

Northeastern University  
**DAMG6210** - Data Management and Database Design  
Project Phase - 1 : Database Design Document

MEMBERS

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Team name: Gen-D

PROJECT TOPIC:

Stadium Management System

PROBLEM STATEMENT:

Managing structures that host more than 80,000 spectators goes beyond land acquisition, construction, and engineering disciplines like civil, mechanical, and electrical. Stadiums are mega-structures generating data at a scale that needs to be collected, processed, managed, and verified in real time. Thus there is a need for an automated information system - Stadium Management System which will help integrate data across multiple sources like match tickets, stadium seats, price catalog, payments, discounts, etc. Moreover, there is a need to create a versatile system that can model and replicate any stadium structure with the ability to support pricing/discounting customizations and easy data audits.

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OBJECTIVES:

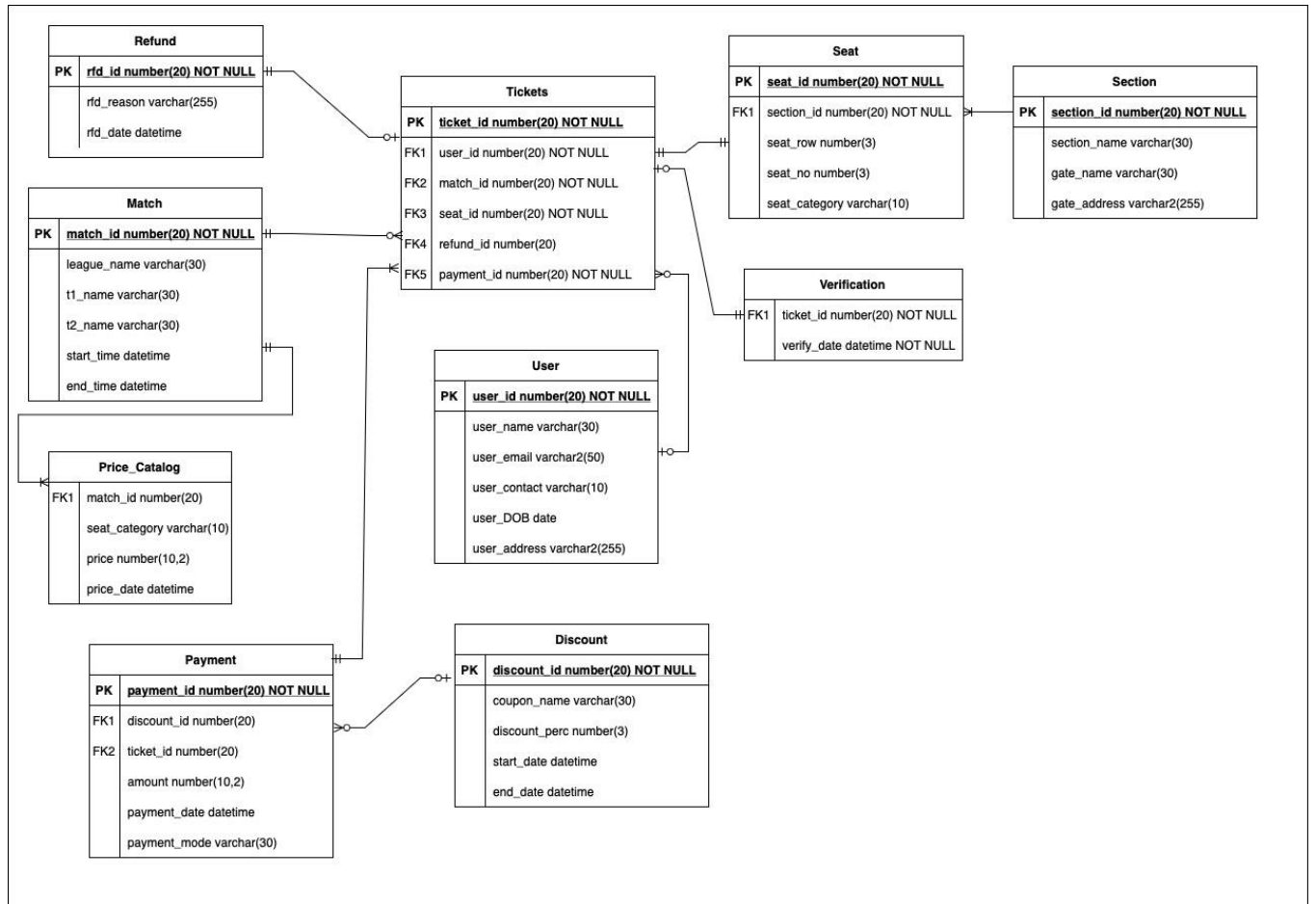
1. To customize seating arrangements, pricing strategies, offers and discounts, and stadium entry points as required by the stadium management team.
2. To manage matches across multiple leagues and multi-channel ticketing like online, in-person, etc.
3. To handle multiple ticket bookings via a single user and tracking corresponding payments.
4. To provide flexibility for users to cancel and refund tickets which are governed by the stadium's refund policies.
5. To allow real-time ticket verification for authorized entry to secure the stadium from unauthorized personnel.
6. To help the stadium management get insights into revenue generation, match-wise attendance, and many more activities.

PROPOSED SOLUTION:

1. The proposed solution brings together stakeholders like customers, stadium marketing, operations, finance, security, and management teams while managing data at a scale in real-time.
2. It allows the stadium management teams to model and customize the solution that best represents the stadium's structural elements, like sections, gates, rows, and seats. Any new seat additions concerning stadium expansion can be gracefully factored in and synced with the ticket booking module for upcoming matches.
3. The seats can be clubbed together as per ticket segments like general, gold, silver, VIP, and many more.
4. The solution also allows the stadium's marketing teams to customize a pricing strategy for ticket segments per match which can change over time.
5. Marketing teams have the ability to add discount coupons to attract customers that are verified automatically and applied as per the stadium's policies.
6. It also helps the management team manage and maintain match timetables across several leagues anticipated to take place in their stadium.
7. The solution maintains data relating to the stadium's customers. This data is used later while ticketing, payments, etc. While it does that, authentication and authorization of customers happen outside the system generally by an identity management service.
8. Customers have the flexibility to book single or multiple tickets for any upcoming matches. They can also benefit from the discount coupons set into the system. They also have the ability to cancel seats and ask for a refund in a particular timeline.
9. The stadium's finance team can track payments relating to ticket bookings and refund cases.
10. The stadium's operation team and security team can verify tickets in real time during a match and get an idea about stadium footfall.

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**E-R DIAGRAM:**



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**ENTITIES & ATTRIBUTES**

Entity 1: Refund

ATTRIBUTES	DATATYPE	CONSTRAINT
rfd_id	number(20)	NOT NULL, Primary key
rfd_reason	varchar(255)	
rfd_date	datetime	

Entity 2: Match

ATTRIBUTES	DATATYPE	CONSTRAINT
match_id	number(20)	NOT NULL, Primary key
league_name	varchar(30)	
t1_name	varchar(30)	
t2_name	varchar(30)	
start_time	datetime	
end_time	datetime	

Entity 3: Price\_Catalog

ATTRIBUTES	DATATYPE	CONSTRAINT
match_id	number(20)	Foreign key
seat_category	varchar(10)	
price	number(10,2)	
price_datetime	datetime	

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Entity 4: Payment

ATTRIBUTES	DATATYPE	CONSTRAINT
payment_id	number(20)	Primary Key
discount_id	number(20)	Foreign key
ticket_id	number(20)	Foreign Key
amount	number(10,2)	
payment_date	datetime	
payment_mode	varchar(30)	

Entity 5: Tickets

ATTRIBUTES	DATATYPE	CONSTRAINT
ticket_id	number(20)	Primary key, NOT NULL
user_id	number(20)	Foreign key, NOT NULL
match_id	number(20)	Foreign key, NOT NULL
seat_id	number(20)	Foreign key, NOT NULL
refund_id	number(20)	Foreign key
payments_id	number(20)	Foreign key, NOT NULL

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Entity 6:User

ATTRIBUTES	DATATYPE	CONSTRAINT
user_id	number(20)	Primary Key
user_name	varchar(30)	
user_email	varchar(50)	
user_contact	varchar(10)	
user_DOB	date	
user_address	varchar2(255)	

Entity 7: Discount

ATTRIBUTES	DATATYPE	CONSTRAINT
discount_id	number(20)	Primary key
coupon_name	varchar(30)	
discount_perc	number(3)	
start_date	datetime	
end_date	datetime	

Entity 8: seat

ATTRIBUTES	DATATYPE	CONSTRAINT
seat_id	number(20)	Primary key, NOT NULL
section_id	number(20)	Foreign key, NOT NULL
seat_row	number(3)	
seat_no	number(3)	
category	varchar(10)	

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Entity 9: Verification

ATTRIBUTES	DATATYPE	CONSTRAINT
ticket_id	number(20)	NOT NULL, Foreign key
verify_date	datetime	NOT NULL

Entity 10: Section

ATTRIBUTES	DATATYPE	CONSTRAINT
section_name	varchar(30)	
section_id	number(20)	Primary Key
gate_name	varchar(30)	
gate_address	varchar2(255)	