EDA - Exploratory Data Analysis

- It is the process to know more about the data.
- Exploring the data
- To understand different aspects of data

Steps

- Data collection
- Find all variables and understand them
- Clean the dataset(if null values present)
- Identify correlated variables
- Choose the right statistical method
- Analyze and Visualize results

Analysis of IPL Dataset

- Here we are analyzing the dataset of IPL(Indian Premier League), which includes analysis of match information,match season,toss winners,max match winners,etc.
- Number of matches played in each season
- Cities where >40 matches played
- Max no of wins by a team in each season
- Max no of toss winners
- Player with most man of match awards

In [148]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [149]:
```
dt=pd.read_excel(r"C:\Users\lenovo\Downloads\matches.xlsx")
dt
```

Out[149]:

	id	season	city	date	team1	team2	toss_winner	toss_decision	result	dl_applied	winner	win_by_runs	win_b
0	1	2017	Hyderabad	2017-04-05	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Sunrisers Hyderabad	35	
1	2	2017	Pune	2017-04-06	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	0	Rising Pune Supergiant	0	
2	3	2017	Rajkot	2017-04-07	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Kolkata Knight Riders	0	
3	4	2017	Indore	2017-04-08	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	0	Kings XI Punjab	0	
4	5	2017	Bangalore	2017-04-08	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	0	Royal Challengers Bangalore	15	
...	...	...	...	...	...	...	...	...	...	...	...	...	
631	632	2016	Raipur	2016-05-22	Delhi Daredevils	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Royal Challengers Bangalore	0	
632	633	2016	Bangalore	2016-05-24	Gujarat Lions	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Royal Challengers Bangalore	0	
633	634	2016	Delhi	2016-05-25	Sunrisers Hyderabad	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Sunrisers Hyderabad	22	
634	635	2016	Delhi	2016-05-27	Gujarat Lions	Sunrisers Hyderabad	Sunrisers Hyderabad	field	normal	0	Sunrisers Hyderabad	0	
635	636	2016	Bangalore	2016-05-29	Sunrisers Hyderabad	Royal Challengers Bangalore	Sunrisers Hyderabad	bat	normal	0	Sunrisers Hyderabad	8	

636 rows × 18 columns

In [150]:
```
dt.shape
```

Out[150]:
```
(636, 18)
```

In [151]:
```
dt.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 636 entries, 0 to 635
Data columns (total 18 columns):
 #   Column           Non-Null Count  Dtype         
---  ------           --------------  -----         
 0   id               636 non-null    int64         
 1   season           636 non-null    int64         
 2   city             629 non-null    object        
 3   date             636 non-null    datetime64[ns]
 4   team1            636 non-null    object        
 5   team2            636 non-null    object        
 6   toss_winner      636 non-null    object        
 7   toss_decision    636 non-null    object        
 8   result           636 non-null    object        
 9   dl_applied       636 non-null    int64         
 10  winner           633 non-null    object        
 11  win_by_runs      636 non-null    int64         
 12  win_by_wickets   636 non-null    int64         
 13  player_of_match  633 non-null    object        
 14  venue            636 non-null    object        
 15  umpire1          635 non-null    object        
 16  umpire2          635 non-null    object        
 17  umpire3          0 non-null      float64       
dtypes: datetime64[ns](1), float64(1), int64(5), object(11)
memory usage: 89.6+ KB
```

In [152]:
```
dt.drop(['id','date','umpire1','umpire2','umpire3'],axis=1,inplace=True)
dt
```

Out[152]:

	season	city	team1	team2	toss_winner	toss_decision	result	dl_applied	winner	win_by_runs	win_by_wicket
0	2017	Hyderabad	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Sunrisers Hyderabad	35	
1	2017	Pune	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	0	Rising Pune Supergiant	0	
2	2017	Rajkot	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Kolkata Knight Riders	0	1
3	2017	Indore	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	0	Kings XI Punjab	0	
4	2017	Bangalore	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	0	Royal Challengers Bangalore	15	
...	...	...	...	...	...	...	...	...	...	...	
631	2016	Raipur	Delhi Daredevils	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Royal Challengers Bangalore	0	
632	2016	Bangalore	Gujarat Lions	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Royal Challengers Bangalore	0	
633	2016	Delhi	Sunrisers Hyderabad	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Sunrisers Hyderabad	22	
634	2016	Delhi	Gujarat Lions	Sunrisers Hyderabad	Sunrisers Hyderabad	field	normal	0	Sunrisers Hyderabad	0	
635	2016	Bangalore	Sunrisers Hyderabad	Royal Challengers Bangalore	Sunrisers Hyderabad	bat	normal	0	Sunrisers Hyderabad	8	

636 rows × 13 columns

In [153]:
```
dt.columns
```

Out[153]:
```
Index(['season', 'city', 'team1', 'team2', 'toss_winner', 'toss_decision',
       'result', 'dl_applied', 'winner', 'win_by_runs', 'win_by_wickets',
       'player_of_match', 'venue'],
      dtype='object')
```

No of matches in each season

In [154]:
```
dt.season.value_counts()
```

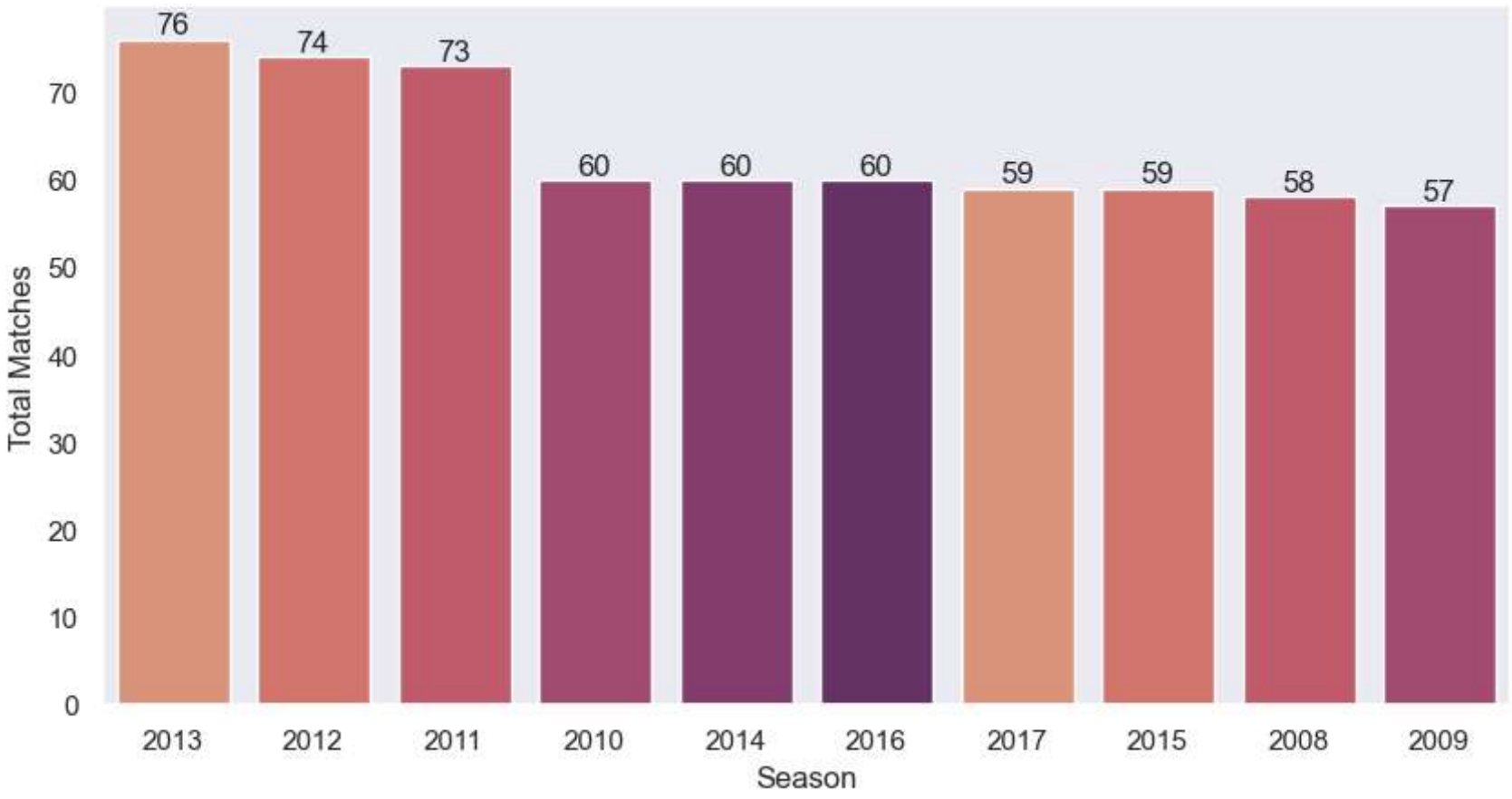
Out[154]:
```
2013    76
2012    74
2011    73
2010    60
2014    60
2016    60
2017    59
2015    59
2008    58
2009    57
Name: season, dtype: int64
```

In [155]:
```
df=pd.DataFrame({'Season':dt.season.value_counts().index,'Total Matches':dt.season.value_counts().values})
df
```

Out[155]:

	Season	Total Matches
0	2013	76
1	2012	74
2	2011	73
3	2010	60
4	2014	60
5	2016	60
6	2017	59
7	2015	59
8	2008	58
9	2009	57

