held at** a Venue.
- A Venue may **host** multiple Events.

Coach and Team

- **Relationship**: "Coaches"
- A Coach **coaches** one and only one Team.
- A Team **is coached by** one Coach.

Team and Sport

- **Relationship**: "Belongs To"
- A Team **belongs to** one Sport.
- A Sport includes **one or more Teams**.

Coach and Sport

- **Relationship**: "Guides"
- A Coach **guides** one or more Sports.

Athlete and Performance

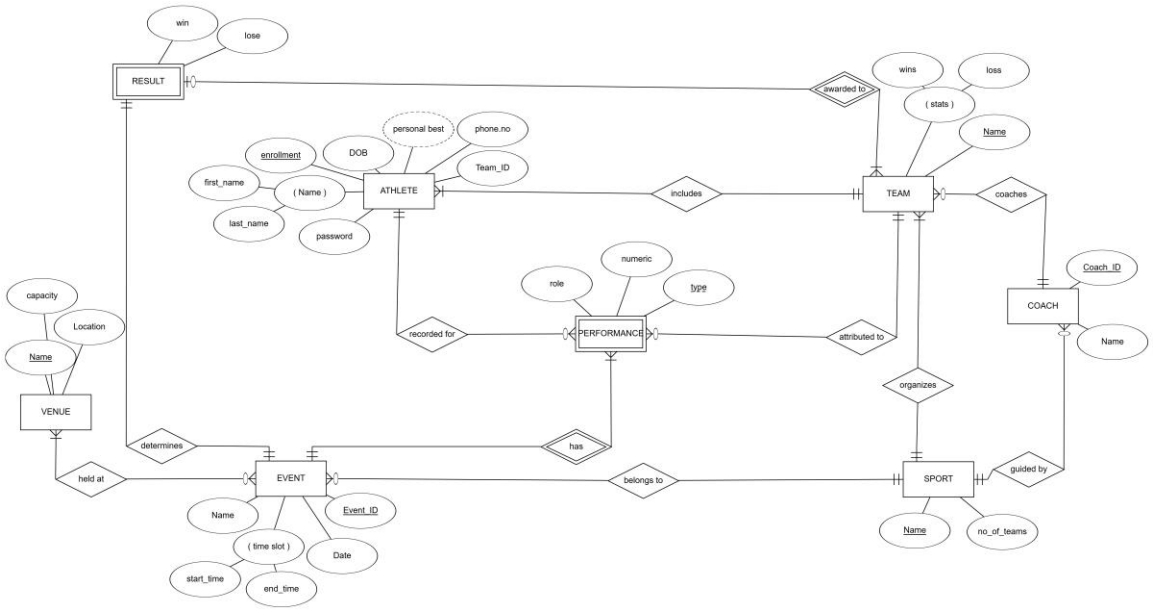
- **Relationship**: "Recorded For"
- An Athlete's **Performance** is recorded for specific Events.

Performance and Event

- **Relationship**: "Includes"
- A Performance **belongs to** an Event.

Result and Team

- **Relationship**: "Awarded To"
- Results are **awarded to** Teams based on their performances.



ER DIAGRAM

Relational Schema

Athlete

Attributes:

- enrollment (INT, PRIMARY KEY)
- first_name (VARCHAR)
- last_name (VARCHAR)
- DOB (DATE)
- phone_no (VARCHAR)
- password (VARCHAR)
- personal_best (VARCHAR)
- team_id (FK → Team.team_id)

Team

Attributes:

- team_id (INT, PRIMARY KEY)
- name (VARCHAR)
- wins (INT)
- loss (INT)
- stats (VARCHAR)
- coach_id (FK → Coach.coach_id)

Event

Attributes:

- event_id (INT, PRIMARY KEY)
- name (VARCHAR)
- date (DATE)
- start_time (TIME)
- end_time (TIME)
- venue_name (FK → Venue.name)

Venue

Attributes:

- name (VARCHAR, PRIMARY KEY)
- location (VARCHAR)
- capacity (INT)

Coach

Attributes:

- coach_id (INT, PRIMARY KEY)
- name (VARCHAR)
- email (VARCHAR)
- phone (VARCHAR)

Sport

Attributes:

- name (VARCHAR, PRIMARY KEY)
- no_of_teams (INT)

Performance

Attributes:

- athlete_id (FK → Athlete.enrollment)
- event_id (FK → Event.event_id)
- numeric (DECIMAL)
- roles (VARCHAR)
- type (VARCHAR)
- PRIMARY KEY (athlete_id, event_id)

Result

Attributes:

- team_id (FK → Team.team_id)
- event_id (FK → Event.event_id)
- win (BOOLEAN)
- lose (BOOLEAN)
- PRIMARY KEY (team_id, event_id)
-

Constraints

Entity Integrity Constraints

Each table's Primary Key must be unique and non-null.

