https://github.com/linlin-husky/DAMG6210_Group8

Business Problem To Be Solved

We created a database to solve the below challenges that we met in managing the volleyball team. If we just simply use file documents such as excel or spreadsheet to access the data, we may have the below challenges:

1. The data can be redundant, the same data may be input in different places several times. So the data may be redundant;
2. The data may be inconsistent. Updating data in one place cannot ensure the data in other places will be updated as well. So the data may be inconsistent;
3. The data may not be that accurate;
4. Hard to use the different excel files to do game analytics;
5. The wrong management of team order and the unreasonable resource may lead to the unfairness of the data allocation;
6. Hard to get enough data from player or match to improve the performance;
7. It is hard to collect all data for the historical analysis to facilitate decision making for every match.
8. Tickets are not managed in an efficient way. Scattered ticket records cause lost or duplicated tickets and no single source of truth.
9. Coach cannot access the data to analyze the match data, historical data to improve its strategy for future game;
10. Players cannot get enough useful and comprehensive data from match records.
11. It's hard to record the internal revenue of the team;
12. It's hard to demonstrate our team performance to the sponsors.
13. We are preventing mishandling of accessible seats. Accessible seats aren't reserved or tracked, risking poor fan experience.
14. e-tickets aren't consistently issued on payment; delivery failures go unnoticed.
15. No reliable way to see which orders are fully paid, partially paid (split tender), or unpaid

So we create database to realize the improvement in our previously mentioned objectives as below:

1. Player & Team Performance Tracking
2. Match Scheduling & Queue Management
3. Financial Management
4. Data Security & Role-Based Access

Business Rule

1. For completed matches, to make analysis more accurate, it is necessary to record match data as detailed as possible without duplication.
2. For different matches, all data can be compared and analyzed.
3. For a specific team, the match sequence can be updated on time(in the queue).
4. For the two teams in a match, it is necessary to distinguish between the home team and the away team.
5. Each match must have only one referee.
6. A player can only belong to one team (analysis is based on the season; players cannot transfer to other teams after the season begins).
7. Every match our volleyball team participates in here all belongs to a tournament.
8. Our volleyball team participates in tournaments from time to time.
9. For any given event/time, a seat can be assigned to at most one ticket.
10. Every order must contain at least one ticket .
11. Each ticket must have a delivery method(e-ticket/physical).
12. Every venue must have greater than or equal to one section.
13. Refunds must use the same method as the original payment when possible (cash to cash, card to card).
14. The record is related to the match. There is only one record per match.

Key database design decisions

Focusing on a few core architectural principles helped in the development of the schema for the database. Most of the major design decisions can be encapsulated around our first two key entities. One set of decisions relates to the Team entity, while the other pertains to the Match entity. These decisions cumulatively address the robustness of the design while meeting the key business needs.