In [156]:
```
plt.figure(figsize=(10,5),dpi=100)
ax=sns.barplot(x='Season',y='Total Matches',data=df,order=df['Season'],palette=sns.color_palette('flare'))
for i in ax.containers:
        ax.bar_label(i)
plt.show()
```



Number of Cities where matches held

In [11]:
```
dt.city.unique()
```

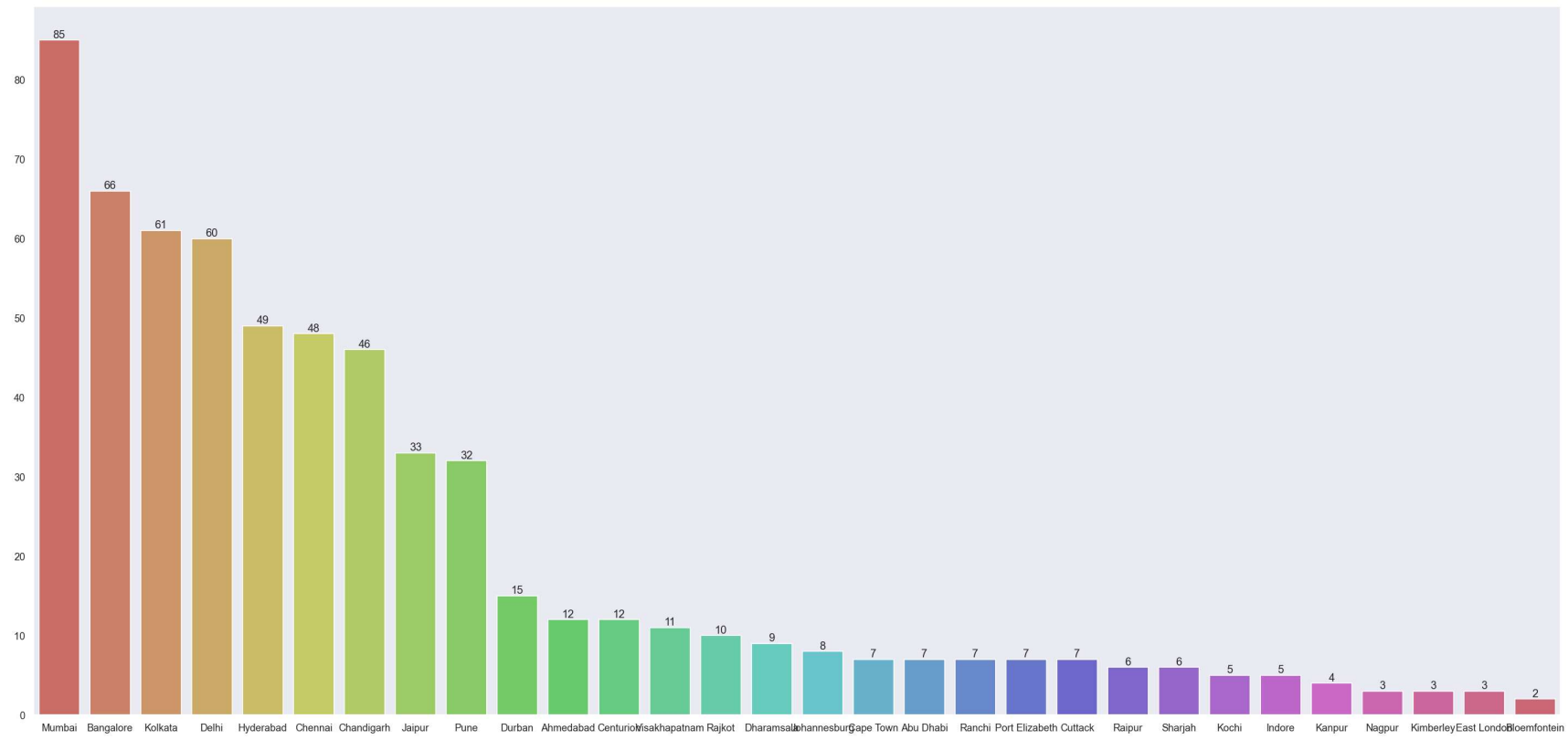
Out[11]:
```
array(['Hyderabad', 'Pune', 'Rajkot', 'Indore', 'Bangalore', 'Mumbai',
       'Kolkata', 'Delhi', 'Chandigarh', 'Kanpur', 'Jaipur', 'Chennai',
       'Cape Town', 'Port Elizabeth', 'Durban', 'Centurion',
       'East London', 'Johannesburg', 'Kimberley', 'Bloemfontein',
       'Ahmedabad', 'Cuttack', 'Nagpur', 'Dharamsala', 'Kochi',
       'Visakhapatnam', 'Raipur', 'Ranchi', 'Abu Dhabi', 'Sharjah', nan],
      dtype=object)
```

Number of matches played in a particular city

In [12]:
```
city=dt.city.value_counts()
city
```

Out[12]:
```
Mumbai           85
Bangalore        66
Kolkata          61
Delhi            60
Hyderabad        49
Chennai          48
Chandigarh       46
Jaipur           33
Pune             32
Durban           15
Ahmedabad        12
Centurion        12
Visakhapatnam    11
Rajkot           10
Dharamsala        9
Johannesburg      8
Cape Town         7
Abu Dhabi         7
Ranchi            7
Port Elizabeth    7
Cuttack           7
Raipur            6
Sharjah           6
Kochi             5
Indore            5
Kanpur            4
Nagpur            3
Kimberley         3
East London       3
Bloemfontein      2
Name: city, dtype: int64
```

In [61]:
```
plt.figure(figsize=(30,14),dpi=120)
ax=sns.barplot(x=city.index,y=city.values,palette='hls')
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```



Cities where more then 40 matches have been played

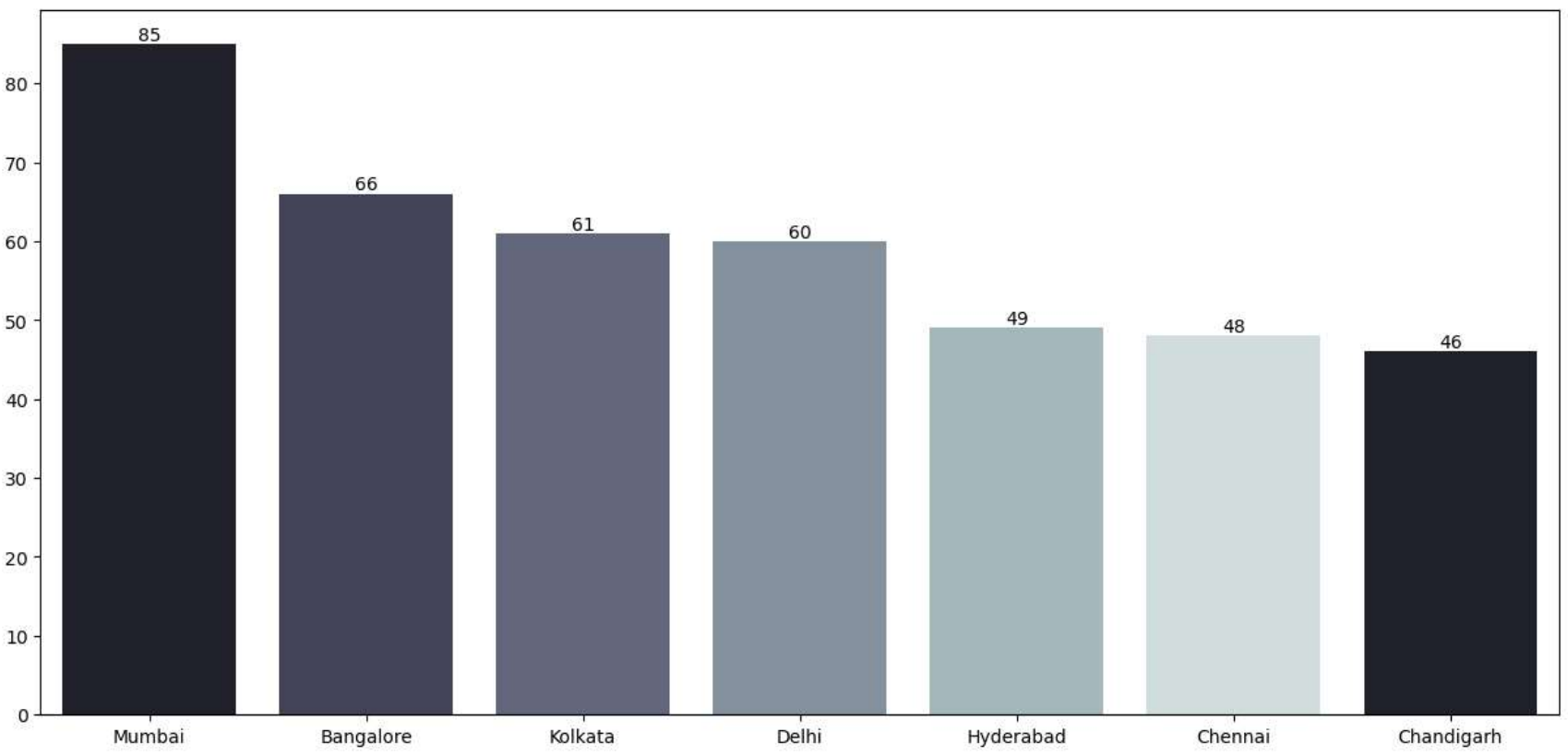
In [14]:
```
city>40
```

Out[14]:
```
Mumbai             True
Bangalore          True
Kolkata            True
Delhi              True
Hyderabad          True
Chennai            True
Chandigarh         True
Jaipur            False
Pune              False
Durban            False
Ahmedabad         False
Centurion         False
Visakhapatnam     False
Rajkot            False
Dharamsala        False
Johannesburg      False
Cape Town         False
Abu Dhabi         False
Ranchi            False
Port Elizabeth    False
Cuttack           False
Raipur            False
Sharjah           False
Kochi             False
Indore            False
Kanpur            False
Nagpur            False
Kimberley         False
East London       False
Bloemfontein      False
Name: city, dtype: bool
```

In [15]:
```
city[city>40]
```

Out[15]:
```
Mumbai        85
Bangalore     66
Kolkata       61
Delhi         60
Hyderabad     49
Chennai       48
Chandigarh    46
Name: city, dtype: int64
```

In [16]:
```
plt.figure(figsize=(15,7),dpi=100)
ax=sns.barplot(x=city[city>40].index,y=city[city>40].values,palette=sns.color_palette('bone'))
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

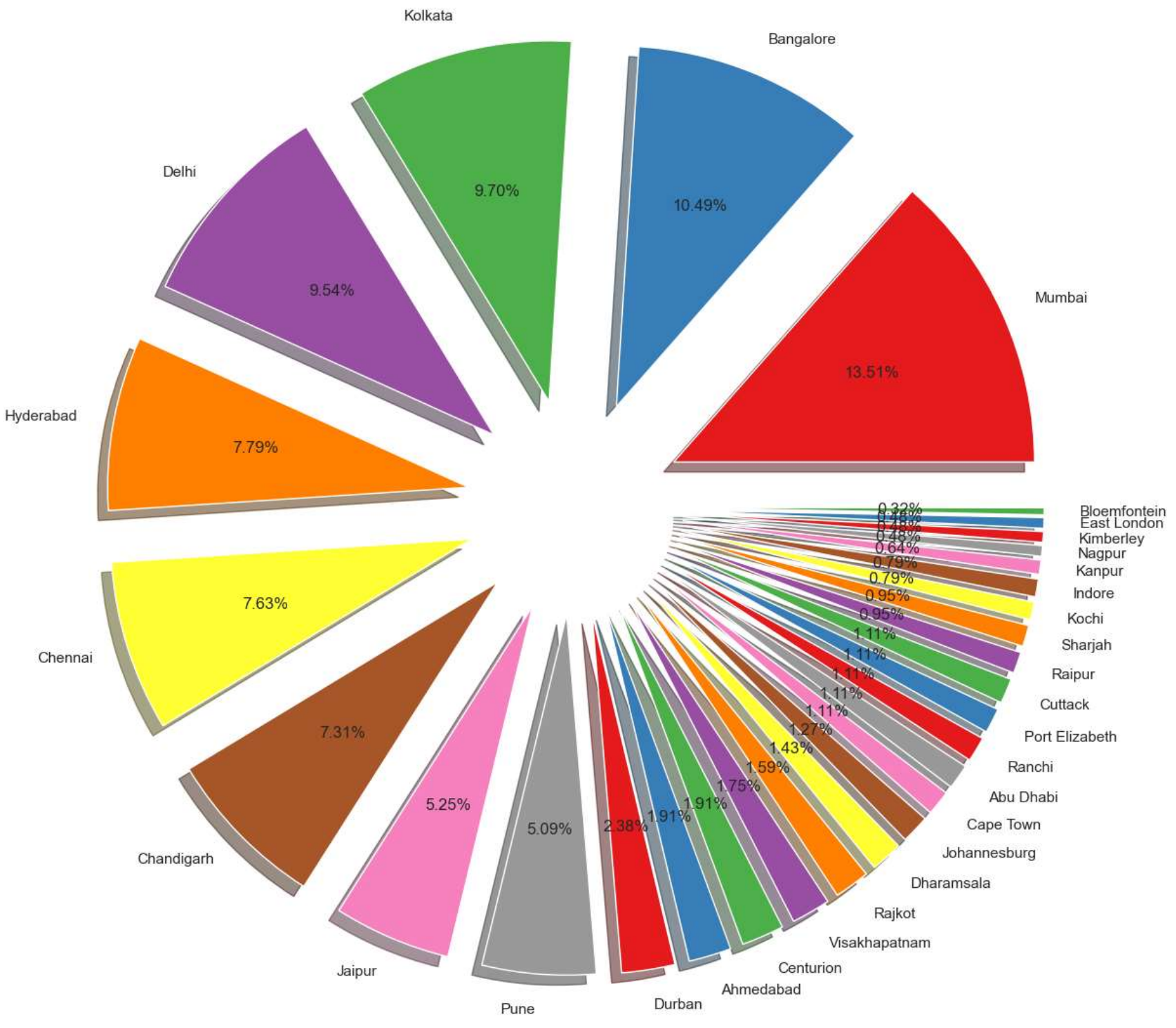


Percentage of most matches played in a city

In [17]:
```
dt.city.value_counts()*100/len(dt)    #using formula of finding % of something.....
```

Out[17]:
```
Mumbai            13.364780
Bangalore         10.377358
Kolkata            9.591195
Delhi              9.433962
Hyderabad          7.704403
Chennai            7.547170
Chandigarh         7.232704
Jaipur             5.188679
Pune               5.031447
Durban             2.358491
Ahmedabad          1.886792
Centurion          1.886792
Visakhapatnam      1.729560
Rajkot             1.572327
Dharamsala         1.415094
Johannesburg       1.257862
Cape Town          1.100629
Abu Dhabi          1.100629
Ranchi             1.100629
Port Elizabeth     1.100629
Cuttack            1.100629
Raipur             0.943396
Sharjah            0.943396
Kochi              0.786164
Indore             0.786164
Kanpur             0.628931
Nagpur             0.471698
Kimberley          0.471698
East London        0.471698
Bloemfontein       0.314465
Name: city, dtype: float64
```

In [142]:
```
plt.figure(figsize=(12,12),dpi=100)
plt.pie(dt.city.value_counts()*100/len(dt),labels=dt.city.value_counts().index,
        autopct='%.2f%%',shadow=True,explode=[0.3 for i in range(30)],colors=sns.color_palette('Set1'))
plt.show()
```

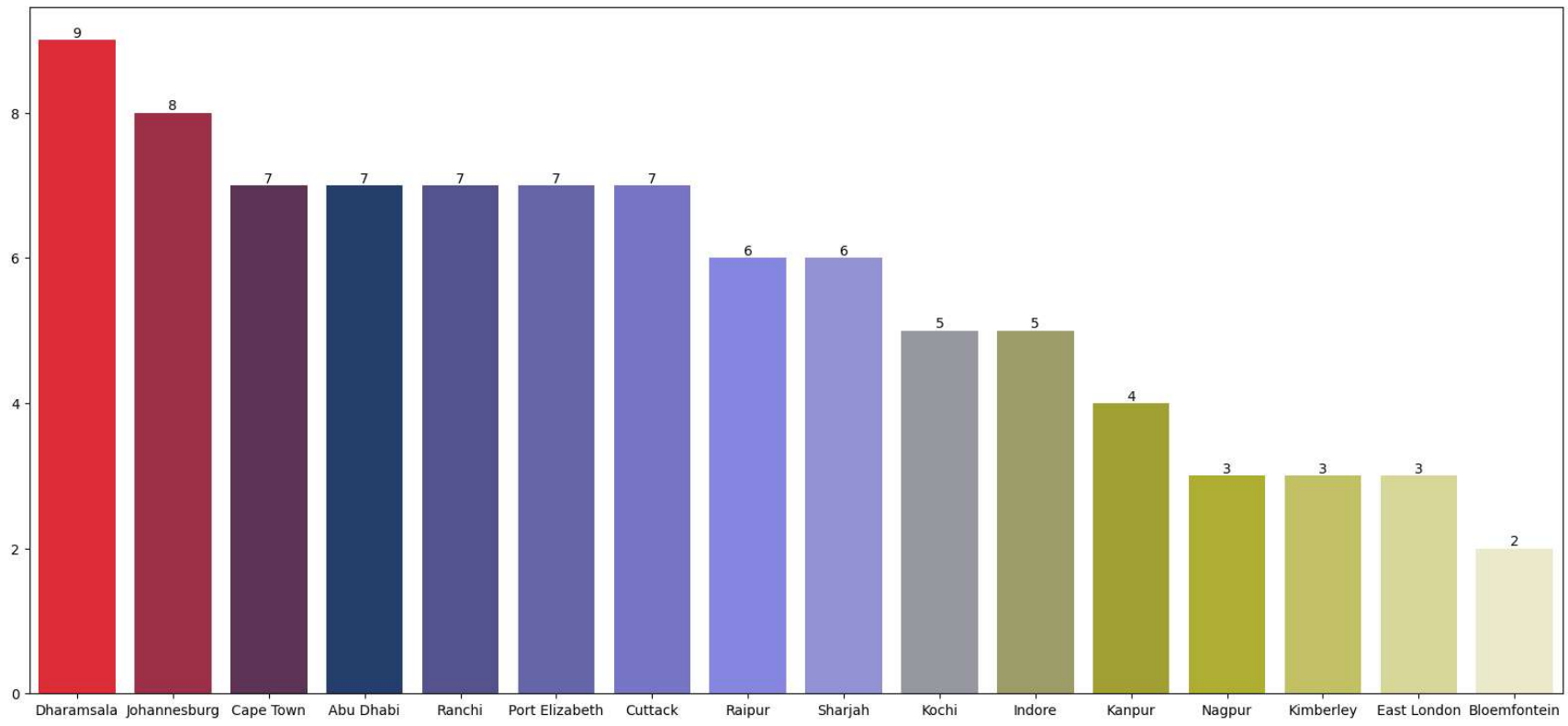


Cities where less then 10 matches have been played

In [19]:
```
city[city<10]
```

Out[19]:
```
Dharamsala        9
Johannesburg      8
Cape Town         7
Abu Dhabi         7
Ranchi            7
Port Elizabeth    7
Cuttack           7
Raipur            6
Sharjah           6
Kochi             5
Indore            5
Kanpur            4
Nagpur            3
Kimberley         3
East London       3
Bloemfontein      2
Name: city, dtype: int64
```

In [20]:
```
plt.figure(figsize=(20,9),dpi=100)
ax=sns.barplot(x=city[city<10].index,y=city[city<10].values,palette='gist_stern')
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```



Name of all winners in each season

In [21]:
```
dt.winner.unique()
```

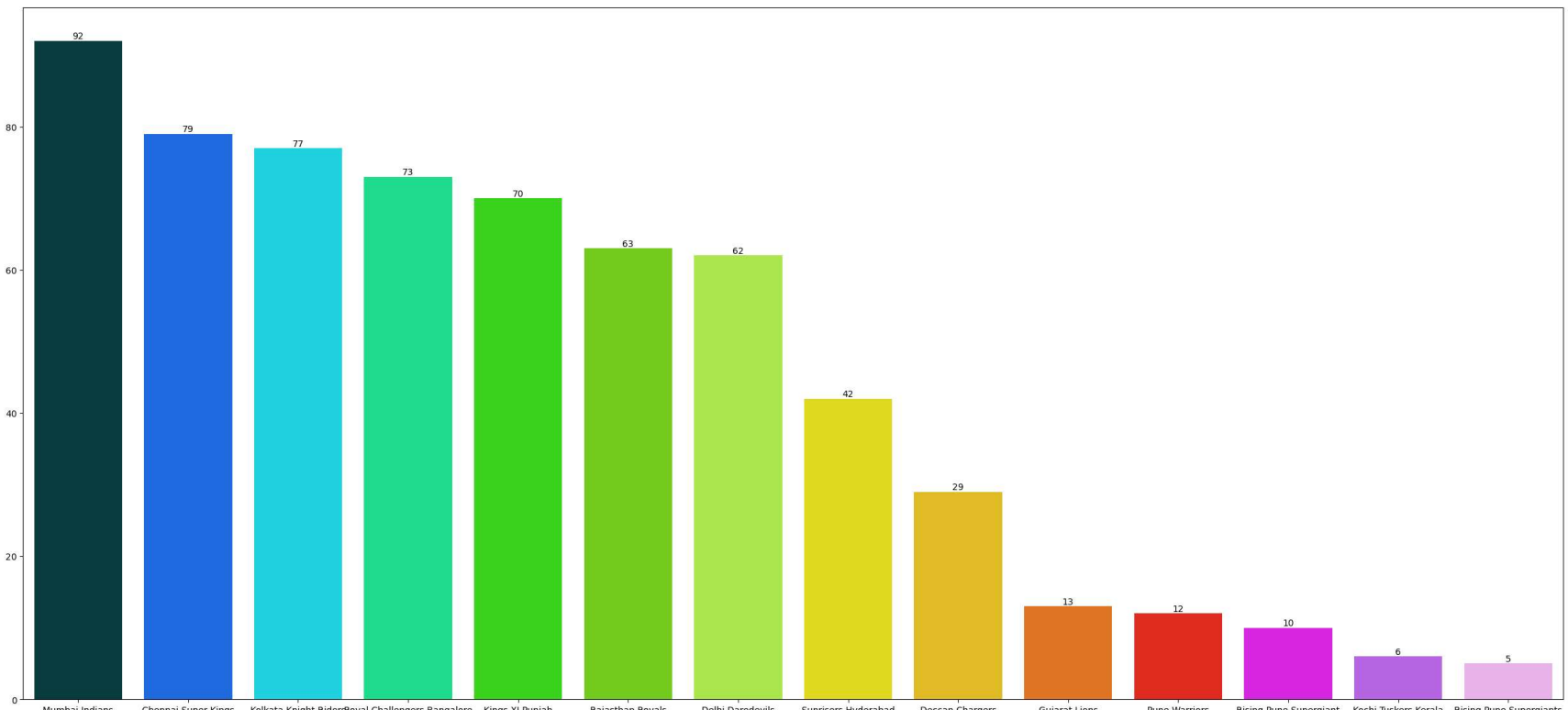
Out[21]:
```
array(['Sunrisers Hyderabad', 'Rising Pune Supergiant',
       'Kolkata Knight Riders', 'Kings XI Punjab',
       'Royal Challengers Bangalore', 'Mumbai Indians',
       'Delhi Daredevils', 'Gujarat Lions', 'Chennai Super Kings',
       'Rajasthan Royals', 'Deccan Chargers', 'Pune Warriors',
       'Kochi Tuskers Kerala', nan, 'Rising Pune Supergiants'],
      dtype=object)
```

Total no of wins by each team in all seasons

In [22]:
```
dt.winner.value_counts()
```

Out[22]:
```
Mumbai Indians                92
Chennai Super Kings           79
Kolkata Knight Riders         77
Royal Challengers Bangalore   73
Kings XI Punjab               70
Rajasthan Royals              63
Delhi Daredevils              62
Sunrisers Hyderabad           42
Deccan Chargers               29
Gujarat Lions                 13
Pune Warriors                 12
Rising Pune Supergiant        10
Kochi Tuskers Kerala           6
Rising Pune Supergiants        5
Name: winner, dtype: int64
```

In [23]:
```
plt.figure(figsize=(31,14),dpi=100)
ax=sns.barplot(x=dt.winner.value_counts().index,y=dt.winner.value_counts().values,palette='gist_ncar')
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

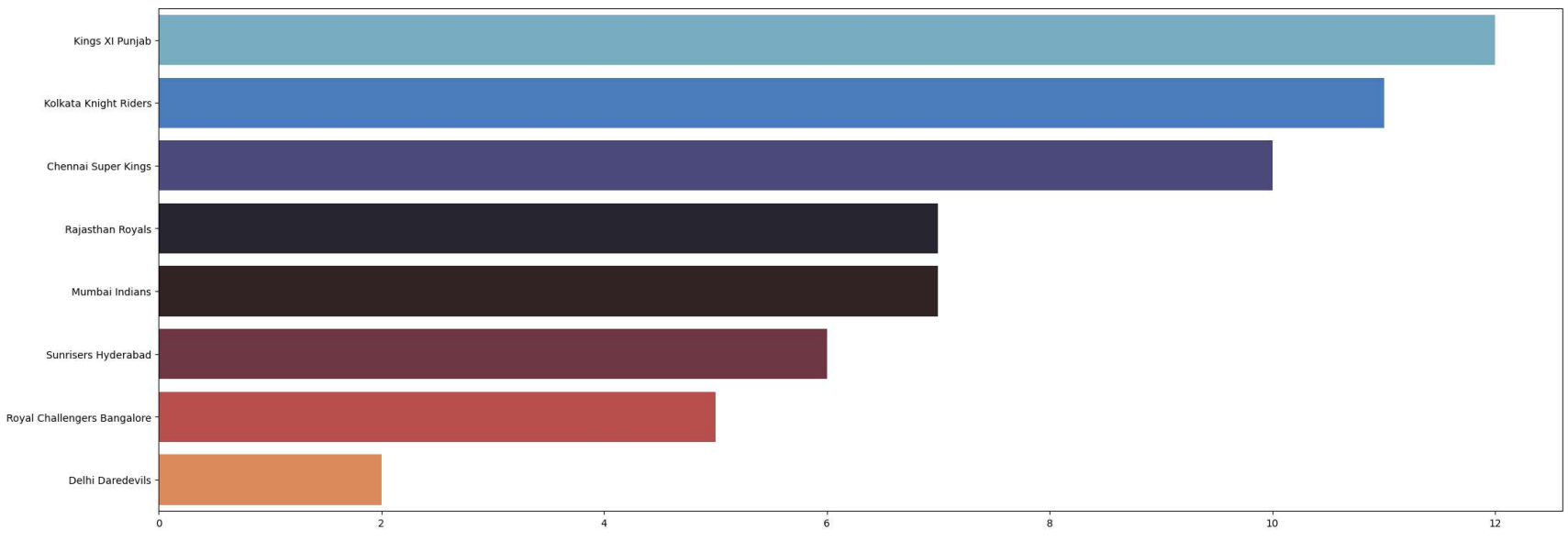


Total no of wins by each team in season 2014

In [24]:
```
dt[dt.season==2014]['winner'].value_counts()
```

Out[24]:
```
Kings XI Punjab                12
Kolkata Knight Riders          11
Chennai Super Kings            10
Rajasthan Royals                7
Mumbai Indians                  7
Sunrisers Hyderabad             6
Royal Challengers Bangalore     5
Delhi Daredevils                2
Name: winner, dtype: int64
```

In [25]:
```
plt.figure(figsize=(25,9),dpi=100)
ax=sns.barplot(y=dt[dt.season==2014]['winner'].value_counts().index,
               x=dt[dt.season==2014]['winner'].value_counts().values,palette='icefire')
plt.show()
```



Maximum no of wins by a team in each season

In [26]:
```
def max_wins(year):
    return dt[dt.season==year]['winner'].value_counts()

max_wins(2014)
```

Out[26]:
```
Kings XI Punjab               12
Kolkata Knight Riders         11
Chennai Super Kings           10
Rajasthan Royals               7
Mumbai Indians                 7
Sunrisers Hyderabad            6
Royal Challengers Bangalore    5
Delhi Daredevils               2
Name: winner, dtype: int64
```

In [27]:
```
max_wins(2015)
```

Out[27]:
```
Chennai Super Kings           10
Mumbai Indians                10
Royal Challengers Bangalore    8
Kolkata Knight Riders          7
Rajasthan Royals               7
Sunrisers Hyderabad            7
Delhi Daredevils               5
Kings XI Punjab                3
Name: winner, dtype: int64
```

In [28]:
```
max_wins(2016)
```

Out[28]:
```
Sunrisers Hyderabad           11
Gujarat Lions                  9
Royal Challengers Bangalore    9
Kolkata Knight Riders          8
Mumbai Indians                 7
Delhi Daredevils               7
Rising Pune Supergiants        5
Kings XI Punjab                4
Name: winner, dtype: int64
```

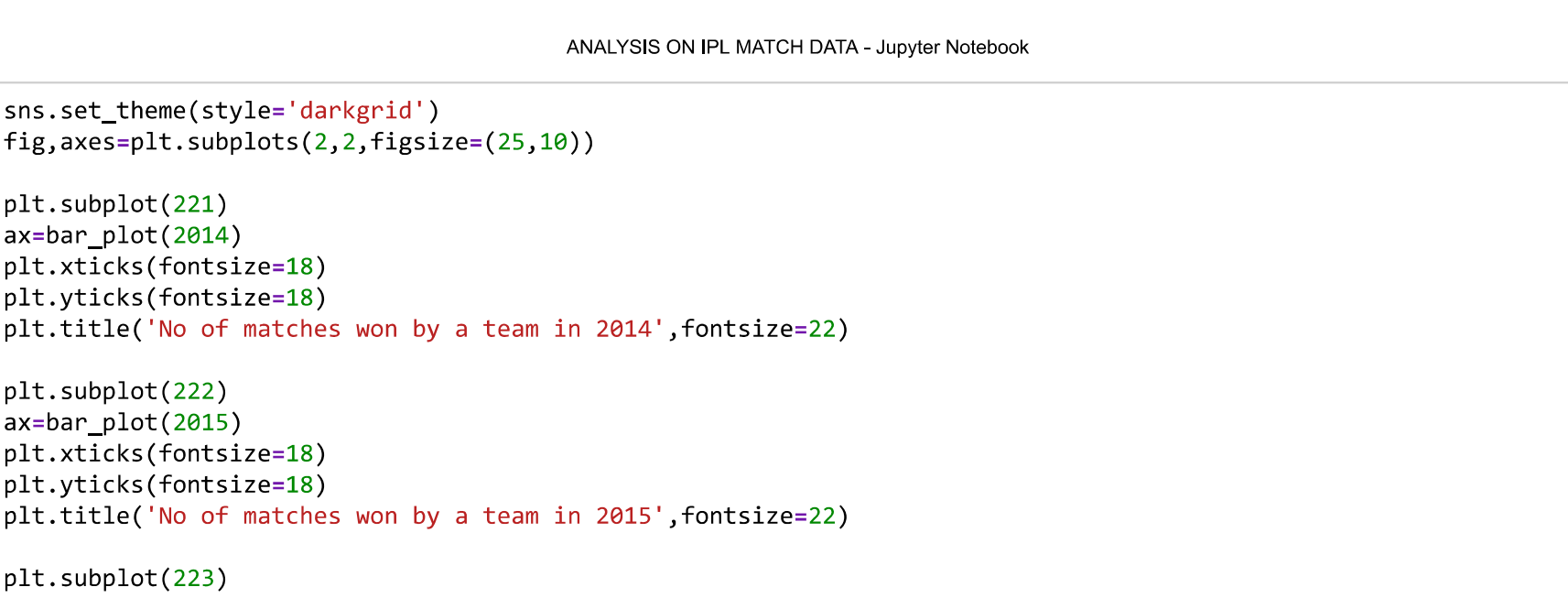
In [29]:
```
max_wins(2017)
```

Out[29]:
```
Mumbai Indians                12
Rising Pune Supergiant        10
Kolkata Knight Riders          9
Sunrisers Hyderabad            8
Kings XI Punjab                7
Delhi Daredevils               6
Gujarat Lions                  4
Royal Challengers Bangalore    3
Name: winner, dtype: int64
```

In [30]:
```
def bar_plot(year):
    return sns.barplot(y=dt[dt.season==year]['winner'].value_counts().index,
                       x=dt[dt.season==year]['winner'].value_counts().values,palette='gist_heat_r')
```

In [31]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [32]:
```
sns.set_theme(style='darkgrid')
fig,axes=plt.subplots(2,2,figsize=(25,10))

plt.subplot(221)
ax=bar_plot(2014)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2014',fontsize=22)

plt.subplot(222)
ax=bar_plot(2015)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2015',fontsize=22)

plt.subplot(223)
ax=bar_plot(2016)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2016',fontsize=22)

plt.subplot(224)
ax=bar_plot(2017)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2017',fontsize=22)

plt.subplots_adjust(hspace=0.5,wspace=0.6)
```

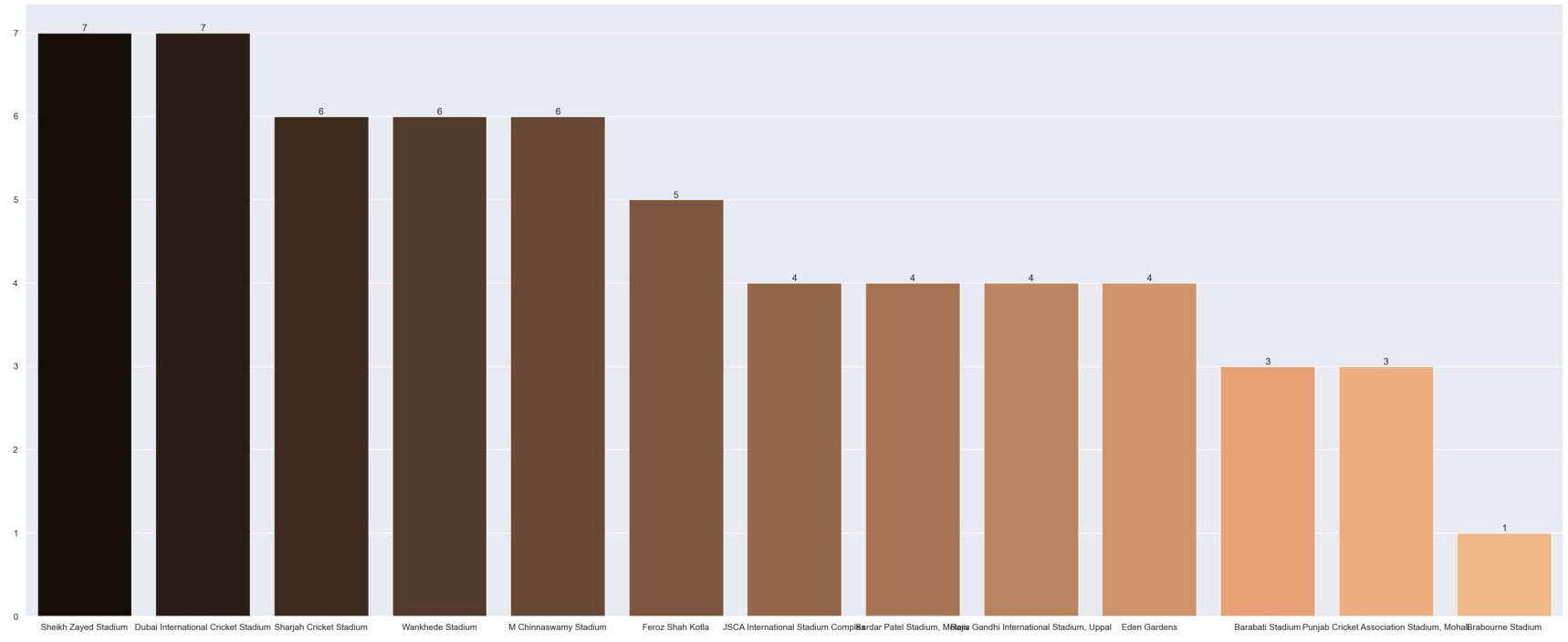


No of matches in each venue in the season 2014

In [33]:
```
dt[dt.season==2014]['venue'].value_counts()
```

Out[33]:
```
Sheikh Zayed Stadium                        7
Dubai International Cricket Stadium         7
Sharjah Cricket Stadium                     6
Wankhede Stadium                            6
M Chinnaswamy Stadium                       6
Feroz Shah Kotla                            5
JSCA International Stadium Complex          4
Sardar Patel Stadium, Motera                4
Rajiv Gandhi International Stadium, Uppal   4
Eden Gardens                                4
Barabati Stadium                            3
Punjab Cricket Association Stadium, Mohali  3
Brabourne Stadium                           1
Name: venue, dtype: int64
```

In [34]:
```
plt.figure(figsize=(35,14),dpi=100)
ax=sns.barplot(x=dt[dt.season==2014]['venue'].value_counts().index,
               y=dt[dt.season==2014]['venue'].value_counts().values,palette='copper')
for i in ax.containers:
    ax.bar_label(i)
```



Venue wise no of matches won by a team in season 2014

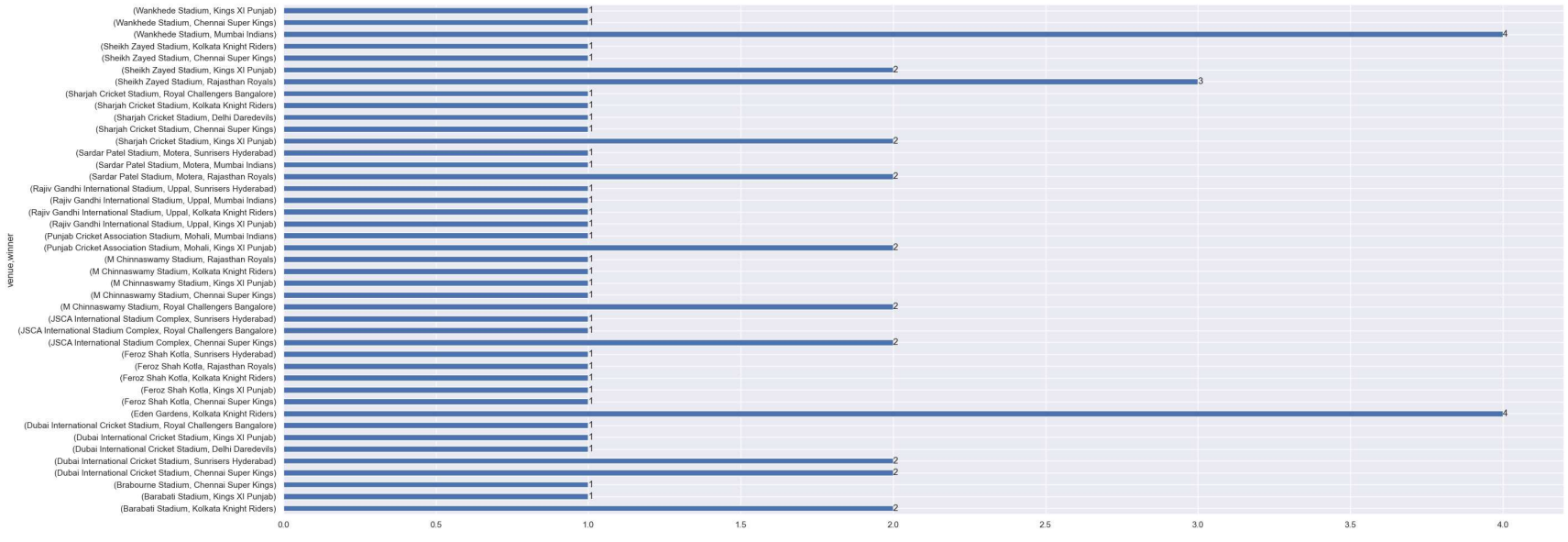
In [35]:
```
df=dt[dt['season']==2014].groupby('venue').winner.value_counts()
df
```

Out[35]:

venue	winner	
Barabati Stadium	Kolkata Knight Riders	2
	Kings XI Punjab	1
Brabourne Stadium	Chennai Super Kings	1
Dubai International Cricket Stadium	Chennai Super Kings	2
	Sunrisers Hyderabad	2
	Delhi Daredevils	1
	Kings XI Punjab	1
	Royal Challengers Bangalore	1
Eden Gardens	Kolkata Knight Riders	4
Feroz Shah Kotla	Chennai Super Kings	1
	Kings XI Punjab	1
	Kolkata Knight Riders	1
	Rajasthan Royals	1
	Sunrisers Hyderabad	1
JSCA International Stadium Complex	Chennai Super Kings	2
	Royal Challengers Bangalore	1
	Sunrisers Hyderabad	1
M Chinnaswamy Stadium	Royal Challengers Bangalore	2
	Chennai Super Kings	1
	Kings XI Punjab	1
	Kolkata Knight Riders	1
	Rajasthan Royals	1
Punjab Cricket Association Stadium, Mohali	Kings XI Punjab	2
	Mumbai Indians	1
Rajiv Gandhi International Stadium, Uppal	Kings XI Punjab	1
	Kolkata Knight Riders	1
	Mumbai Indians	1
	Sunrisers Hyderabad	1
Sardar Patel Stadium, Motera	Rajasthan Royals	2
	Mumbai Indians	1
	Sunrisers Hyderabad	1
Sharjah Cricket Stadium	Kings XI Punjab	2
	Chennai Super Kings	1
	Delhi Daredevils	1
	Kolkata Knight Riders	1
	Royal Challengers Bangalore	1
Sheikh Zayed Stadium	Rajasthan Royals	3
	Kings XI Punjab	2
	Chennai Super Kings	1
	Kolkata Knight Riders	1
Wankhede Stadium	Mumbai Indians	4
	Chennai Super Kings	1
	Kings XI Punjab	1

Name: winner, dtype: int64

In [36]:
```
plt.figure(figsize=(30,12),dpi=100)
ax=df.plot.barh()
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

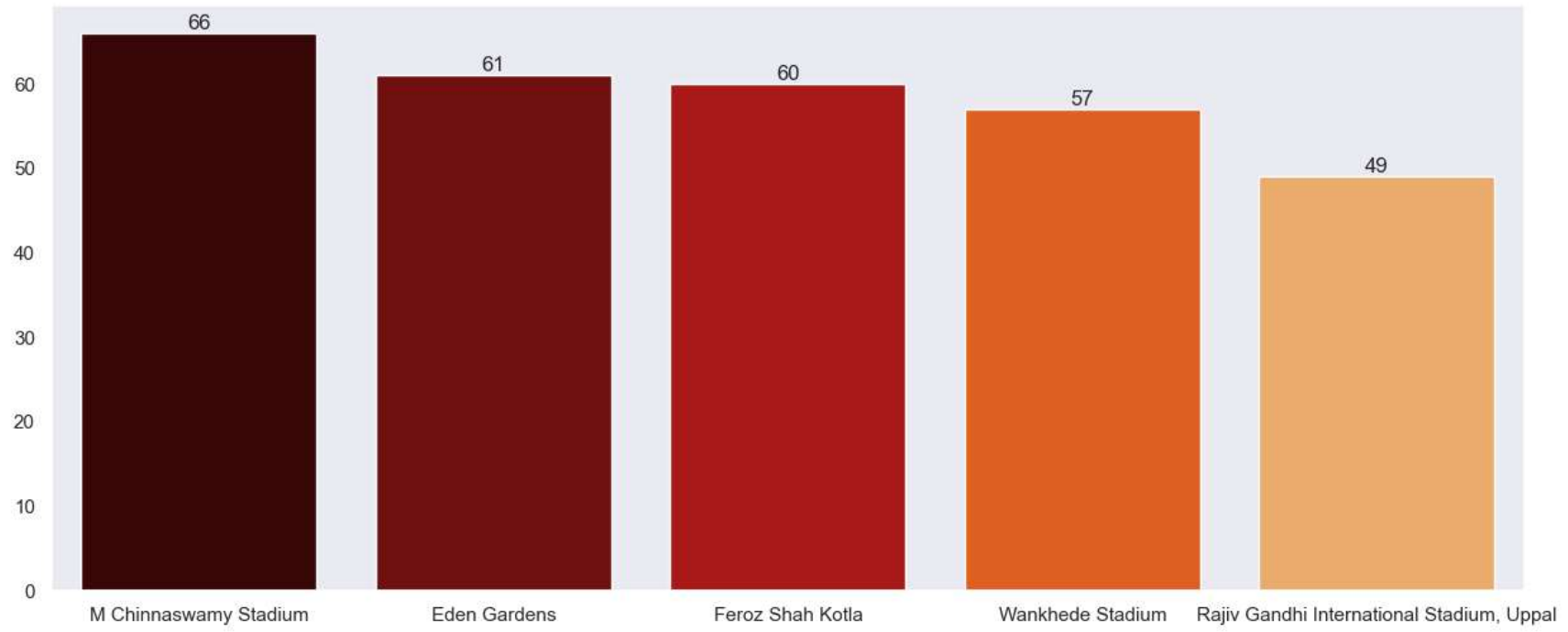


Top 5 venues where max no of matches held from 2008-2017

In [131]:
```
dt.venue.value_counts().head(5)
```

Out[131]:
```
M Chinnaswamy Stadium                          66
Eden Gardens                                   61
Feroz Shah Kotla                               60
Wankhede Stadium                               57
Rajiv Gandhi International Stadium, Uppal      49
Name: venue, dtype: int64
```

In [141]:
```
plt.figure(figsize=(15,6),dpi=100)
ax=sns.barplot(x=dt.venue.value_counts().head(5).index,y=dt.venue.value_counts().head(5).values,palette='gist_he
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