- enrollment for Athlete.
- team_id for Team.
- event_id for Event.
- name for Venue and Sport.
- coach_id for Coach.

Referential Integrity Constraints

- team_id in Athlete → team_id in Team.
- coach_id in Team → coach_id in Coach.
- venue_name in Event → name in Venue.
- athlete_id in Performance → enrollment in Athlete.
- event_id in Performance → event_id in Event.
- team_id in Result → team_id in Team.
- event_id in Result → event_id in Event.

Domain Definitions

Athlete

- first_name, last_name, personal_best: VARCHAR (50).
- enrollment: INT (6-10 digits).
- DOB: DATE.
- phone_no: VARCHAR (15).
- password: VARCHAR (50).

Team

- team_id: INT.
- name: VARCHAR (50).
- wins, loss: INT.
- stats: VARCHAR (255).

Event

- event_id: INT.
- name: VARCHAR (50).
- date: DATE.
- start_time, end_time: TIME.
- venue_name: VARCHAR (50).

Venue

- name: VARCHAR (50).
- location: VARCHAR (100).
- capacity: INT.

Coach

- coach_id: INT (6-10 digits).
- name, email: VARCHAR (50).
- phone: VARCHAR (15).

Sport

- name: VARCHAR (50).
- no_of_teams: INT.

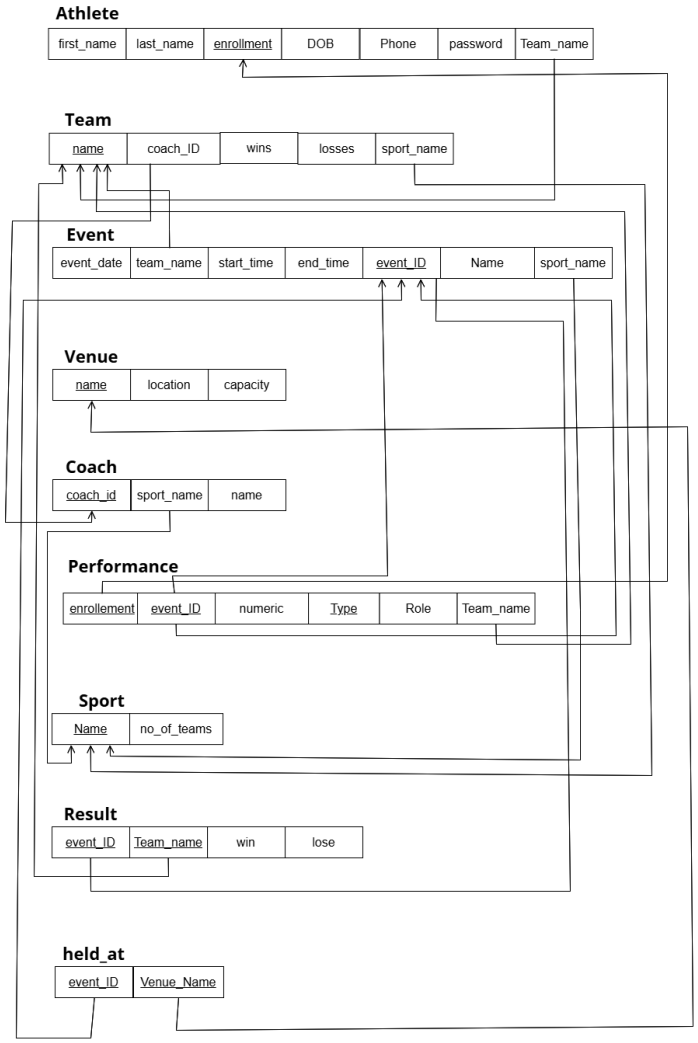
Performance

- numeric: DECIMAL (5,2).

