Project Report 1

Short Description of the Company

It is an association that organizes soccer matches between different teams of the city. There are multiple teams that are associated with this soccer association and the association is responsible to keep track of the matches played by different teams. It also keeps track of the coaches and players who are playing for different teams.

Reasons Why the Company Needs a Database

The numbers of teams have increased, and it has become difficult for the association to keep track of the matches using a register. As the number of teams has increased the players have also increased dramatically so with the increase in data there are greater chances of association committing errors in keeping the record. To avoid any unfortunate incident and to keep the record in an easier way the association has decided to leverage from the database.

Business Requirements and Details

1. One team can play in more than one match. One match must be played by two teams. (M:N)

   The above relationship is M:N that is many-to-many as team may play in more than one match and a match is played between two teams, that is more than one. To resolve many-to-many relationship we will add an intermediate entity named as "Team_Match."
   After the intermediate table the relationship of "Team" and "Match" with the intermediate table will be strong as the intermediate table depends on both the tables.
   For "Team" and intermediate table it is mandatory on "one" side and optional on "many" side. The cardinalities are (1,1) on "one" side because it is mandatory and (0,M) on many side as it's optional for the team to be a part of any match.
   Between "Match" and the intermediate table it is mandatory on both sides. The cardinalities are (1,1) on "one" side and (1,2) on "many" side as business rule suggest that a match must be played between two teams and it is also mandatory.

2. One player must play for only one team. One team can have more than one player. (1:M)

   This is (1:M) relationship as every team can have more than one player but a player can only belong to one team. The relationship the two entities is weak as they both doesn't depend on each other. It is mandatory on "one" side as player must belong to a team and optional on "many" side as a Team may exist without a player. Thus, the cardinalities are (0,M) on many side as business rules suggest that a team can have more than one player but it is not necessary to have at least one player which means it

is optional. The other is (1,1) on "one" side as the business rule says player must belong to one team means it is mandatory.

3. One team must have only one coach. One coach must be coaching only one team. (1:1)

This is (1:1) relationship as every team has only one coach and one coach can only coach one team. The relationship between them is weak as they are not dependent on each other. It is mandatory on both sides according to business rules. The cardinality is (1,1) on both sides as business rule include the word must that means it is mandatory and it is one-to-one relationship.

Following are the two added business rules as specified for this homework

one business rule must describe a M:N relationship

4. One Coach must have one or can have more than one certification. One certification may be taken by more than one coach.

The above relationship is M:N that is many-to-many as coach must have one or more than one certification and a certification may be taken by more than one coach. To resolve many-to-many relationship we will add an intermediate entity named as "Coach_Certification."

After the intermediate table the relationship of "Coach" and "certification" with the intermediate table will be strong as the intermediate table depends on both the tables.

For "Coach" and intermediate table it is mandatory on "one" side and mandatory on "many" side. The cardinalities are (1,1) on "one" side because it is mandatory and (1,M) on many side as it's mandatory for the coach to have at least one certification.

Between "certification" and the intermediate table it is mandatory on one side and optional on many side. The cardinalities are (1,1) on "one" side and (0,M) on "many" side as business rule suggest that a certification may be with one or more coaches.

One business rule must describe a relationship that can be implemented using the EER model

5. This is "is_a" relationship. Player has specialization {Goalkeeper, Other}. It has a 'd' in a circle that suggest a disjoint which means an entity can be a part of at most one of the subclasses of specialization. The two lines after the circle suggest total 'total completeness' which means that every player must be a part of any one of the subclasses.

Following are the details of entities:

Coach, Team, Player and Match and Certification are strong entities while Team_Match and Coach_certification that are intermediary entities are weak entities.

Further, the Player has specialization {Goalkeeper, Other} that have their attributes along with that they will inherit attributes of their superclass that is Player.

The fully labelled diagram Entity-Relationship diagram for the above business requirements is shared below: