```
In [1]: # This Python 3 environment comes with many helpful analytics libraries installed
          # It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
          # For example, here's several helpful packages to load
          import numpy as np # linear algebra
          import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
          # Input data files are available in the read-only "../input/" directory
          # For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory
          import os
          for dirname, _, filenames in os.walk('/kaggle/input'):
              for filename in filenames:
                   print(os.path.join(dirname, filename))
          # You can write up to 5GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version us
          ing "Save & Run All"
          # You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
          /kaggle/input/mi-vs-rcb/matches.csv
          /kaggle/input/mi-vs-rcb/deliveries.csv
In [2]: import pandas as pd
          import numpy as np
          import matplotlib.pyplot as plt
          import seaborn as sns
          df=pd.read_csv("../input/mi-vs-rcb/deliveries.csv")
          df.head()
          df.info()
          import os
          print(os.listdir("../input"))
          <class 'pandas.core.frame.DataFrame'>
          RangeIndex: 179078 entries, 0 to 179077
          Data columns (total 21 columns):
                                   Non-Null Count Dtype
               Column
                                  179078 non-null int64
               match id
           1 inning
                                  179078 non-null int64
           2 batting_team 179078 non-null object
               bowling_team
                                   179078 non-null object
                                   179078 non-null int64
               over
               ball
                                   179078 non-null int64
                                   179078 non-null object
               batsman
               non_striker
                                   179078 non-null object
               bowler
                                   179078 non-null object
                                   179078 non-null int64
               is_super_over
                                   179078 non-null int64
               wide_runs
                                   179078 non-null int64
               bye_runs
                                   179078 non-null int64
           12 legbye_runs
                                   179078 non-null int64
           13 noball_runs
           14 penalty_runs
                                   179078 non-null int64
           15 batsman_runs
                                   179078 non-null int64
           16 extra_runs
                                   179078 non-null int64
                                   179078 non-null int64
           17 total_runs
           18 player_dismissed 8834 non-null
                                                     object
           19 dismissal_kind
                                   8834 non-null
                                                     object
           20 fielder
                                   6448 non-null
                                                     object
          dtypes: int64(13), object(8)
          memory usage: 28.7+ MB
          ['mi-vs-rcb']
 In [3]: df1=pd.read_csv("../input/mi-vs-rcb/matches.csv")
          df1.info()
          <class 'pandas.core.frame.DataFrame'>
          RangeIndex: 756 entries, 0 to 755
          Data columns (total 18 columns):
                                  Non-Null Count Dtype
                Column
                                  -----
                                  756 non-null
                                                   int64
                                  756 non-null
                                                   int64
                season
               city
                                  749 non-null
                                                   object
                                                   object
                                  756 non-null
               date
                                                   object
               team1
                                  756 non-null
                                                   object
               team2
                                  756 non-null
               toss_winner
                                  756 non-null
                                                   object
               toss_decision
                                  756 non-null
                                                   object
               result
                                  756 non-null
                                                   object
               dl_applied
                                  756 non-null
                                                   int64
                                                   object
               winner
                                  752 non-null
           11 win_by_runs
                                  756 non-null
                                                   int64
           12 win_by_wickets
                                 756 non-null
                                                   int64
           13 player_of_match
                                 752 non-null
                                                   object
                                                   object
               venue
                                  756 non-null
           15 umpire1
                                  754 non-null
                                                   object
           16 umpire2
                                  754 non-null
                                                   object
           17 umpire3
                                                   object
                                  119 non-null
          dtypes: int64(5), object(13)
          memory usage: 106.4+ KB
          QUES 1
 In [4]: df2=df1[['id','team1','team2','winner','result','toss_winner','toss_decision','season',]]
          df2.head()
Out[4]:
              id
                                                                                                            toss_winner toss_decision season
                                  team1
                                                          team2
                                                                                  winner result
           0 1
                       Sunrisers Hyderabad Royal Challengers Bangalore
                                                                       Sunrisers Hyderabad normal Royal Challengers Bangalore
                                                                                                                                       2017
                                                                                                                                field
           1 2
                                                                     Rising Pune Supergiant normal
                                                                                                                                       2017
                           Mumbai Indians
                                             Rising Pune Supergiant
                                                                                                    Rising Pune Supergiant
                                                                                                                                field
           2 3
                             Gujarat Lions
                                                                       Kolkata Knight Riders normal
                                                                                                                                       2017
                                               Kolkata Knight Riders
                                                                                                     Kolkata Knight Riders
                                                                                                                                field
           3 4
                     Rising Pune Supergiant
                                                   Kings XI Punjab
                                                                           Kings XI Punjab normal
                                                                                                         Kings XI Punjab
                                                                                                                                       2017
                                                                                                                                field
           4 5 Royal Challengers Bangalore
                                                    Delhi Capitals Royal Challengers Bangalore normal Royal Challengers Bangalore
                                                                                                                                       2017
                                                                                                                                 bat
 In [5]: df3 = df2[(df2['team1']=='Royal Challengers Bangalore') & (df2['team2'] == 'Mumbai Indians') | (df2['team1']=='Mumbai Indians')
          & (df2['team2'] == 'Royal Challengers Bangalore')]
          df3
Out[5]:
                   id
                                                               team2
                                                                                                                 toss_winner toss_decision season
                                       team1
                                                                                       winner result
                  12 Royal Challengers Bangalore
                                                        Mumbai Indians
                                                                                Mumbai Indians normal
                                                                                                                                            2017
                                                                                                               Mumbai Indians
                                                                                                                                     field
                  37 Royal Challengers Bangalore
                                                        Mumbai Indians
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                            2017
            36
                                                                                                                                      bat
                  63
                                Mumbai Indians Royal Challengers Bangalore Royal Challengers Bangalore normal
                                                                                                               Mumbai Indians
                                                                                                                                     bat
                                                                                                                                            2008
            62
                  90 Royal Challengers Bangalore
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                     field
                                                                                                                                            2008
            89
                                                        Mumbai Indians
                 143
                                                                                                                                            2009
                                Mumbai Indians Royal Challengers Bangalore Royal Challengers Bangalore normal
                                                                                                               Mumbai Indians
           142
                                                                                                                                      bat