- roles: VARCHAR (50).
- type: VARCHAR (50).

Result

- win, lose: BOOLEAN.



RELATIONAL SCHEMA

1NF (First Normal Form)

Objective:

Eliminate repeating groups and ensure atomicity.

- All columns contain atomic (indivisible) values.
- Each row is uniquely identifiable, typically using a primary key.
- Any multi-valued attributes or nested relations are removed.

Result:
The tables were already in the 1st normal form, so no changes made.

2NF (Second Normal Form)

Objective:

- Eliminate partial dependency.
- All non-prime attributes (attributes not part of the primary key) must depend on the entire primary key, not just a part of it.
- This step applies only if the table has a composite primary key.

Changes Made:

- Tables with partial dependencies are split into smaller tables.
- Each non-prime attribute is moved to the table where it fully depends on the primary key.

Result:

The tables were already in the 2nd normal form, so no changes made.

3NF (Third Normal Form)

Objective:

- Eliminate transitive dependency.
- Non-prime attributes must depend only on the primary key and not on any other non-prime attribute.

Changes Made:

- Attributes that are transitively dependent are moved into separate tables.
- Each table now represents a single concept or entity.

Result:

In the performance table, few changes are made

- The role (non-primary attribute) was defining another non primary attribute type so column, type would be dropped
- A new table role is created with primary key role_ and it has type attribute
- Now the role attribute in the performance table would become foreign key from the role table.

Final Normalized Tables

After the normalization process, the database schema is organized into a set of tables, each representing a distinct entity or relationship. Relationships between these tables are maintained using foreign keys.

Following the final normalized tables from our database

Athlete:

select * from athlete;

	first_name	last_name	enrollment	DOB	Phone	password	Team_name
1	Ali	Khan	ENR004	2000-06-01	1111111111	pass001	karachi
2	Ahmed	Raza	ENR005	1999-12-10	2222222222	pass002	karachi
3	Bilal	Hussain	ENR006	2001-03-15	3333333333	pass003	karachi
4	Danish	Iqbal	ENR007	2000-07-19	4444444444	pass004	karachi
5	Faisal	Shah	ENR008	1998-11-25	5555555555	pass005	karachi
6	Hassan	Ali	ENR009	1999-09-20	6666666666	pass006	lahore
7	Irfan	Mehmood	ENR010	2001-02-14	7777777777	pass007	lahore
8	Junaid	Akram	ENR011	2002-04-18	8888888888	pass008	lahore
9	Kamran	Yousuf	ENR012	1998-08-10	9999999999	pass009	lahore
10	Luqman	Shah	ENR013	2000-01-22	1010101010	pass010	lahore
11	Moiz	Ahmed	ENR014	2001-05-30	1112223334	pass011	islamabad
12	Noman	Khalid	ENR015	2000-06-11	2223334445	pass012	islamabad
13	Owais	Iqbal	ENR016	2001-09-14	3334445556	pass013	islamabad
14	Parvez	Hassan	ENR017	1999-07-21	4445556667	pass014	islamabad
15	Qasim	Khan	ENR018	1998-12-02	5556667778	pass015	islamabad
16	Rizwan	Tariq	ENR019	2000-10-04	6667778889	pass016	quetta
17	Saad	Iqbal	ENR020	2001-04-28	7778889990	pass017	quetta
18	Talha	Ali	ENR021	1999-11-18	8889990001	pass018	quetta
19	Umair	Hussain	ENR022	1998-05-11	9990001112	pass019	quetta
20	Vicky	Raja	ENR023	2000-02-16	0001112223	pass020	quetta
21	Waqas	Zafar	ENR024	2001-08-17	1110001110	pass021	peshawar
22	Xavier	Mehmood	ENR025	2000-12-31	2221112221	pass022	peshawar
23	Yasir	Ali	ENR026	1999-10-15	3332223332	pass023	peshawar
24	Zeeshan	Shah	ENR027	2002-03-29	4443334443	pass024	peshawar
25	Abdullah	Iqbal	ENR028	2000-04-09	5554445554	pass025	peshawar
26	Babar	Ahmed	ENR029	1999-06-30	6665556665	pass026	gilgit
27	Cameron	Raza	ENR030	2001-01-01	7776667776	pass027	gilgit
28	Dawood	Ali	ENR031	2002-06-12	8887778887	pass028	gilgit
29	Ehsan	Tariq	ENR032	2001-09-19	9998889998	pass029	gilgit
30	Farhan	Shah	ENR033	2000-11-27	0009990009	pass030	gilgit

	Field	Type	Null	Key	Default
1	first_name	varchar(50)	NO		null
2	last_name	varchar(50)	NO		null
3	enrollment	varchar(20)	NO	PRI	null
4	DOB	date	NO		null
5	Phone	varchar(15)	YES		null
6	password	varchar(50)	NO		null
7	Team_name	varchar(50)	YES	MUL	null

Team :

select * from team;

	name	coach_ID	wins	losses	sport_name
1	gilgit	2	8	4	Basketball
2	islamabad	3	12	1	Cricket
3	karachi	1	10	2	Football
4	lahore	1	9	3	Football
5	peshawar	3	11	2	Cricket
6	quetta	2	7	5	Basketball

	Field	Type	Null	Key	Default
1	name	varchar(50)	NO	PRI	null
2	coach_ID	int	YES	MUL	null
3	wins	int	YES		null
4	losses	int	YES		null
5	sport_name	varchar(50)	YES	MUL	null

Sport :

select * from sport;

	Name	no_of_teams
1	Basketball	2
2	cricket	2
3	Football	2

	Field	Type	Null	Key	Default
1	Name	varchar(255)	NO	PRI	null
2	no_of_teams	int	YES		null

Role :

select * from role;

	role_	type
1	batter	runs
2	bowler	wickets
3	center	points
4	forward	points
5	guard	points

	Field	Type	Null	Key	Default
1	role_	varchar(50)	NO	PRI	null
2	type	varchar(50)	YES		null

Coach :

select * from coach;

	coach_id	sport_name	name
1	1	Basketball	Coach Smith
2	2	Football	Coach Johnson
3	3	cricket	Coach Brown

	Field	Type	Null	Key	Default
1	coach_id	int	NO	PRI	null
2	sport_name	varchar(50)	YES	MUL	null
3	name	varchar(50)	YES		null

Performance :

select * from performance;

	ath_enrollment	event_id	numeric_value	role	team_name
1	ENR014	5	40	batter	islamabad
2	ENR015	5	2	bowler	islamabad
3	ENR016	5	15	batter	islamabad
4	ENR017	5	4	bowler	islamabad
5	ENR018	5	20	batter	islamabad
6	ENR019	6	5	center	quetta
7	ENR019	6	3	forward	quetta
8	ENR019	6	6	guard	quetta
9	ENR022	6	2	forward	quetta
10	ENR023	6	4	guard	quetta
11	ENR024	5	10	batter	peshawar
12	ENR025	5	1	bowler	peshawar
13	ENR026	5	25	batter	peshawar
14	ENR027	5	3	bowler	peshawar
15	ENR028	5	30	batter	peshawar
16	ENR029	6	8	center	gilgit
17	ENR029	6	5	forward	gilgit
18	ENR029	6	2	guard	gilgit
19	ENR031	6	4	forward	gilgit
20	ENR031	6	1	guard	gilgit

	Field	Type	Null	Key	Default
1	ath_enrollment	varchar(50)	NO	PRI	null
2	event_id	int	NO	PRI	null
3	numeric_value	int	NO		null
4	role	varchar(50)	NO	PRI	null
5	team_name	varchar(100)	YES	MUL	null

Event :

select * from event;

	event_date	team_name	start_time	end_time	event_ID	sport_name
1	2024-06-10	karachi	10:00:00	12:00:00	4	Football
2	2024-06-10	lahore	10:00:00	12:00:00	4	Football
3	2024-06-12	islamabad	14:00:00	16:00:00	5	Cricket
4	2024-06-12	peshawar	14:00:00	16:00:00	5	Cricket
5	2024-06-15	gilgit	17:00:00	19:00:00	6	Basketball
6	2024-06-15	quetta	17:00:00	19:00:00	6	Basketball

	Field	Type	Null	Key	Default
1	event_date	date	YES		null
2	team_name	varchar(50)	NO	PRI	null
3	start_time	time	YES		null
4	end_time	time	YES		null
5	event_ID	int	NO	PRI	null
6	sport_name	varchar(50)	YES	MUL	null

Result :

select * from result;

	event_ID	Team_name	win	lose
1	4	lahore	1	0
2	4	karachi	0	1
3	5	islamabad	1	0
4	5	peshawar	0	1
5	6	gilgit	1	0
6	6	quetta	0	1

	Field	Type	Null	Key	Default
1	event_ID	int	YES	MUL	null
2	Team_name	varchar(255)	YES	MUL	null
3	win	int	YES		null
4	lose	int	YES		null

Held At:

select * from held_at;

	event_ID	Venue_Name
1	6	Arena D
2	5	Stadium E
3	4	Field F

	Field	Type	Null	Key	Default
1	event_ID	int	YES	MUL	null
2	Venue_Name	varchar(255)	YES	MUL	null

Venue :

select * from venue;

	name	location	capacity
1	Arena D	West End	4500
2	Field F	Central Park	3500
3	Stadium E	South District	6000

	Field	Type	Null	Key	Default
1	name	varchar(50)	NO	PRI	null
2	location	varchar(100)	YES		null
3	capacity	int	YES		null

DDL Commands:

1. Create Database

Explanation: Create a new database named SportEventManagement and set it as active for subsequent queries.

Sql:

```
CREATE DATABASE SportsEventManagement;

USE SportsEventManagement;
```

2. Create Tables

a. Athlete Table

Explanation: Stores athlete details, including a unique enrollment number and references to their team.

Sql:

```
CREATE TABLE Athlete (
    athlete_ID INT AUTO_INCREMENT PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
    enrollment VARCHAR(20) UNIQUE NOT NULL,
    DOB DATE NOT NULL,
    Phone VARCHAR(15),
    password VARCHAR(50) NOT NULL,
    Team_name VARCHAR(50),
```

```
    FOREIGN KEY (Team_name) REFERENCES Team(name)
);
```

b. Team Table

Explanation: Holds team details such as their name, associated coach, and performance statistics. It references the `Coach` and `Sport` tables.

Sql:

```
CREATE TABLE Team (
    team_ID INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(50) UNIQUE NOT NULL,
    coach_ID INT,
    wins INT,
    losses INT,
    sport_name VARCHAR(50),
    FOREIGN KEY (coach_ID) REFERENCES Coach(coach_id),
    FOREIGN KEY (sport_name) REFERENCES Sport(Name)
);
```

c. Event Table

Explanation: Stores event information, including associated teams, sport type, and timing details

Sql:

```
CREATE TABLE Event (
```

```
    event_date DATE,
    team_name VARCHAR(50),
    start_time TIME,
    end_time TIME,
    event_ID INT PRIMARY KEY,
    Name VARCHAR(50),
    sport_name VARCHAR(50),
    FOREIGN KEY (team_name) REFERENCES Team(name),
    FOREIGN KEY (sport_name) REFERENCES Sport(Name)
);
```

d. Venue Table

Explanation: Contains information about venues, including their name, location, and seating capacity.

Sql:

```
CREATE TABLE Venue (
    name VARCHAR(50) PRIMARY KEY,
    location VARCHAR(100),
    capacity INT
);
```

e. Coach Table

Explanation: Stores details about coaches, including their name and associated sport.

Sql:

```
CREATE TABLE Coach (
    coach_id INT PRIMARY KEY,
    sport_name VARCHAR(50),
    name VARCHAR(50),
    FOREIGN KEY (sport_name) REFERENCES Sport(Name)
);
```

f. Sport Table

Explanation: Holds metadata about different sports, including the number of teams participating.

Sql:

```
CREATE TABLE Sport (
    Name VARCHAR(255) PRIMARY KEY,
    no_of_teams INT
);
```

g. Performance Table

Explanation: Tracks athlete performance metrics in events. References `Athlete`, `Event`, and `Team` tables.

Sql:

```
CREATE TABLE Performance (
   ath_enrollment VARCHAR(50) NOT NULL,
   event_id INT NOT NULL,
   numeric_value INT NOT NULL,
   type VARCHAR(50) NOT NULL,
   role VARCHAR(50),
   team_name VARCHAR(100),
   PRIMARY KEY (ath_enrollment, event_id, type),
   FOREIGN KEY (ath_enrollment) REFERENCES Athlete(enrollment) ON DELETE CASCADE,
   FOREIGN KEY (event_id) REFERENCES Event(event_ID) ON DELETE CASCADE,
   FOREIGN KEY (team_name) REFERENCES Team(name) ON DELETE SET NULL
);
```

h. Result Table

Explanation: Contains the outcome of events for each team, including win/loss records.

Sql:

```
CREATE TABLE Result (
   event_ID INT,
   Team_name VARCHAR(255),
```

```
    win INT,
    lose INT,
    FOREIGN KEY (event_ID) REFERENCES Event(event_ID) ON DELETE
CASCADE,
    FOREIGN KEY (Team_name) REFERENCES Team(name) ON DELETE
CASCADE
);
```

i. Held_at Table

Explanation: Links events to venues, referencing the `Event` and Venue tables.

```
CREATE TABLE Held_at (
    event_ID INT,
    Venue_Name VARCHAR(255),
    FOREIGN KEY (event_ID) REFERENCES Event(event_ID),
    FOREIGN KEY (Venue_Name) REFERENCES Venue(name)
);
```

3. Insert Sample Data

a. Insert Teams

Explanation: Adds sample team data with their associated sport and performance stats.

Sql:

```
INSERT INTO Team (name, coach_ID, wins, losses, sport_name)
```

VALUES

('karachi', 1, 10, 2, 'Football'),

('gilgit', 2, 8, 4, 'Basketball'),

('islamabad', 3, 12, 1, 'Cricket');

b. Insert Athletes

Explanation: Adds sample athlete data with their enrollment, team association, and personal details

Sql:

INSERT INTO Athlete (first_name, last_name, enrollment, DOB, Phone, password, Team_name)

VALUES

('awais', 'abrahim', 'ENR001', '2000-05-15', '1234567890', 'pass123', 'karachi'),

('hashim', 'nair', 'ENR002', '2001-08-22', '9876543210', 'pass456', 'gilgit'),

('muhammad', 'hammad', 'ENR003', '1999-11-12', '5678901234', 'pass789', 'islamabad');

c. Insert Events

Explanation: Adds events with their associated teams, schedule, and sport.

Sql:

INSERT INTO Event (event_date, team_name, start_time, end_time, event_ID, Name, sport_name)

VALUES

('2024-06-01', 'islamabad', '10:00:00', '12:00:00', 1, 'Event One', 'Basketball'),

('2024-06-02', 'karachi', '13:00:00', '15:00:00', 2, 'Event Two', 'Football'),

('2024-06-03', 'gilgit', '15:30:00', '17:30:00', 3, 'Event Three', 'Tennis');

d.Insert Coach:

INSERT INTO Coach (coach_id, sport_name, name)

VALUES

(4, 'Cricket', 'Coach Williams'),

(5, 'Basketball', 'Coach Davis'),

(6, 'Football', 'Coach Taylor');

e. Insert Event:

INSERT INTO Event (event_date, team_name, start_time, end_time, event_ID, Name, sport_name)

VALUES

('2024-06-04', 'gilgit', '09:00:00', '11:00:00', 4, 'Event Four', 'Cricket'),

('2024-06-05', 'karachi', '12:30:00', '14:30:00', 5, 'Event Five', 'Basketball'),

('2024-06-06', 'islamabad', '15:00:00', '17:00:00', 6, 'Event Six', 'Football');

f.Insert Venue

INSERT INTO Venue (name, location, capacity)

VALUES

('Arena D', 'South End', 7000),

('Ground E', 'West Valley', 2500),

('Hall F', 'Central Square', 1500);

g.Insert Held_at:

INSERT INTO Held_at (event_ID, Venue_Name)

VALUES

(4, 'Arena D'),

(5, 'Ground E'),

(6, 'Hall F');

h.Insert Performance:

INSERT INTO Performance (ath_enrollment, event_id, numeric_value, type, role, team_name)

VALUES

('ENR004', 4, 60, 'runs', 'batter', 'karachi'),

('ENR005', 5, 4, 'assists', 'forward', 'islamabad'),

('ENR006', 6, 2, 'goals', 'goalkeeper', 'karachi');

i.Insert result:

INSERT INTO Result (event_ID, Team_name, win, lose)

VALUES

(4, 'karachi', 10, 4),

(5, 'gilgit', 7, 6),

(6, 'islamabad', 5, 7);