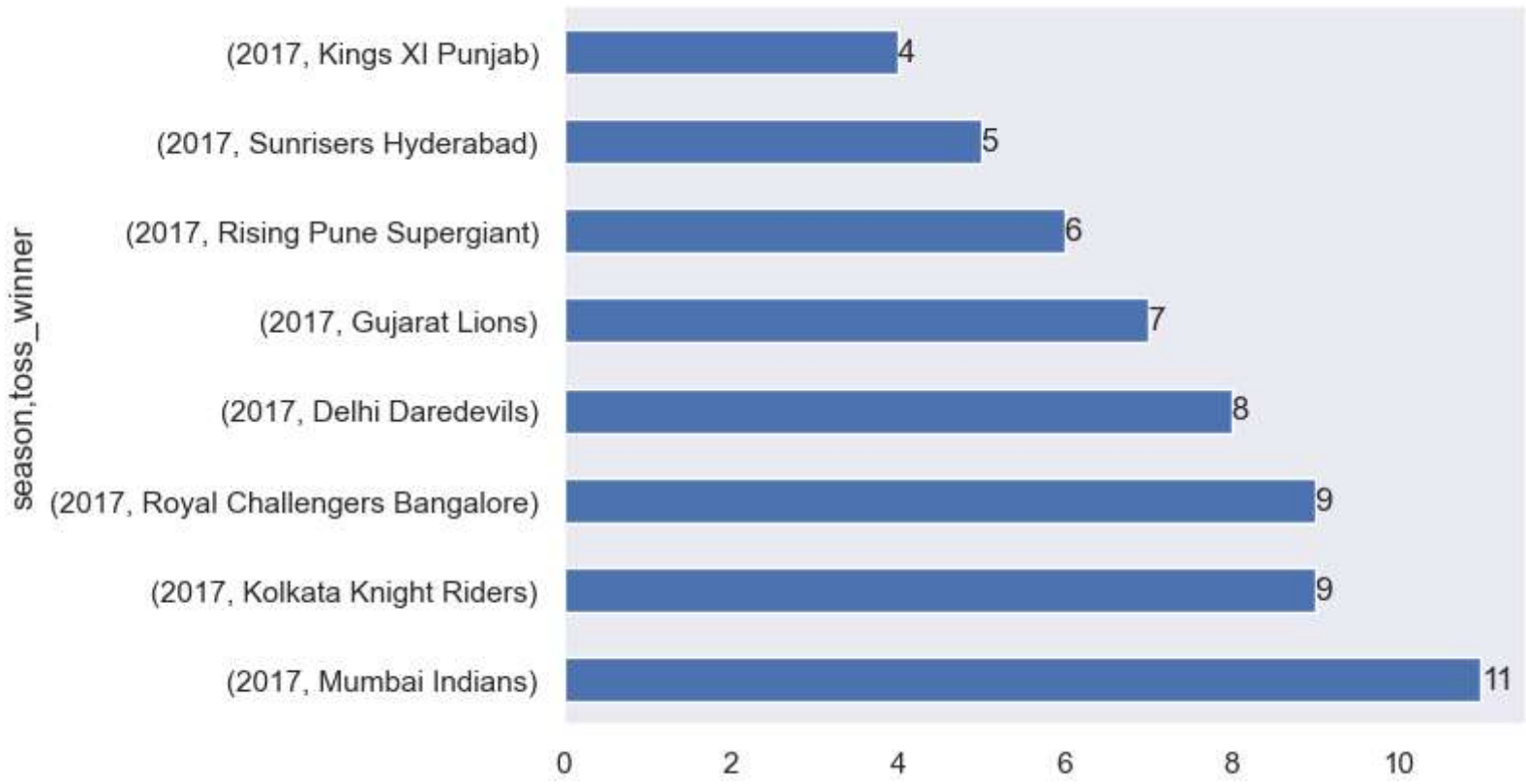


No of toss wins by each team in 2017

In [126]:
```
dt[dt['season']==2017].groupby('season').toss_winner.value_counts()
```

Out[126]:
```
season  toss_winner
2017    Mumbai Indians                 11
        Kolkata Knight Riders           9
        Royal Challengers Bangalore     9
        Delhi Daredevils                8
        Gujarat Lions                   7
        Rising Pune Supergiant          6
        Sunrisers Hyderabad             5
        Kings XI Punjab                 4
Name: toss_winner, dtype: int64
```

In [127]:
```
ax=dt[dt['season']==2017].groupby('season').toss_winner.value_counts().plot.barh()
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```



Maximum toss winner in each season

In [41]:
```
def max_toss_winner(year):
    return dt[dt.season==year]['toss_winner'].value_counts()    ### by using function.......

max_toss_winner(2008)     # we can now call the func as many times as we want it to......
```

Out[41]:
```
Rajasthan Royals              11
Deccan Chargers                9
Mumbai Indians                 8
Kings XI Punjab                8
Kolkata Knight Riders          6
Delhi Daredevils               6
Royal Challengers Bangalore    5
Chennai Super Kings            5
Name: toss_winner, dtype: int64
```

In [42]:
```
max_toss_winner(2009)
```

Out[42]:
```
Deccan Chargers               10
Delhi Daredevils               9
Royal Challengers Bangalore    8
Chennai Super Kings            7
Kolkata Knight Riders          7
Kings XI Punjab                6
Mumbai Indians                 6
Rajasthan Royals               4
Name: toss_winner, dtype: int64
```

In [43]:
```
max_toss_winner(2011)
```

Out[43]:
```
Kings XI Punjab               10
Chennai Super Kings            9
Delhi Daredevils               9
Kochi Tuskers Kerala           8
Rajasthan Royals               7
Kolkata Knight Riders          7
Mumbai Indians                 6
Royal Challengers Bangalore    6
Deccan Chargers                6
Pune Warriors                  5
Name: toss_winner, dtype: int64
```

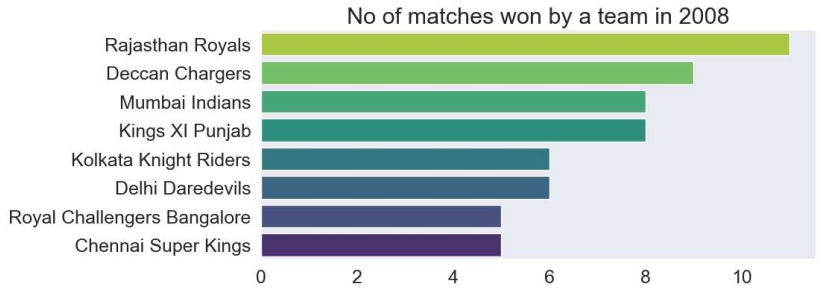
In [44]:
```
max_toss_winner(2013)
```

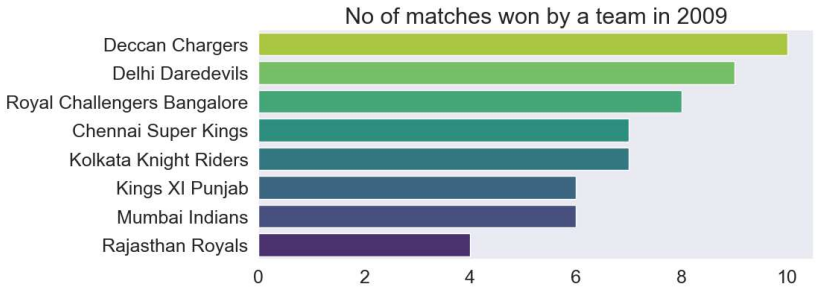
Out[44]:
```
Kolkata Knight Riders          12
Mumbai Indians                 12
Rajasthan Royals               11
Pune Warriors                   9
Chennai Super Kings             8
Kings XI Punjab                 7
Sunrisers Hyderabad             7
Royal Challengers Bangalore     5
Delhi Daredevils                5
Name: toss_winner, dtype: int64
```

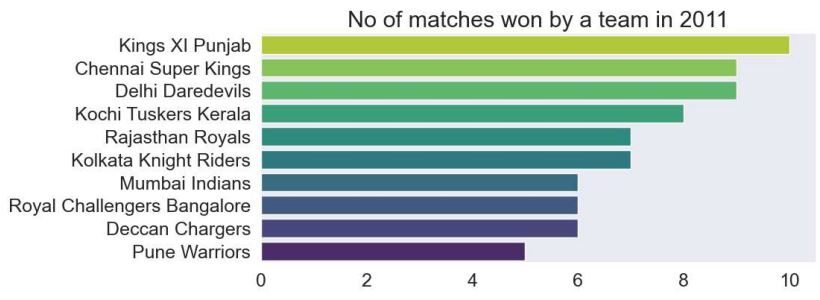
In [45]:
```
def bar_plot(year):
    return sns.barplot(y=dt[dt.season==year]['toss_winner'].value_counts().index,
                       x=dt[dt.season==year]['toss_winner'].value_counts().values,palette='viridis_r')
```

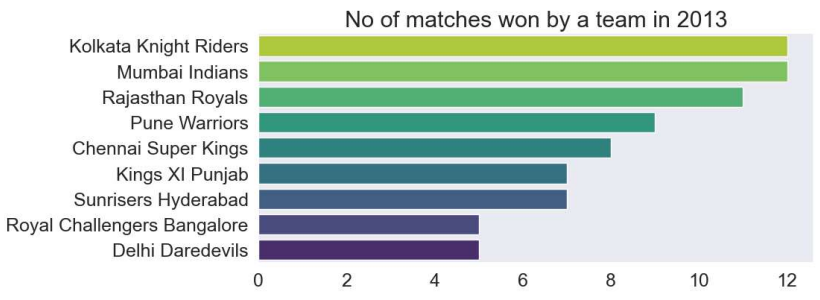
In [46]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [47]:
```
sns.set_theme(style='dark')
fig,axes=plt.subplots(4,4,figsize=(25,10))