           152
                 153
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                     bat
                                                                                                                                            2009
                                Mumbai Indians Royal Challengers Bangalore
                                Mumbai Indians Royal Challengers Bangalore Royal Challengers Bangalore normal
                                                                                                                                            2010
                                                                                                               Mumbai Indians
                                                                                                                                     bat
           187
                 226
                                Mumbai Indians Royal Challengers Bangalore
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                            2010
                                                                                                                                     field
                 231
                                Mumbai Indians Royal Challengers Bangalore
           230
                                                                                Mumbai Indians normal
                                                                                                                                     bat
                                                                                                                                            2010
                                                                                                               Mumbai Indians
                 242 Royal Challengers Bangalore
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                     field
                                                                                                                                            2011
                                                        Mumbai Indians
                 306 Royal Challengers Bangalore
                                                        Mumbai Indians Royal Challengers Bangalore normal
                                                                                                                                     field
                                                                                                                                            2011
                                                                                                               Mumbai Indians
                 360
                                Mumbai Indians Royal Challengers Bangalore Royal Challengers Bangalore normal Royal Challengers Bangalore
           359
                                                                                                                                     field
                                                                                                                                            2012
                 367 Royal Challengers Bangalore
                                                        Mumbai Indians
                                                                                Mumbai Indians normal
                                                                                                                                     field
                                                                                                                                            2012
                                                                                                               Mumbai Indians
                 383 Royal Challengers Bangalore
                                                        Mumbai Indians Royal Challengers Bangalore normal
                                                                                                                                            2013
                                                                                                               Mumbai Indians
                                                                                                                                     field
                 417
                                Mumbai Indians Royal Challengers Bangalore
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                            2013
                                                                                                                                     bat
           416
                                Mumbai Indians Royal Challengers Bangalore Royal Challengers Bangalore normal Royal Challengers Bangalore
                 462
                                                                                                                                     field
                                                                                                                                            2014
           461
                 484
                                Mumbai Indians Royal Challengers Bangalore
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                     field
                                                                                                                                            2014
           483
                 534
                                Mumbai Indians Royal Challengers Bangalore
                                                                                                                                     field
           533
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                            2015
                 562 Royal Challengers Bangalore
                                                        Mumbai Indians Royal Challengers Bangalore normal Royal Challengers Bangalore
           561
                                                                                                                                     bat
                                                                                                                                            2015
                 590 Royal Challengers Bangalore
                                                        Mumbai Indians
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                     field
                                                                                                                                            2016
                 617 Royal Challengers Bangalore
                                                                                Mumbai Indians normal
                                                                                                               Mumbai Indians
                                                                                                                                     field
                                                                                                                                            2016
                                                        Mumbai Indians
                                Mumbai Indians Royal Challengers Bangalore
                7907
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                            2018
                                                                                                                                     field
           649
                                                        Mumbai Indians Royal Challengers Bangalore normal
                7924 Royal Challengers Bangalore
                                                                                                                                            2018
                                                                                                               Mumbai Indians
                                                                                                                                     field
                                Mumbai Indians Royal Challengers Bangalore
           702 11143
                                                                                Mumbai Indians normal Royal Challengers Bangalore
                                                                                                                                     field
                                                                                                                                            2019
           726 11322 Royal Challengers Bangalore
                                                        Mumbai Indians
                                                                                Mumbai Indians normal
                                                                                                                                     field
                                                                                                                                            2019
                                                                                                               Mumbai Indians
 In [6]: df3['winner'].value_counts()
 Out[6]: Mumbai Indians
                                            16
          Royal Challengers Bangalore
                                             9
          Name: winner, dtype: int64
          total_matches=df3['id'].nunique()
          total_matches
Out[7]: 25
 In [8]: sns.countplot(df3['winner'])
          plt.text(1,9,str(9))
          plt.text(0,16,str(16))
Out[8]: Text(0, 16, '16')
             16
             14
             12
             10
           count
              2 :
                      Mumbai Indians
                                         Royal Challengers Bangalore
 In [9]: df3['toss_decision'].value_counts()
Out[9]: field
                   17
          bat
          Name: toss_decision, dtype: int64
In [10]: matches_played=pd.concat([df1['team1'],df1['team2']])
          matches_played=matches_played.value_counts().reset_index()
          matches_played.columns=['Team','Total Matches']
          matches_played['wins']=df1['winner'].value_counts().reset_index()['winner']
          matches_played.set_index('Team',inplace=True)
          matches_played.reset_index().head(8)
Out[10]:
                               Team Total Matches wins
                        Mumbai Indians
                                              187 109
           1 Royal Challengers Bangalore
                                              180
                                                   100
                   Kolkata Knight Riders
                                              178
                         Delhi Capitals
                                              177
                                                    84
                       Kings XI Punjab
                                              176
                                                    82
                   Chennai Super Kings
                                              164
                                                    77
           5
                      Rajasthan Royals
                                              147
                                                   75
           6
                                              108
                    Sunrisers Hyderabad
           7
                                                    58
In [11]: win_percentage = round(matches_played['wins']/matches_played['Total Matches'],3)*100
          win_percentage.head(8)
Out[11]: Team
          Mumbai Indians
                                            58.3
                                            55.6
          Royal Challengers Bangalore
          Kolkata Knight Riders
                                            51.7
          Delhi Capitals
                                            47.5
          Kings XI Punjab
                                            46.6
          Chennai Super Kings
                                            47.0
          Rajasthan Royals
                                            51.0
          Sunrisers Hyderabad
                                            53.7
          dtype: float64
```



177

176

14

178

187

46

147

16

14

180

108

30

Delhi Capitals

Gujarat Lions

Kings XI Punjab

Mumbai Indians

Rajasthan Royals

Pune Warriors

Kochi Tuskers Kerala

Kolkata Knight Riders

Rising Pune Supergiant

Rising Pune Supergiants

Sunrisers Hyderabad

In [13]: plt.figure(figsize=(10,10))

Name: id, dtype: int64

plt.xticks(rotation=90)

plt.title('WIN PERCENTAGE BY TEAMS')

Out[13]: Text(0.5, 1.0, 'WIN PERCENTAGE BY TEAMS')

Royal Challengers Bangalore

30

plt.bar(win_percentage.index,((df1['winner'].value_counts()/ total)*100).sort_values())

WIN PERCENTAGE BY TEAMS



In [34]: | df4= df[['match_id','bowling_team','batting_team','total_runs','bowler','player_dismissed']]

df4['player_dismissed'] = df4['player_dismissed'].apply(lambda x: '1' if x!= 0 else 0)

Mumbai Indians Royal Challengers Bangalore

m']=='Mumbai Indians') & (df4['bowling_team'] == 'Royal Challengers Bangalore')]

bowling_team

11322 Royal Challengers Bangalore 172271 11322 Royal Challengers Bangalore 172272 11322 Royal Challengers Bangalore 172273 172274 11322 Royal Challengers Bangalore

172275

QUES 2

df4=df4.fillna(0)

match_id

12

12

12

12

12

KA Pollard

KH Pandya

Mohammed Siraj

172073

df5

172196

match_id

Out[20]:

M Ali

11322 Royal Challengers Bangalore

204

180

30

92

df4

2633

2634

2635

2636

2637

Out[34]:

1161 rows × 6 columns In [36]: df4.groupby('bowler').agg({'player_dismissed':'count'}) Out[36]: player_dismissed bowler JJ Bumrah 310

df4 = df4[(df4['batting_team']=='Royal Challengers Bangalore') & (df4['bowling_team'] == 'Mumbai Indians') | (df4['batting_tea

df4=df4[(df4['bowler'] == 'RD Chahar') | (df4['bowler'] == 'TA Boult') | (df4['bowler'] == 'JJ Bumrah') | (df4['bowler'] == 'KA

