

SPORTS MANAGEMENT SYSTEM

A Project Report Submitted

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ABSTRACT

The Sports Tournament Management System is a comprehensive platform designed to streamline the organization and execution of sporting events. Its functionality encompasses various aspects, including efficient registration processes for teams and participants, automated fixture generation to optimize scheduling, real-time score tracking, and statistical analysis. The system also facilitates player management, ensuring compliance with regulations and fair play. Furthermore, it offers features for financial management, fan engagement, and post-event evaluation. Overall, the Sports Tournament Management System serves as a centralized hub for organizers, teams, and spectators, enhancing the overall experience and success of sporting tournaments.

ACM Taxonomy Terms: -

[Software]: Tournament Management System; Sports Management System; Event Management System

[Computing Milieux]: Sports Industry; Sports Technology; Sports Software

[Information systems applications]: Sports Analytics; Player Management Systems

Sustainable Development Goals

[SDG]: Industry, Innovation, and Infrastructure: The implementation of a digital Sports Tournament Management System promotes innovation in sports management and infrastructure development, leading to more efficient and sustainable organization of tournaments.

[SDG]: Good Health and Well-being: By promoting sports events and encouraging physical activity, the project contributes to improving the health and well-being of individuals participating in sports tournaments.

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Revision History

Name	Date	Reason For Changes	Version

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2. Sport (Sport_name, Type)
3. Matches (Match_id, Date, Venue)
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Abbreviations

- ❖ **NF- Normalization Form**
- ❖ **1NF- 1st Normalization Form**
- ❖ **2NF- 2nd Normalization Form**
- ❖ **3NF- 3rd Normalization Form**
- ❖ **BCNF- Boyce Codd Normalization Form**
- ❖ **SQL- Structured Query Language**
- ❖ **DBMS- Database Management System**
- ❖ **UI- User Interface**
- ❖ **CK- Candidate Key**
- ❖ **ERD- Entity Relationship Diagram**

Chapter 1: Introduction

1.1) Purpose:

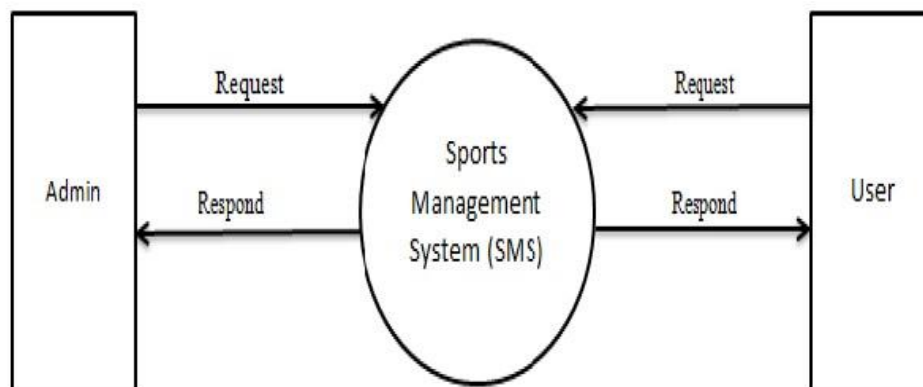
The purpose of the Sports Management System project is to revolutionize the organization and execution of sporting events by providing a comprehensive digital platform. By streamlining processes such as registration, scheduling, score tracking, and financial management, the system aims to enhance the efficiency, transparency, and overall experience of tournaments for organizers, participants, and spectators alike. Through automation and integration of key functionalities, the project seeks to optimize resource utilization, foster fair play, and promote community engagement in sports at various levels. Ultimately, the project strives to contribute to the advancement of the sports industry by leveraging technology to create more accessible, inclusive, and sustainable sporting experiences.

1.2) Product Scope:

The scope of the Sports Management System project encompasses the development of a robust digital platform tailored to meet the needs of organizing sporting events efficiently. This includes features such as automated registration processes, dynamic fixture generation, real-time score tracking, and comprehensive player management functionalities. Additionally, the project aims to incorporate elements for financial management, fan engagement, and post-event analysis. The system's scope extends to various sports and tournament formats, catering to both amateur and professional levels. Overall, the project strives to create a versatile and scalable solution that enhances the overall experience of sports tournaments while promoting inclusivity, fairness, and sustainability.

1.3) Product Perspective:

The Sports Management System will serve as an all-encompassing, independent, web-based platform that will manage various aspects of sports league operations.



Chapter 2: Literature Survey/Background

Sports tournament management systems are digital platforms designed to streamline the organization and execution of sporting events. Various literature and existing systems provide insights into the features, technologies, and methodologies used in this domain. Several studies have highlighted the importance of such systems in improving the efficiency, transparency, and overall experience of sports tournaments. Existing literature often discusses the challenges faced in traditional tournament management processes, such as manual registration, scheduling conflicts, and lack of real-time data tracking. In response, researchers and practitioners have developed and implemented various sports tournament management systems to address these challenges.

Common features found in sports tournament management systems include:

Registration and Participant Management: Online registration portals for teams and participants, with features for managing player rosters and eligibility.

Fixture Generation and Scheduling: Automated scheduling algorithms to create fair and balanced match schedules, considering factors like team strengths, venue availability, and tournament structure.

Score Tracking and Reporting: Real-time score tracking and reporting capabilities to provide instant updates to organizers, participants, and spectators.

Financial Management: Tools for managing finances related to registration fees, ticket sales, sponsorships, and expenses, providing transparency and accountability.

Communication and Engagement: Features for communication between organizers, teams, and participants, as well as engagement tools for spectators, such as live updates and social media integration.

Chapter 3: Objectives/Problem Statement

The primary objective of the project is to develop a comprehensive digital platform for sports tournament management. This platform aims to streamline the organization and execution of sporting events by providing automated tools and functionalities to manage various aspects of tournaments efficiently. The key objectives include:

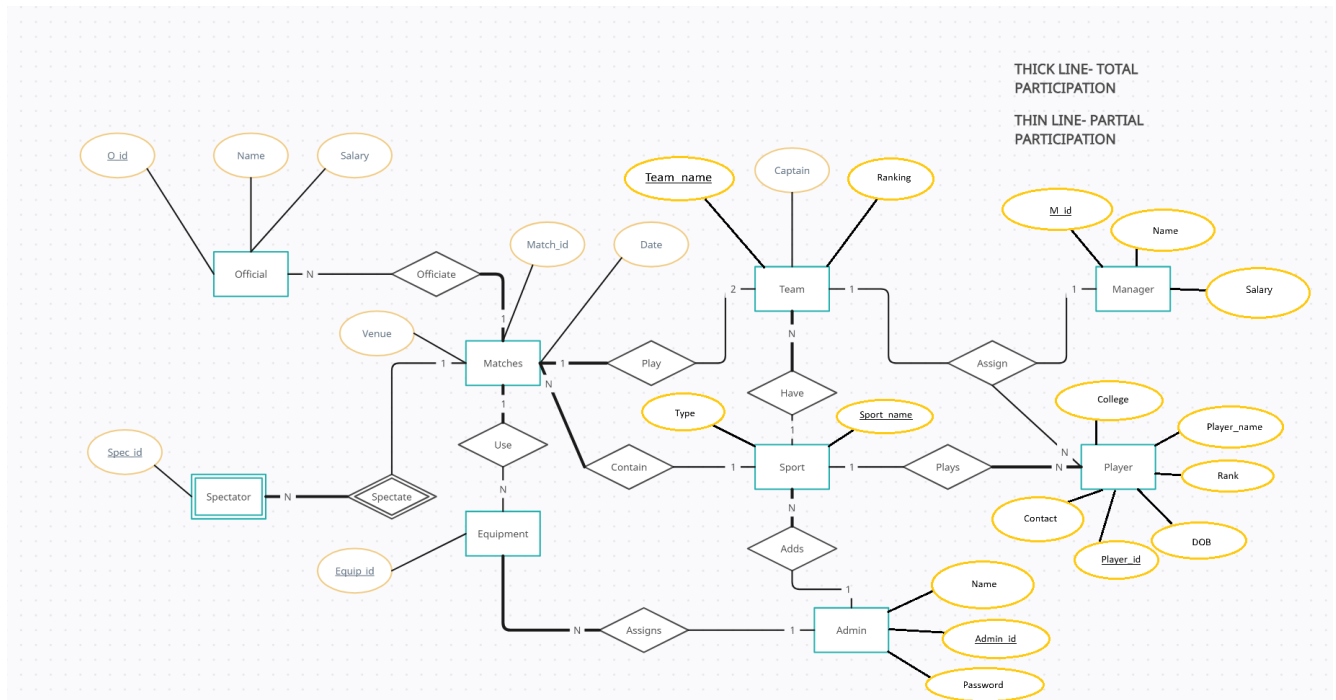
- Develop an intuitive and user-friendly digital platform that facilitates seamless registration processes for teams and participants.
- Implement automated fixture generation algorithms to optimize scheduling and ensure fair and balanced match schedules.
- Provide real-time score tracking and reporting capabilities to offer instant updates to organizers, participants, and spectators.
- Integrate financial management tools to facilitate transparent and accountable handling of finances related to registration fees, ticket sales, sponsorships, and expenses.
- Enhance communication and engagement between organizers, teams, participants, and spectators through features like live updates, social media integration, and multimedia content sharing.

