Project Phase 3(Team fightFight ID: 56)

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Mapping ER Model to Relational Model

Changes Made to Model

1. **Team** was converted from a Weak Entity to a Strong Entity by adding a **team_id** attribute to the entity. As a result, the **5_stack_stats** relationship was converted from an identifying relationship to a normal binary relationship.

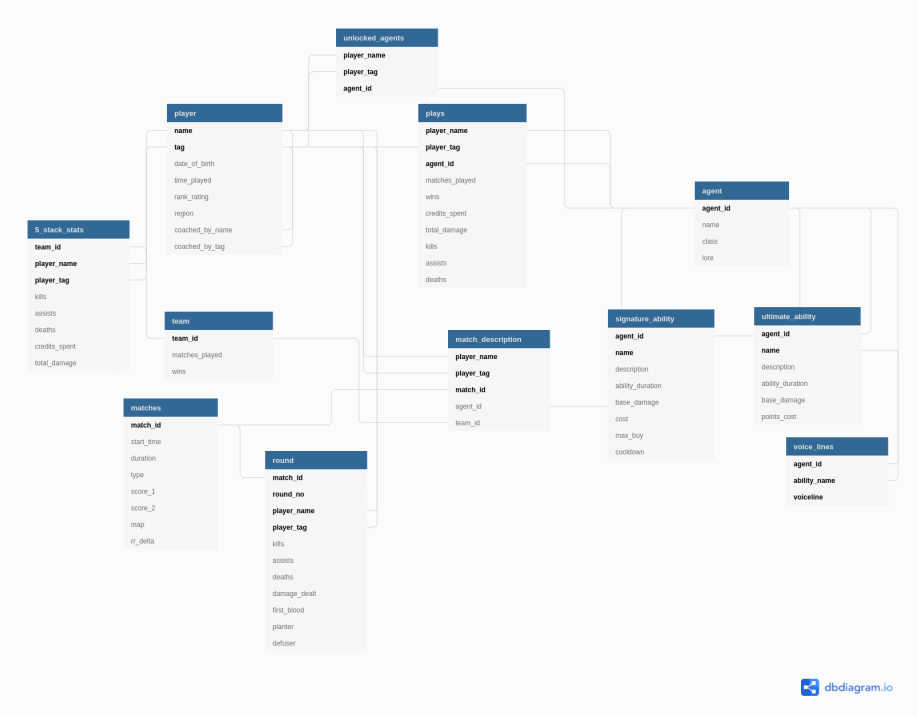
Explanation of Steps taken to Convert to Relational Model

1. All Entities were converted into relations with their primary key and the entity's attributes.
2. **Coaches** relationship was made into an attribute of relation **player** for the sake of the relational model. The attributes are **coached_by_name** and **coached_by_tag**, which are foreign keys of the **player** entity.
3. **plays** relationship was converted to a relation in the relational model as it was an **M:N** binary relationship (Relationship - relation approach). Primary keys of **player** and **agent** were added as foreign keys to the relation.
4. Since the specialization of **Abilities** is total and disjoint, we use the "Multiple relations - subclass relations only" approach. Hence, we created 2 relations, Signature ability and Ultimate ability, which contain the attributes of **Abilities** as well as their respective specialization attributes.
5. Composite attributes such as **Handle** in entity **Player, Match Score** in entity **Matches** were represented as only the attributes that comprise it. Hence, instead of **handle**, we listed attributes **name** and **tag,** and instead of **match score** we listed **score1** and **score2.**
6. Multivalued attributes were represented as a separate relation, such as **voicelines** and **unlocked agents.** Voicelines relation consists of the primary key of the ultimate ability (**agent_id + ability_name)** and the voiceline, while **unlocked agents** contains the primary key of **players** (**player_name + player_tag)** and the primary key of agents **(agent_id).**
7. Subclass **Ranked Match** was converted into a simple attribute of the entity **Match,** by listing the subclass's attribute **rr_delta** as an attribute of **Matches.** If the **type** attribute of **Matches** is not "Ranked" then **rr_delta** is NULL, else it'll contain a value.

8. Weak entities were converted into a relation by adding the primary key of the entity that identifies them and listing the rest of their attributes. **Round** was converted into a relation with primary key of **players(player_name + player_tag)** and **matches(match_id).** These three foreign keys + the partial key(**round_no)** acts as the primary key of the **Round** relation. The specializations of **Abilities** contained the primary key of **Agent(agent_id).** This foreign key along with the partial key **name** acts as the primary key of the s**ignature_ability** and **ultimate_ability.** The identifying relationships are also represented by this method
9. The 4-ary relationship **Match Description** was converted into a relation, containing the primary keys of **team(team_id), player(player_name + player_tag), agent(agent_id), matches(match_id).** The primary keys of the relation are chosen as **player_name + player_tag + match_id.**

First Normal Form

By converting the ER model to a relational model, we've automatically converted it into first normal form, as all attributes are atomic/simple/indivisible, i.e. no composite or multivalued attributes.



Second Normal Form

After converting the ER model to a relational model, we see that for every relation in the relational model, every non-prime attribute is fully functionally dependent on the primary key of the entity. Hence, the relational model is already in second normal form as well.

Third Normal Form

After converting the ER model to a relational model, we see that for every relation in the relational model, every non-prime attribute of every relation R in the relational model is not transitively dependent on the primary key of that relation. Hence, the relational model is already in third normal form as well.