Pollard') | (df4['bowler'] == 'KH Pandya') | (df4['bowler'] == 'N Saini') | (df4['bowler'] == 'Mohammed Siraj') | (df4['bowler']

0

bowler player_dismissed

0

0

0

JJ Bumrah

JJ Bumrah

JJ Bumrah

JJ Bumrah

JJ Bumrah

2 Mohammed Siraj

1 Mohammed Siraj

0 Mohammed Siraj

2 Mohammed Siraj

1 Mohammed Siraj

r'] == 'CH Morris') |(df4['bowler'] == 'YS Chahal') | (df4['bowler'] == 'M Ali') | (df4['bowler'] == 'Washington Sundar')]

batting_team total_runs

Mumbai Indians

Mumbai Indians

Mumbai Indians

Mumbai Indians

Mumbai Indians

	N Saini	İ	44			
	RD Chahar	•	24			
Wa	shington Sundar	•	19			
	YS Chahal	1 2	258			
Q	UES 5					
	=df4[(df4['ba		g_team','batting_team' == 'Royal Challenger:			
	match_id	bowling_team	batting_team	total_runs	ball	over
2	_		batting_team Royal Challengers Bangalore	_	ball 1	over
	2589 12	Mumbai Indians		1		over 1 1
2	2589 12 2590 12	Mumbai Indians Mumbai Indians	Royal Challengers Bangalore	1	1	over
2	2589 12 2590 12 2591 12	Mumbai Indians Mumbai Indians Mumbai Indians	Royal Challengers Bangalore Royal Challengers Bangalore	1 1 1	1 2 3	1

	172074	11322	Mumbai Indians	Royal Challengers Bangalo	re	0	3	6				
	172075	11322	Mumbai Indians	Royal Challengers Bangalo	re	4	4	6				
	172076	11322	Mumbai Indians	Royal Challengers Bangalo	re	0	5	6				
	172077	11322	Mumbai Indians	Royal Challengers Bangalo	re	0	6	6				
	937 rows ×	6 colum	nns									
In [17]:	df4['match_id'].nunique()											
Out[17]:	25											
In [18]:	total_runs_for_MI_in_first_six_overs_vs_RCB=df4['total_runs'].sum() total_runs_for_MI_in_first_six_overs_vs_RCB											
Out[18]:	1076											
In [19]:	<pre>runs_per_matchfor_MI_in_first_six_overs_vs_RCB=total_runs_for_MI_in_first_six_overs_vs_RCB/total_matches runs_per_matchfor_MI_in_first_six_overs_vs_RCB</pre>											
Out[19]:	43.04											
In [20]:				_team','batting_team == 'Mumbai Indians'				all','over']] _team'] == 'Royal Challengers Bangalore') & (df5['over'] < 7)]				

11322 Mumbai Indians Royal Challengers Bangalore

12 Royal Challengers Bangalore Mumbai Indians 2713 2714 12 Royal Challengers Bangalore Mumbai Indians 12 Royal Challengers Bangalore Mumbai Indians 2715 2716 12 Royal Challengers Bangalore Mumbai Indians 2717 12 Royal Challengers Bangalore Mumbai Indians 11322 Royal Challengers Bangalore Mumbai Indians 172195

11322 Royal Challengers Bangalore Mumbai Indians

bowling_team

```
11322 Royal Challengers Bangalore Mumbai Indians
          172197
                     11322 Royal Challengers Bangalore Mumbai Indians
           172198
                     11322 Royal Challengers Bangalore Mumbai Indians
                                                                      1 6
           172199
          955 rows × 6 columns
In [21]: df5['match_id'].nunique()
Out[21]: 25
In [22]: total_runs_for_RCB_in_first_six_overs_vs_MI=df5['total_runs'].sum()
          total_runs_for_RCB_in_first_six_overs_vs_MI
Out[22]: 1125
In [23]: runs_per_match__for_RCB_in_first_six_overs_vs_MI=total_runs_for_RCB_in_first_six_overs_vs_MI/total_matches
```

Out[23]: 45.0 In [24]: difference_in_runs_for_MI_as_compared_to_RCB=runs_per_match__for_MI_in_first_six_overs_vs_RCB - runs_per_match__for_RCB_in_first_six_overs_vs_RCB _in_first_six_overs_vs_RCB_in_first_first_six_overs_vs_RCB_in_first_six_overs_vs_RCB_in_first_first_six_overs_vs_RCB_in_firs _six_overs_vs_MI

difference_in_runs_for_MI_as_compared_to_RCB

Out[24]: -1.9600000000000000 In [25]: #DIFFERENCE IS 2 RUNS(ROUNDOFF)

batting_team total_runs ball over

0 1 1

In []:

runs_per_match__for_RCB_in_first_six_overs_vs_MI