The project aims to address several challenges and inefficiencies in traditional tournament organization processes, including:

- **Manual Registration Processes:** Streamlining the registration process by replacing manual paper-based forms with an online registration portal to reduce administrative burden and errors.
- **Scalability Challenges:** Ensuring the platform can accommodate tournaments of varying sizes, from small local events to large-scale international competitions, without compromising performance or functionality.
- **Data Privacy and Security Concerns:** Implementing robust measures to protect the privacy and security of participant data collected during the registration process and throughout the tournament.
- **Complexity in Tournament Organization:** Simplifying the process of organizing tournaments by providing intuitive tools and functionalities that make it easier for organizers to manage various aspects of the event.

Chapter 4: Data Design

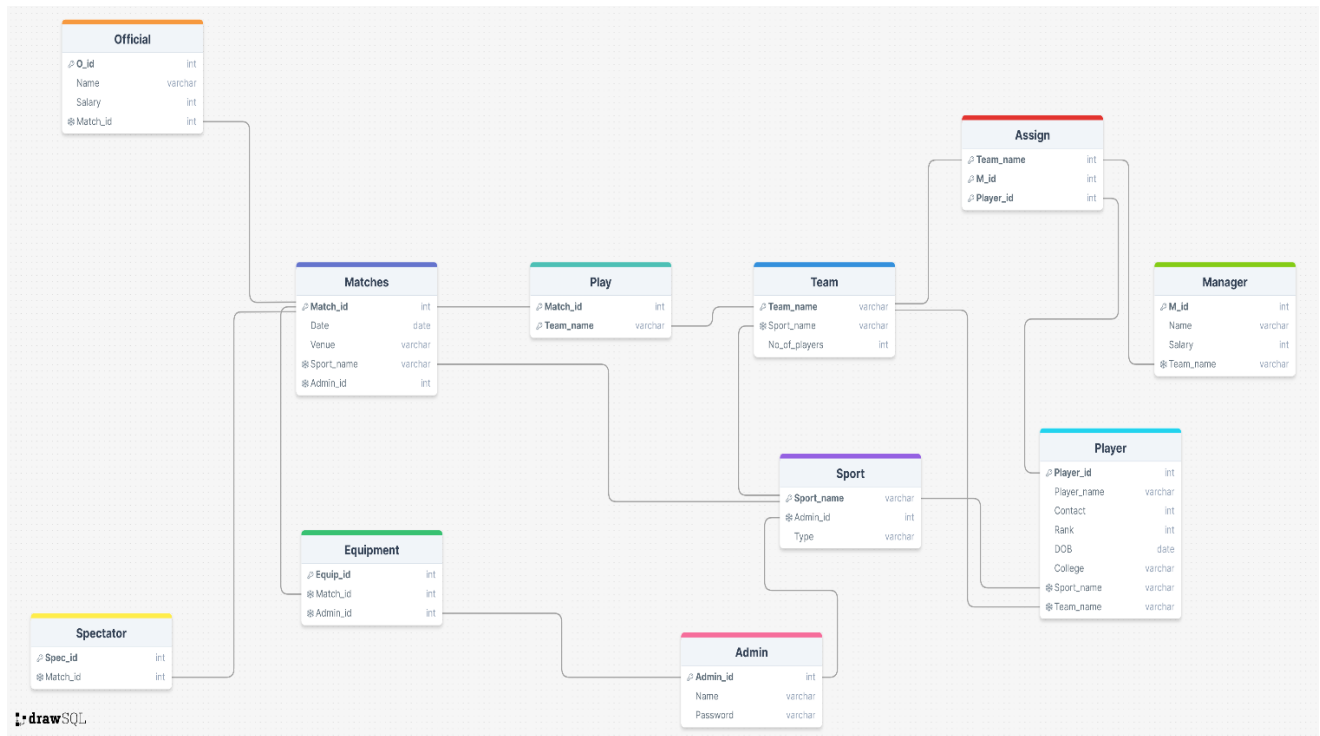
4.1) Entity Relation Diagram:



4.2) Reduced Schema:

1. Admin (Admin_id, Name, Password)
2. Sport (Sport_name, Admin_id, Type)
3. Matches (Match_id, Date, Venue, Sport_name, Admin_id)
4. Team (Team_name, Sport_name, No_of_players)
5. Play (Match_id, Team_name)
6. Player (Player_id, Player_name, Contact, Rank, DOB, College, Sport_name, Team_name)
7. Manager (M_id, Name, Salary, Team_name)
8. Equipment (Equip_id, Match_id, Admin_id)
9. Spectator (Spec_id, Match_id)
10. Official (O_id, Name, Salary, Match_id)
11. Assign (Team_id, M_id, Player_id)

4.3) Schema Diagram:



4.4) Normalization:

1) Admin (Admin_id, Name, Password)

FD

Admin_id \longrightarrow Name, Password

Since there is one 1 FD, it is the canonical cover.

- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ CK: Admin_id
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

2) Sport (Sport_name, Admin_id, Type)

FD

Admin_id, Sport_name \longrightarrow Type

Since there is only 1 FD, it is the canonical cover.

- ✓ 1NF is satisfied.

- Reason: No multivalued attributes.
- ✓ CK: (Sport_name, Admin_id)
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

3) Matches (Match_id, Date, Venue, Sport_name, Admin_id)

FD

Match_id \longrightarrow Date, Venue
 Match_id \longrightarrow Sport_name
 Match_id \longrightarrow Admin_id

- (Match_id)⁺ = Match_id, Date, Venue, Sport_name, Admin_id
- ✓ CK: Match_id
 - Using Union we get,
- ✓ F_c: Match_id \longrightarrow Date, Venue, Sport_name, Admin_id
 - No extraneous attribute.
- ✓ 1NF is satisfied.
 - No multivalued attributes.
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

4) Team (Team_name, Sport_name, No_of_players, Ranking)

FD

Team_name \longrightarrow No_of_players
 Team_name \longrightarrow Sport_name
 Team_name \longrightarrow Ranking

- (Team_name)⁺ = Team_name, Sport_name, No_of_players, Ranking
- ✓ CK: Team_name
 - Using Union we get,
- ✓ F_c: Team_name \longrightarrow No_of_players, Sport_name, Ranking
 - No extraneous attribute.
- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ 2NF is satisfied.

- Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

5) Play (Match_id, Team_name)

FD

Match_id \longrightarrow Team_name

Since there is only 1 FD, it is the canonical cover.

- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ CK: (Match_id)
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

6) Player (Player_id, Player_name, Contact, Rank, DOB, College, Sport_name, Team_name)

FD

Player_id \longrightarrow Player_name, College, DOB, Contact, Rank

Player_id \longrightarrow Sport_name, Team_name

- (Player_id)⁺ = Player_id, Player_name, College, DOB, Rank, Sport_name, Contact, Team_name
- ✓ CK: Player_id

Using Union we get,

- ✓ F_c: Player_id \longrightarrow Player_name, College, DOB, Contact, Rank, Sport_name, Team_name
 - No extraneous attribute.
- ✓ 1NF is satisfied.
 - No multivalued attributes.
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

7) Manager (M_id, Name, Salary, Team_name)

FD

M_id \longrightarrow Team_name
M_id \longrightarrow Name, Salary

- ✓ $(M_id)^+ = M_id, Team_name, Name, Salary$
- ✓ CK: M_id

Using Union we get,

- ✓ $F_c: M_id \longrightarrow Team_name, Name, Salary$
 - No extraneous attribute.
- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

8) Equipment (Equip_id, Match_id, Admin_id)

FD

Match_id, Admin_id \longrightarrow Equip_id

Since there is only 1 FD, it is the canonical cover.

- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ CK: (Match_id, Admin_id)
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

9) Official (O_id, Name, Salary, Match_id)

FD

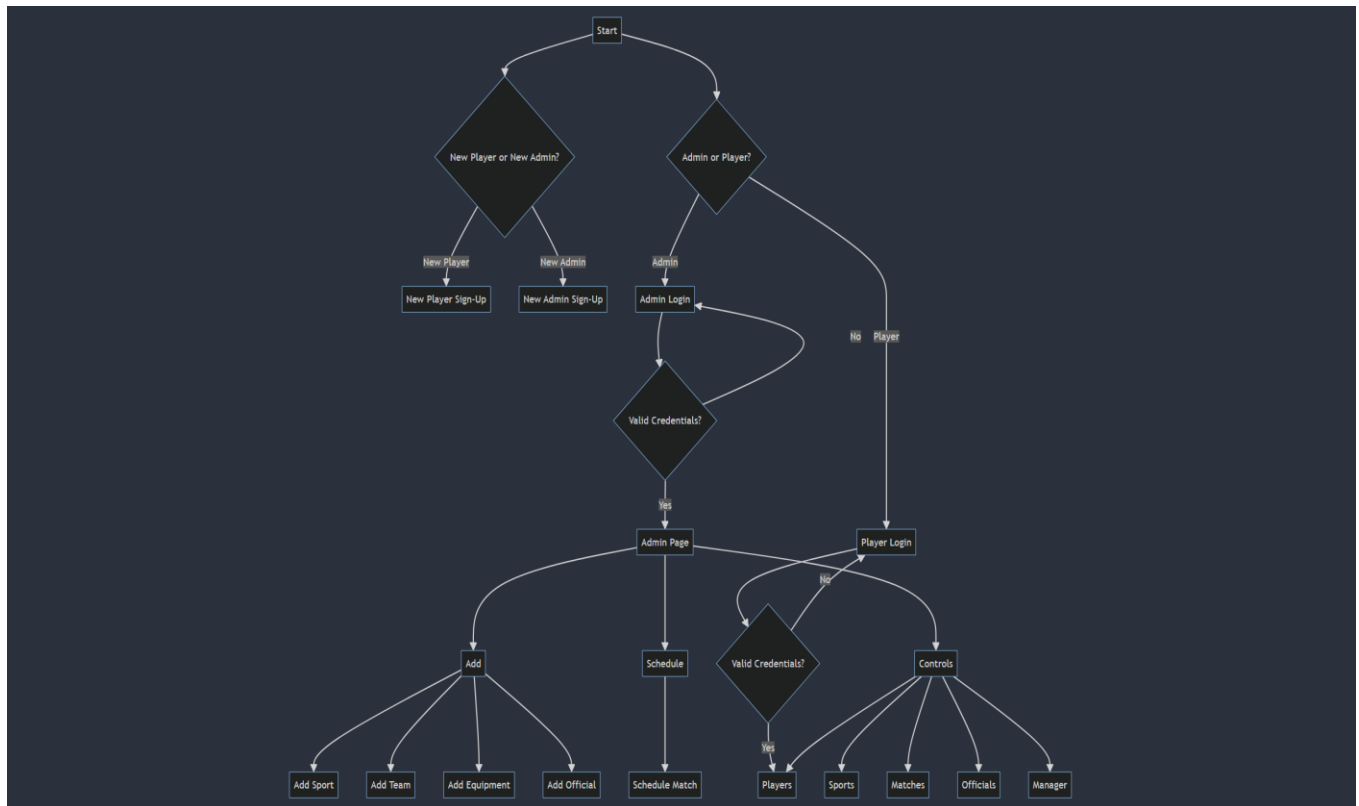
O_id \longrightarrow Match_id, Name, Salary

Since there is only 1 FD, it is the canonical cover.

- ✓ 1NF is satisfied.
 - Reason: No multivalued attributes.
- ✓ CK: (O_id)
- ✓ 2NF is satisfied.
 - Reason: No partial dependency.
- ✓ 3NF is satisfied.
 - Reason: Only 1 FD so there's no transitive dependency.
- ✓ BCNF is satisfied.
 - Reason: CK is on α (alpha) side.

Chapter 5: Methodology

5.1) Implementation Block Diagram:



5.2) Implementation Details:

Requirements Analysis:

- Gathered requirements from stakeholders including tournament organizers, teams, participants, and spectators.
- Identified key features such as online registration, fixture generation, and communication tools.
- Defined the scope, objectives, and functionalities of the system based on the collected requirements.

System Design:

- Designed the architecture using C# in Visual Studio for the front end and MySQL for the database management system (DBMS).
- Defined the user interface design with intuitive navigation and user-friendly layouts.
- Created entity-relationship diagrams (ERDs) to model the database schema and relationships between different entities.
- Identified technologies and frameworks for application development and database management.

Database Implementation:

- Implemented the database using MySQL along with XAMPP, including the creation of tables, indexes, and constraints.
- Utilized SQL (Structured Query Language) and SQL/PSM (Persistent Stored Modules) for defining database schemas, queries, and stored procedures.
- Ensured data integrity and security by enforcing constraints and permissions within the database.
-

Application Development:

- Developed the front-end using C# in Visual Studio, including user interfaces, forms, and controls.
- Integrated the front end with the MySQL database to enable data retrieval, storage, and manipulation.
- Implemented business logic and application functionalities such as user authentication, registration, fixture generation and leaderboard tracking.
- Tested the application for functionality, performance, and usability before deployment.

Chapter 6: Results

The Sports Management System's deployment resulted in more effective tournament management by streamlining procedures like scorekeeping, fixture creation, and registration. Its user-friendly interface enhanced the entire experience for viewers, competitors, and organizers alike, and its integrated money management capabilities guaranteed open and honest handling of tournament funds. The system proved to be adaptable and scalable to many sports and tournament forms, and it included strong security features to protect the confidentiality and integrity of user data. Its success in raising stakeholder happiness, productivity, and efficiency was demonstrated by positive comments and broad adoption. In the end, it fulfilled its goals of providing a full digital platform for managing sports tournaments.

Data Security and Integrity: Robust security measures were implemented to protect the privacy and integrity of participant data, instilling trust and confidence in the system.

Improved Decision Making: The system provided organizers with valuable insights and data analytics, enabling informed decision-making and optimization of tournament operations.

Efficient Tournament Organization: The system streamlined various aspects of tournament organization, such as registration, and scheduling, leading to improved efficiency and reduced administrative burden.

1) Login page:

LOGIN PAGE

admin

USERNAME shivam

PASSWORD pande

LOGIN

New Player

New Admin

2) New Player

NEW PLAYER

player_id

player_name

contact

college

rank

dob 24 April 2024

register

player_id	player_name	contact	college	rank	dob	team
1	Ashish Singh	9876543210	ABC University	1	15-05-1995	Football Team A
2	Arjun Kumar	9876543211	DEF University	2	20-01-1998	Baseball Team B
3	Aditya Singh	9876543212	GHI University	3	10-03-1997	Basketball Team A
4	Amisha Singh	9876543213	JKL University	4	25-11-1999	Volleyball Team C
5	Ananya Singh	9876543214	MNO University	5	05-08-1996	Baseball Team B
6	Anika Singh	9876543215	PQR University	6	30-06-1994	Volleyball Team C
7	Anshu Singh	9876543216	STU University	7	01-01-1998	Football Team A
8	Anshika Singh	9876543217	VWX University	8	10-05-1997	Baseball Team B
9	Anshika Singh	9876543218	YZA University	9	12-02-1996	Volleyball Team C
10	Anshika Singh	9876543219	BCD University	10	28-03-1999	Baseball Team A
11	Anshika Singh	9876543220	EFG University	11	18-09-1995	Baseball Team C

3) New Admin:

NEW ADMIN

admin_id

name

password

confirm

4) New Player:

NEW PLAYER

player_id

player_name

contact

college

rank

dob 24 April 2024

register

player_id	player_name	contact	rank	dob	college	team_name	team_color
1	John Doe	123456789	1	15-03-2000	ABC College	Football	Team A
2	Jane Smith	987654321	2	20-07-1998	XYZ College	Basketball	Team B
3	Michael Johnson	567890123	3	10-05-2001	QW University	Tennis	Team C
4	Emily Brown	345678901	4	25-11-1999	RST College	Baseball	Team D
5	William Clark	012345678	5	05-08-1995	UVW University	Baseball	Team E
6	Olivia Davis	789012345	6	30-01-2004	XYZ College	Volleyball	Team F
7	James Martinez	654321098	7	20-01-1998	PQR University	Football	Team G
8	Sarah Thompson	210987654	8	10-06-2001	STU College	Basketball	Team H
9	Alexander King	876543210	9	15-09-1999	VWX University	Football	Team I
10	Mia Lee	432109876	10	28-03-1999	YZA College	Volleyball	Team J
11	Arjun	098765432	11	12-02-2002	BCD University	Baseball	Team K

5) Admin Page:

ADMIN PAGE

admin_id	name	password
1	John Doe	password12
2	Jane Smith	admin356
3	Michael Johnson	securepass
4	Emily Brown	admin1234
5	Daniel Wilson	pass123456
6	Sarah Davis	secretpass
7	Kevin Lee	adminpass
8	Hannah Taylor	securepass
9	Ryan Martinez	adminadmin
10	Ava Rodriguez	password45
11	Arjun	pande

admin

Show Table

6) Add Sport:

ADD SPORT

Sport:

Sport Type:

☒ Indoor
 ☐ Outdoor

Add

sport name	admin id	type
Baseball	7	Indoor
Baseball	2	Indoor
Cricet	5	Outdoor
Football	1	Outdoor
Gymnastics	11	Indoor
Squash	11	Indoor
Swimming	6	Indoor
Table Tennis	9	Indoor
Tennis	11	Outdoor
Volleyball	3	Indoor

7) Add Team:

ADD TEAM

Team Name:

Sport:

No. of Players:

Team Rank:

Add

team name	sport name	no. of players	ranking
Team A	Football	14	1
Team B	Baseball	11	2
Team C	Volleyball	10	3
Team D	Tennis	2	4
Team E	Cricet	11	5
Team F	Swimming	6	6
Team G	Badminton	4	7
Team H	Gymnastics	8	8
Team I	Table Tennis	2	9
Team J	Squash	2	10

8) Add Manager:

ADD MANAGER

manager id

name

salary

team name

Add

id	name	salary	team name
1	John Smith	10000	Team A
2	Alice Johnson	20000	Team B
3	Michael Brown	30000	Team C
4	Emily Wilson	22000	Team D
5	David Davis	27000	Team E
6	Sarah Miller	21000	Team F
7	Robert Martinez	28000	Team G
8	Pamela Rodriguez	23000	Team H
9	Ryan Lee	24000	Team I
10	Anna Nguyen	26000	Team J

9) Add Official:

ADD OFFICIAL

id	name	salary	match_id
1	John Doe	2000	1
2	Jane Smith	2200	2
3	Michael Johnson	2100	3
4	Emily Brown	2400	4
5	David Wilson	2300	5
6	Sarah Davis	2000	6
7	Kevin Lee	2700	7
8	Monica Taylor	2600	8
9	Ryan Martinez	2800	9
10	Alex Rodriguez	3000	10

official id
name
salary
match id

10) Players:

PLAYERS

id	first_name	last_name	salary	hire_date	job_id	department_id	team_id
1	John	Doe	2000	19-03-1980	Job: Director	1000	Team A
2	Emily	Johnson	2100	22-07-1988	Job: Manager	1000	Team B
3	Michael	Williams	2200	12-12-1997	Job: Analyst	1000	Team A
4	Jane	Smith	2300	27-11-1990	Job: Manager	1000	Team C
5	David	Wilson	2400	05-08-1989	Job: Analyst	1000	Team B
6	Sarah	Davis	2500	04-04-1991	Job: Analyst	1000	Team C
7	Kevin	Lee	2600	10-07-1989	Job: Manager	1000	Team A
8	Monica	Taylor	2700	10-05-1990	Job: Manager	1000	Team B
9	Ryan	Martinez	2800	12-08-1988	Job: Analyst	1000	Team A
10	Alex	Rodriguez	2900	08-03-1989	Job: Manager	1000	Team C
11	John	Doe	3000	19-03-1980	Job: Director	1000	Team C

11) Schedule Match:

SCHEDULE MATCHES

match_id	date	venue	sport_name	admin_id
1	01-05-2024	Stadium A	Football	1
2	02-05-2024	Stadium B	Basketball	2
3	03-05-2024	Stadium C	Tennis	3
4	04-05-2024	Stadium D	Football	4
5	05-05-2024	Stadium E	Volleyball	5
6	06-05-2024	Stadium F	Cricket	6
7	07-05-2024	Stadium G	Football	7
8	08-05-2024	Stadium H	Badminton	8
9	09-05-2024	Stadium I	Swimming	9
10	10-05-2024	Stadium J	Badminton	10

12) Sports:

SPORTS

sport_name	admin_id	id
Football	1	1
Basketball	2	2
Tennis	3	3
Football	4	4
Volleyball	5	5
Cricket	6	6
Football	7	7
Badminton	8	8
Swimming	9	9
Badminton	10	10

13) Matches:

match_id	date	team_a	team_b	referee	stadium_id
1	01-01-2024	Team A	Team B	Referee 1	1
2	02-01-2024	Team A	Team B	Referee 2	2
3	03-01-2024	Team A	Team C	Referee 3	3
4	04-01-2024	Team A	Team D	Referee 4	4
5	05-01-2024	Team A	Team E	Referee 5	5
6	06-01-2024	Team A	Team F	Referee 6	6
7	07-01-2024	Team A	Team G	Referee 7	7
8	08-01-2024	Team A	Team H	Referee 8	8
9	09-01-2024	Team A	Team I	Referee 9	9
10	10-01-2024	Team A	Team J	Referee 10	10

14) Officials:

o_id	name	salary	match_id
1	Alice Smith	1000	1
2	Bob Smith	1200	2
3	Michael Johnson	1300	3
4	Emily Brown	1400	4
5	David Wilson	1500	5
6	Sarah Davis	1600	6
7	Kevin Lee	1700	7
8	Hannah Taylor	1800	8
9	James Martin	1900	9
10	Alice Rodriguez	2000	10

15) Manager:

m_id	name	salary	team_name
1	Alice Smith	54000	Team A
2	Alice Johnson	58000	Team B
3	Michael Brown	64000	Team C
4	Emily Wilson	52000	Team D
5	David Davis	57000	Team E
6	Sarah Taylor	53000	Team F
7	Kevin Martinez	59000	Team G
8	Hannah Rodriguez	51000	Team H
9	Ryan Lee	56000	Team I
10	Alice Martinez	56000	Team J

16) Add Equipment:

equip_id	match_id	action_id
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10

equipment id:

match id:

Add

Chapter 7: Conclusion and Future Work

Conclusion:

The Sports Management System has been successfully developed, providing organizers, participants, and spectators with a comprehensive platform for efficiently managing sporting events. The system streamlines various tasks such as registration, analysis and scheduling, enhancing the overall experience for all stakeholders involved. Through intuitive user interfaces, real-time updates, and robust security measures, the system has demonstrated its effectiveness in improving efficiency, transparency, and engagement in sports tournaments.

Future Works:

- 1) **Gamification and Social Features:** Introduce gamification elements and social features such as leaderboards, challenges, and social media integration to promote engagement and interaction among participants and spectators.
- 2) **Localization and Internationalization:** Implement localization and internationalization features to support multiple languages and adapt the system to different cultural preferences and regulatory requirements, enabling global scalability.
- 3) **Accessibility Improvements:** Ensure the system complies with accessibility standards and guidelines, making it usable for individuals with disabilities and enhancing inclusivity.
- 4) **Integration with IoT Devices:** Explore integration with Internet of Things (IoT) devices such as sensors and cameras to capture real-time data during matches, enabling advanced analytics and enhancing the spectator experience with immersive content.

Chapter 8: References

- [1] Amrit Kumar Bhujel, Anuhangma Subba, Bishal Lamichaney and Sondeep Biswakarma, “SPORTS MANAGEMENT SYSTEM”, Advance Technical Training Centre, Sikkim, Volume,03, Issue: 07, 2021
- [2] Dzul Farizan Tumiran and Ismail Mat Amin,” UTM Computing Proceedings Innovation in Computing Technology and Applications”, Faculty of Computing, Universiti Teknologi Malaysia (UTM), Malaysia, Volume: 2, 2017