## Method I

From the number of relevant variables defined above, after **subjective discussion**, we come to the conclusion that some variables deserve better recognition compared to others. Particularly so, in this form of the game. Therefore, we decided to choose three variables each, from league and player perspective, which, according to us is most influential for the result of the game.

### ● Most relevant variables related to League:-

#### ❖ Matches Played-

Each club team plays a total of 38 matches (34 in case of Bundesliga, since the total number of teams in the league is 18) in one season. So, each club plays twice with each of the other 19 clubs (17 in case of Bundesliga). Duration of a match is 90 minutes divided into two halves of 45 minutes each, with some added minutes due to wastage for various reasons

So, the total number of matches played by a team in this season will be one of the key factors that will influence the ranking of the team.

#### ❖ Goal Difference-

It is the difference between the number of goals scored by a particular club and the number of goals scored against that club. It may a positive or a negative integer .If it is positive and higher then the rating of the team would be higher and if it is negative and lower then the rating of the team would be lower .

So, the goal difference of a team is also considered as a key factor which influence the ranking of the team.

#### ❖ Points Won-

Another factor that can be considered as important as the previous two is the points won by a team . A club earns 3 points for each win, loses 3 points of each loss and earns 1 point for each match drawn. The points column in the table shows the total number of points scored by each club after playing 38 matches (34 in case of Bundesliga).The team having higher points wins the league so this factor is very important for ranking a team.

From our minimal understanding of the football league game and after referring to various similar works, we decided subjectively to apply the weightage to the variables as given below -

#### Matches played - 1; Goal Difference - 3; Points won - 2

And the weights are now combined in **product weighted measure** to rate the team in the following way~

**Z score rating formula for Team : [{3\*(Goal Difference)}+{2\*(Points Won)}] /(Matches Played)**

***According to this Z score rating all the Teams are ranked . In this method, a Team with higher rating is a better team, so he will be ranked lower.***

Now, moving on the player department, we repeated the same process and decided to focus on three most relevant variables that boosts up the ranking of a Player in league format.

### ● Most Relevant Variables Related to Players :-

#### ❖ Matches Played-

A player can play for a single club only in a particular season. A player can play atmost 38 matches (34 in case of Bundesliga) in a season.The number of matches played by a player directly related to a player’s rating because if a player got more matches to play then he obviously got chance to score more goals and assists comparatively to the player played less matches than him. So we consider number of matches played as a key factor for our ranking system.

#### ❖ Goals-

It is the number of times a player puts the ball at the back of the net. The number of goals scored by a player obviously impacts on a player’s rating because the number of goals by a player increased then the possibility of win of his team will increase that implies the contributions of a player for his team. So, the number of goals scored is impactful for a player’s rating. That’s why we take number of goals as a key factor for our player ranking system.

#### ❖ Assists-

Another factor that can be considered as important as the previous two is the number of assists by a player. It is the pass from a player to another player of the same team just before he scores a goal. Assists are almost equally important like goal because an assist means a goal on your team scoreboard. Thus it also impacts on a player performance and rating. So, we consider assists as a key factor for our ranking system.

Again, from our minimal understanding of the football leagues and after referring to various similar works, we decided subjectively to apply the weightage to the player variables as given below -

#### Matches Played - 1; Goals - 1; Assists - 1

And the weights are now combined in **product weighted measure** to rate the players in the following way ~

**Z score rating formula for Players** : [{**(Goals)+(Assists)}\*(Goals)] /[Matches Played]**

***According to this Z Score rating all the players are ranked . In this method, a player with lower rating is a better player, so he will be ranked lower.***