International Institute of Information Technology

Data And Applications

Project Phase-3

Team name: PVR

Submitted By

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1. **Minor modifications in the requirements document:**

   - In the names of the Entity types and attributes spaces are kept between 2 words but it is not allowed in the db.io hence whenever a space comes it is replaced by '_'.
   - In the Address attribute(Composite attribute) in Contact us all are written to be varchar but the Door_Number is changed from varchar to int and remaining are still varchar.
   - Primary key of entity "Contact_Us" is Social_Media, it is not specified in the previous requirements document.
   - The cardinality constraints of the Relations Commentators to Matches is changed to 1:1 from N:M relationship type(i.e a commentator can comment in utmost one match in the entire season and there will be only one commentator in a match) and the cardinality constraints from Franchise sponsor to Franchise, Relation is changed from N:M to 1:1 (i.e A Franchise sponsor can atmost sponsor to only one franchise and a Franchise has only one Franchise Sponsor).
   - There is an attribute Player_Type present in the Player entity it is removed because we are already storing the Player_Id's of Batsmen, Bowler and Wicket_Keeper in their relations so having a Player_Type will be redundancy hence it should be removed from the Player entity.

2. **Converting ER Model to Relational Model**

   Step-1:

   First all the strong entities (Franchise, Player, League Sponsor, Matches, Stadium, Contact us and Batsmen and Bowlers) are considered and relations are formed for them and all the simple attributes in the entities are also considered in case of composite attributes the simple components in the composite attributes are also considered.

   Step-2:

   In step2, we considered all weak entities and formed relations for them and included all simple attributes of these weak entities and then we included the primary key of the entity which is participating in identifying relationship with this weak entity as a foreign key of the weak entity (Match_ID for commentator and Franchise_Name for franchise sponsor).

   Step-3:

   Since the 1:1 relations present are identifying relationships (comments, sponsors) we took care of identifying relationships in previous step hence we can directly go to 4^{th} Step.

Step-4:

Now we need to consider all 1:N relationships in our database 1:N relationships are between (Match and Stadium) and (Player and Franchise) now we need to include the primary key of the entity Stadium(Stadium_Name) in the Match Table as foreign key and We need to include Primary Key of Franchise Franchise_Name in the Player as a foreign key.

Step-5:

Now we need to consider all N:M relationships Now we need to include the relationship between (Franchise and Match) We need to create a new relation which includes the Primary keys of Franchise (Name,Owner_Name) and Primary Keys of Match (Match_ID) in the table.

Step-6:

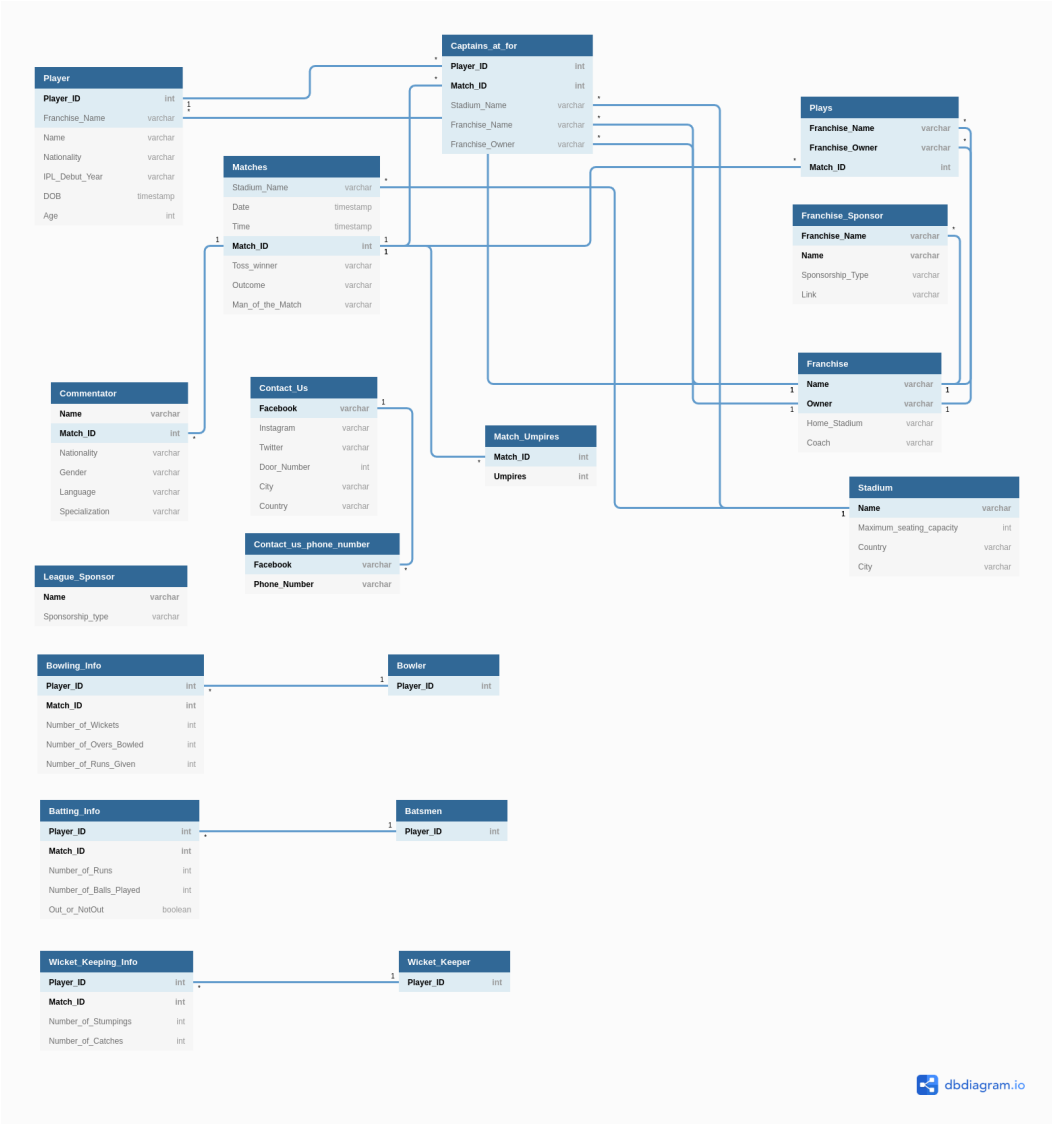
In this step we need to consider n-ary Relationships,here we consider Player Captains in a Match at a Stadium for a Franchise here we include all primary keys of Entities Participating as foreign keys in the new relation and We consider Match_ID+Player_ID as primary key of the relation.

Step-7:

In this step we will consider all the Multivalued Attributes like Umpires in the Matches entity and Batting_Info , Bowling_Info and Wicket_Keeping_Info in the Batsman,Bowler and Wicket_Keeper Entities Respectively For Umpires we consider Match_ID as foreign key and we include it in new relation, similarly for Batting info and Bowling info and Wicket keeping info we include Player_ID as the foreign key of the relationship and we consider Player_ID+Match_ID as the primary key for all these 3 Relations.

Relational model is present in the next page.

Relational Model:

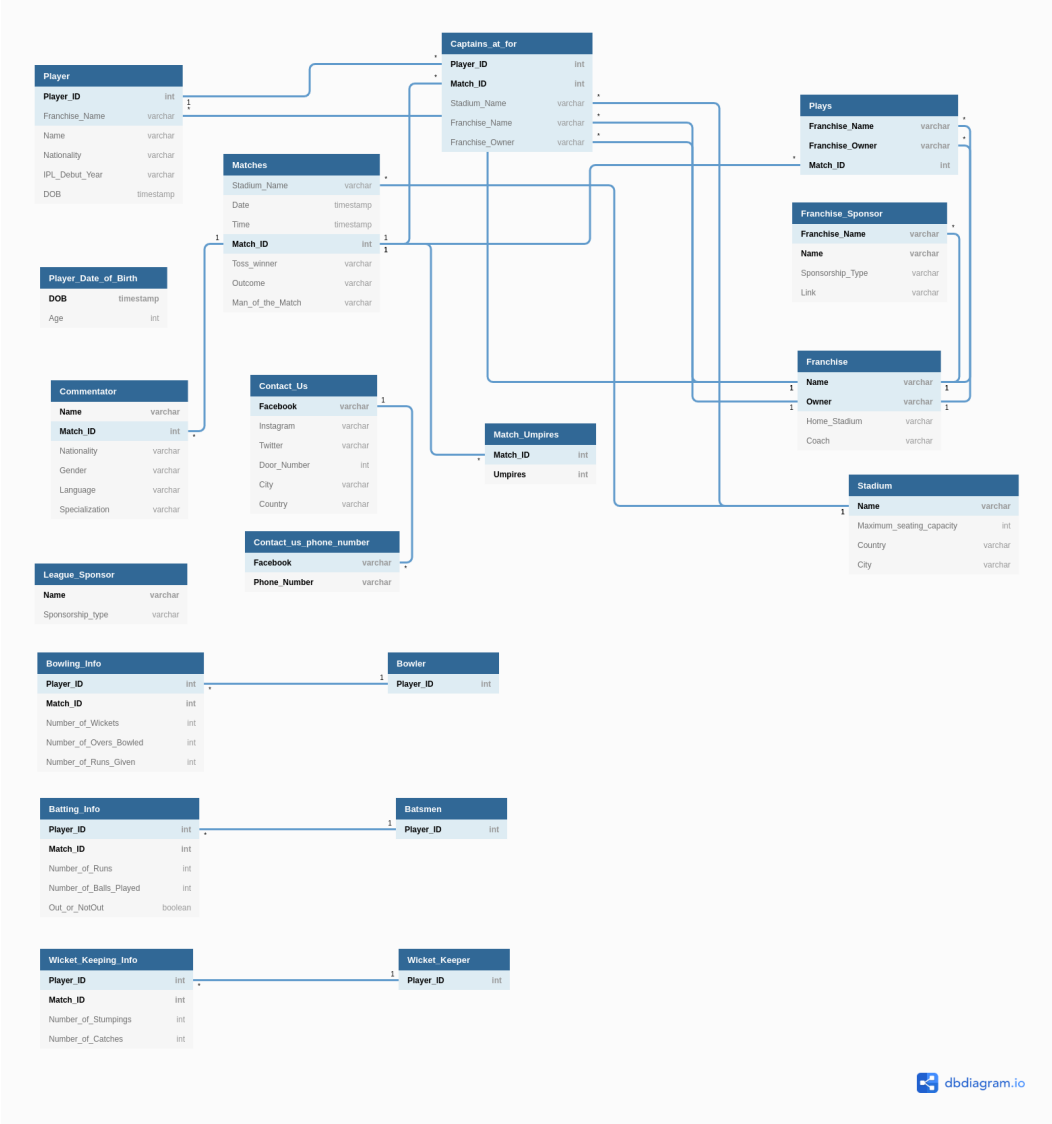


(No Changes from relational model to 1^{st} NF and from 1^{st} NF to 2^{nd} NF). Since all the attributes in this relational model are atomic hence the above relational model is in 1^{st} NF and also note that every non-prime attribute is fully dependent on the primary key and since it also satisfies 1^{st} NF also it satisfies 2^{nd} NF.

Note that the above relational model is not in 3^{rd} NF because in the Player Relation Age is functionally dependent on DOB and note that both DOB and Age are non-prime attributes hence we need to decompose this relation in to 2 relations Players and Date_of_Birth Hence after decomposition the Relational Datamodel looks like.

Relational Model after decomposition is present in the next page.

Relational Model after Decomposition:



Note that after decomposition of Player relation in every Functional Dependency X->Y, X is a superkey of that corresponding relation. Hence the above Relational model also satisfies BCNF.