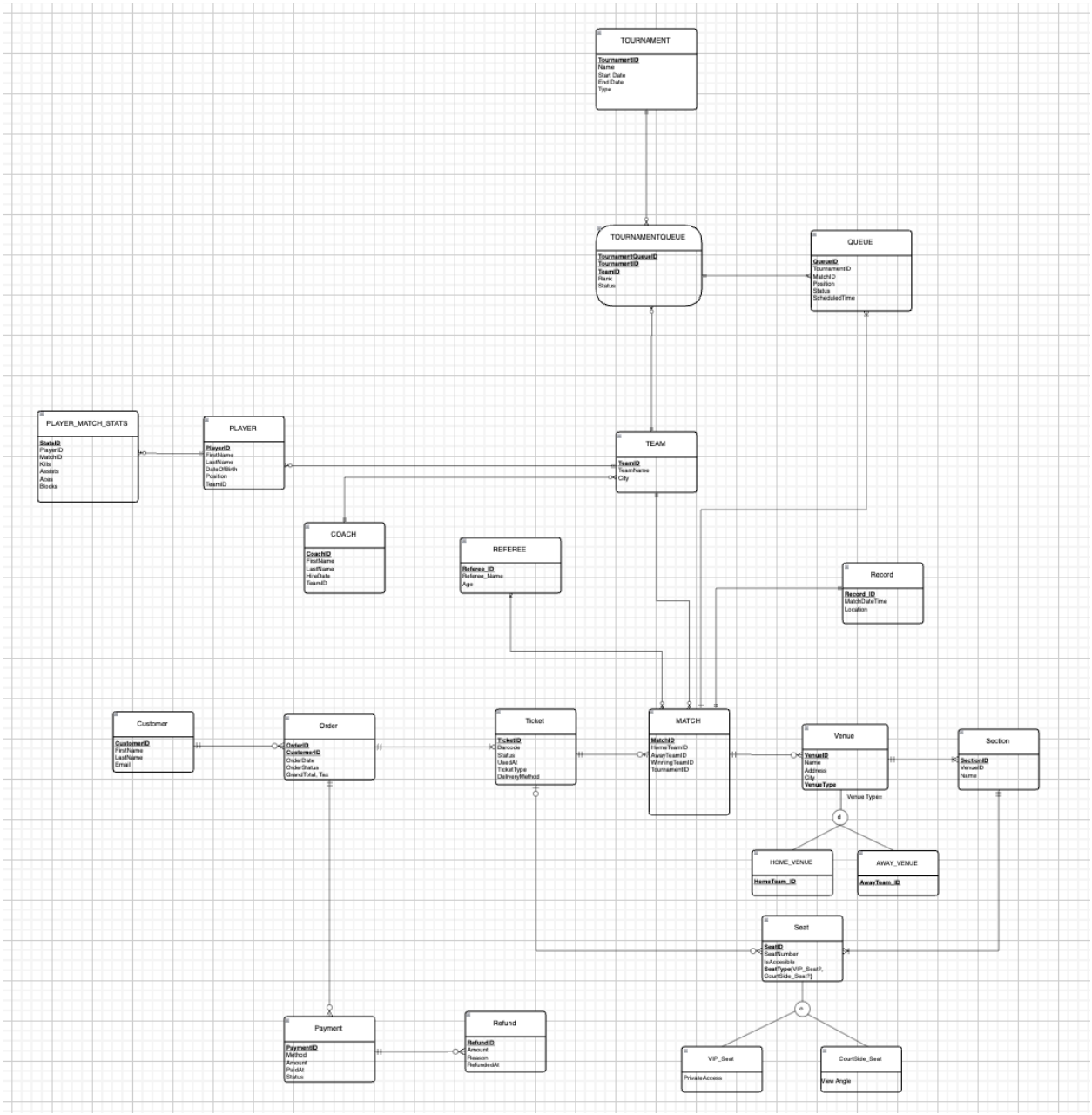
For the Team entity, the main goal was to encapsulate it as a concise, definitive, and authoritative identity in the system. To maintain reference point status, we built Team to unify and control data so that any entity's change involves information in a single repository. All other entities, like Player and Coach, connect to this Team identity. Additionally, we instituted a one-to-many relationship between Team and Player in line with the business rule that roster simplification is vital for operational needs.

Regarding the Match entity, the key decision was to position it as the operational hub that connects all event-related activities. This design allows the Match to unify various entities like Team, Venue, and Ticket, providing a complete view of each event. To accurately represent a real-world competition, we also modeled two specific relationships from Match to Team: one for the "Home Team" and one for the "Away Team". This approach clearly defines the roles of the participants and structurally enforces the rule that a match is a contest between two distinct teams.

Entities & Relationships

No	Entity Name	Purpose	Related Entities	Cardinality
1	Team	Record team information.	Coach	One to one
			Player	One to many
			Tournament	Many to many
2	Player	Record the players' personal files.	Team	One to many
			PLAYER_MATCH_STATS	One to many
3	Coach	Record coach information.	Team	One to one
4	Match	Record match information.	Tournament	One to many
			Court	One to one
			Match Summary	One to many
			Tickets	One to many
5	Tournament	Organize competitions and rankings.	Match	One to many
			Team_Ranking	One to many
			Team	Many to many
6	Referee	Record referee information.	Match	One to many
7	Record	Record the details and results of each match.	Match	One to one
8	Play_match_stats entity	Records a player's statistics in a single game.	Player	One to many
9	QUEUE	Schedule matches with fixed time slots.	Match	One to many
			Tournament	Many to many
10	Customer	Person buying tickets and owning orders	Order	One to Many
11	Order	A purchase transaction that groups tickets and total	Customer	Many to one
			Ticket	One to Many
			Payment	One to Many

12	Ticket	Records the ticket details like ticket type, status	Order	Many to One
			Match	Many to One
13	Venue	records the physical location that hosts matches	Match	One to Many
			Section	One to Many
14	Section	An area within a venue that contains seats.	Venue	Many to One
			Seat	One to Many
15	Seat	An individual place within a section that may be assigned to a ticket	Section	Many to One
			Ticket	Optional Many to Optional One
16	Payment	Records the charge,method of payment and the amount.	Order	Many to One
			Refund	One to Many
17	Refund	Money returned from a specific payment	Payment	Many to One
18	Tournament Queue	Record the team rankings and status in a tournament	Tournament	Many to One
			Team	Many to one
19	Home venue	Subtype of Venue	Venue	One to One
20	Away venue	Subtype of Venue	Venue	One to One
21	VIP seat	Subtype of Seat	Seat	One to one
22	Courtside seat	Subtype of Seat	Seat	One to one



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