plt.subplot(221)
ax=bar_plot(2008)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2008',fontsize=22)

plt.subplot(222)
ax=bar_plot(2009)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2009',fontsize=22)

plt.subplot(223)
ax=bar_plot(2011)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2011',fontsize=22)

plt.subplot(224)
ax=bar_plot(2013)
plt.xticks(fontsize=18)
plt.yticks(fontsize=18)
plt.title('No of matches won by a team in 2013',fontsize=22)

plt.subplots_adjust(hspace=0.5,wspace=0.6)
```









In [48]:
```
def max_toss_winner(year):
    return dt[dt.season==year]['toss_winner'].value_counts().head(1)  #using head() to extract only the max toss

max_toss_winner(2017)
```

Out[48]:
```
Mumbai Indians    11
Name: toss_winner, dtype: int64
```

Maximum toss winner in each season using for loop

In [49]:
```
for i in dt.season.unique():
    print(i,max_toss_winner(i))
    print()
```

```
2017 Mumbai Indians    11
Name: toss_winner, dtype: int64

2008 Rajasthan Royals    11
Name: toss_winner, dtype: int64

2009 Deccan Chargers    10
Name: toss_winner, dtype: int64

2010 Chennai Super Kings    10
Name: toss_winner, dtype: int64

2011 Kings XI Punjab    10
Name: toss_winner, dtype: int64

2012 Mumbai Indians    11
Name: toss_winner, dtype: int64

2013 Kolkata Knight Riders    12
Name: toss_winner, dtype: int64

2014 Chennai Super Kings    10
Name: toss_winner, dtype: int64

2015 Chennai Super Kings    10
Name: toss_winner, dtype: int64

2016 Sunrisers Hyderabad    10
Name: toss_winner, dtype: int64
```

In [50]:
```
for i in dt.season.unique():                                        #removing the name & dtype part
    print(i,max_toss_winner(i).index[0],max_toss_winner(i).values[0],sep='---')  #using sep='---' for a better l
    print()
```

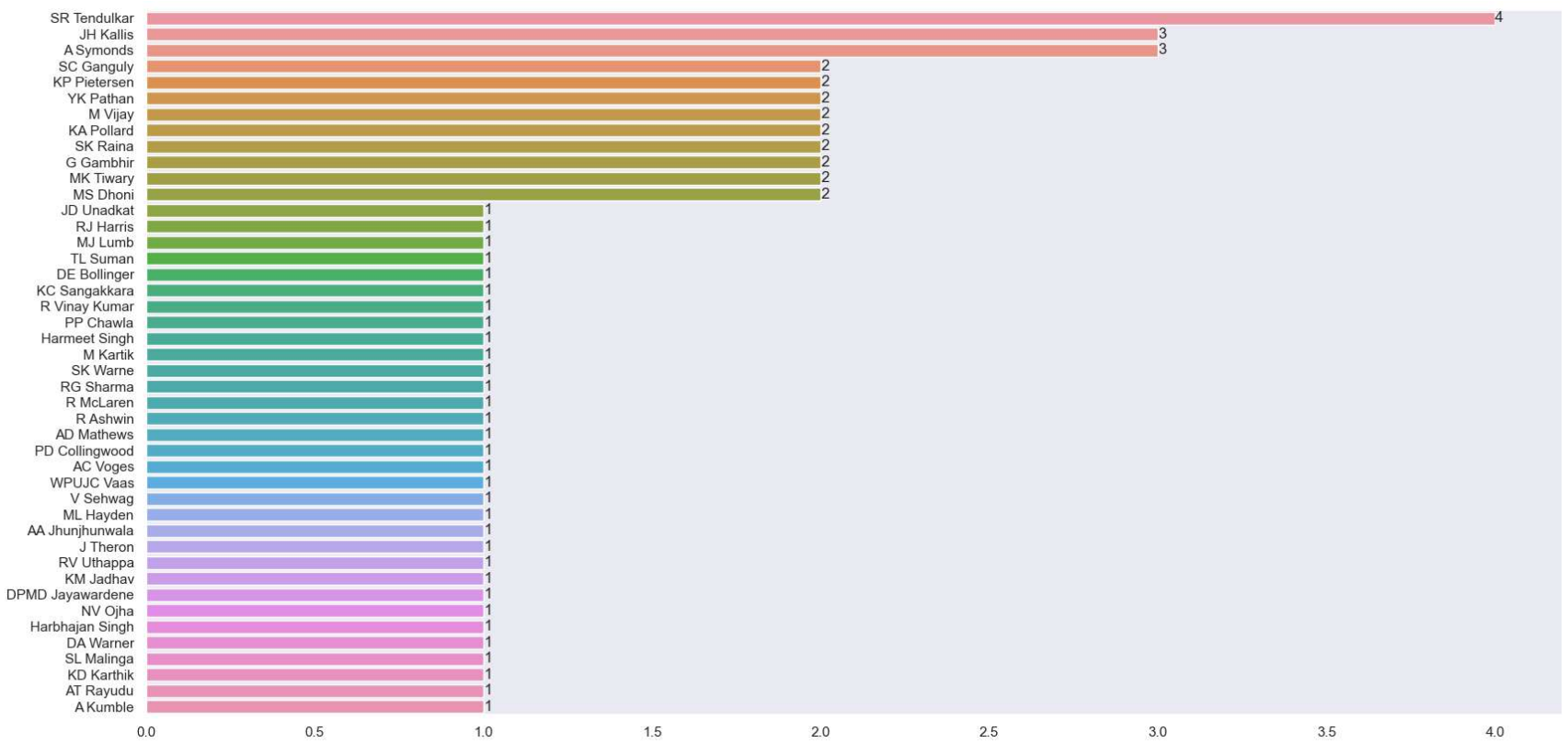
```
2017---Mumbai Indians---11

2008---Rajasthan Royals---11

2009---Deccan Chargers---10

2010---Chennai Super Kings---10

2011---Kings XI Punjab---10

2012---Mumbai Indians---11

2013---Kolkata Knight Riders---12

2014---Chennai Super Kings---10

2015---Chennai Super Kings---10

2016---Sunrisers Hyderabad---10
```

Player with maximum no of player_of_match award in the season 2010

In [51]:
```
dt[dt.season==2010]['player_of_match'].value_counts()
```

Out[51]:
```
SR Tendulkar        4
JH Kallis           3
A Symonds           3
SC Ganguly          2
KP Pietersen        2
YK Pathan           2
M Vijay             2
KA Pollard          2
SK Raina            2
G Gambhir           2
MK Tiwary           2
MS Dhoni            2
JD Unadkat          1
RJ Harris           1
MJ Lumb             1
TL Suman            1
DE Bollinger        1
KC Sangakkara       1
R Vinay Kumar       1
PP Chawla           1
Harmeet Singh       1
M Kartik            1
SK Warne            1
RG Sharma           1
R McLaren           1
R Ashwin            1
AD Mathews          1
PD Collingwood      1
AC Voges            1
WPUJC Vaas          1
V Sehwag            1
ML Hayden           1
AA Jhunjhunwala     1
J Theron            1
RV Uthappa          1
KM Jadhav           1
DPMD Jayawardene    1
NV Ojha             1
Harbhajan Singh     1
DA Warner           1
SL Malinga          1
KD Karthik          1
AT Rayudu           1
A Kumble            1
Name: player_of_match, dtype: int64
```

In [52]:
```
plt.figure(figsize=(20,10),dpi=100)
ax=sns.barplot(y=dt[dt.season==2010]['player_of_match'].value_counts().index,
               x=dt[dt.season==2010]['player_of_match'].value_counts().values)
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```



Player with minimum man of match award in each year

In [53]:
```
year=[]
name=[]
award=[]
for i in dt.season.unique():
    year.append(i)
    x=dt[dt.season==i]['player_of_match'].value_counts()
    name.append(x.index[-1])
    award.append(x[-1])
```

In [54]:
```
name
```

Out[54]:
```
['KV Sharma',
 'SK Raina',
 'A Kumble',
 'A Kumble',
 'SK Raina',
 'MS Bisla',
 'Harbhajan Singh',
 'MK Pandey',
 'RG Sharma',
 'BCJ Cutting']
```

In [55]:
```
award
```

Out[55]:
```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```

In [56]:
```
year
```

Out[56]:
```
[2017, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016]
```

In [57]:
```
min_man_of_match=pd.DataFrame({'Year':year,'Name':name,'Award':award})
min_man_of_match
```

Out[57]:

	Year	Name	Award
0	2017	KV Sharma	1
1	2008	SK Raina	1
2	2009	A Kumble	1
3	2010	A Kumble	1
4	2011	SK Raina	1
5	2012	MS Bisla	1
6	2013	Harbhajan Singh	1
7	2014	MK Pandey	1
8	2015	RG Sharma	1
9	2016	BCJ Cutting	1

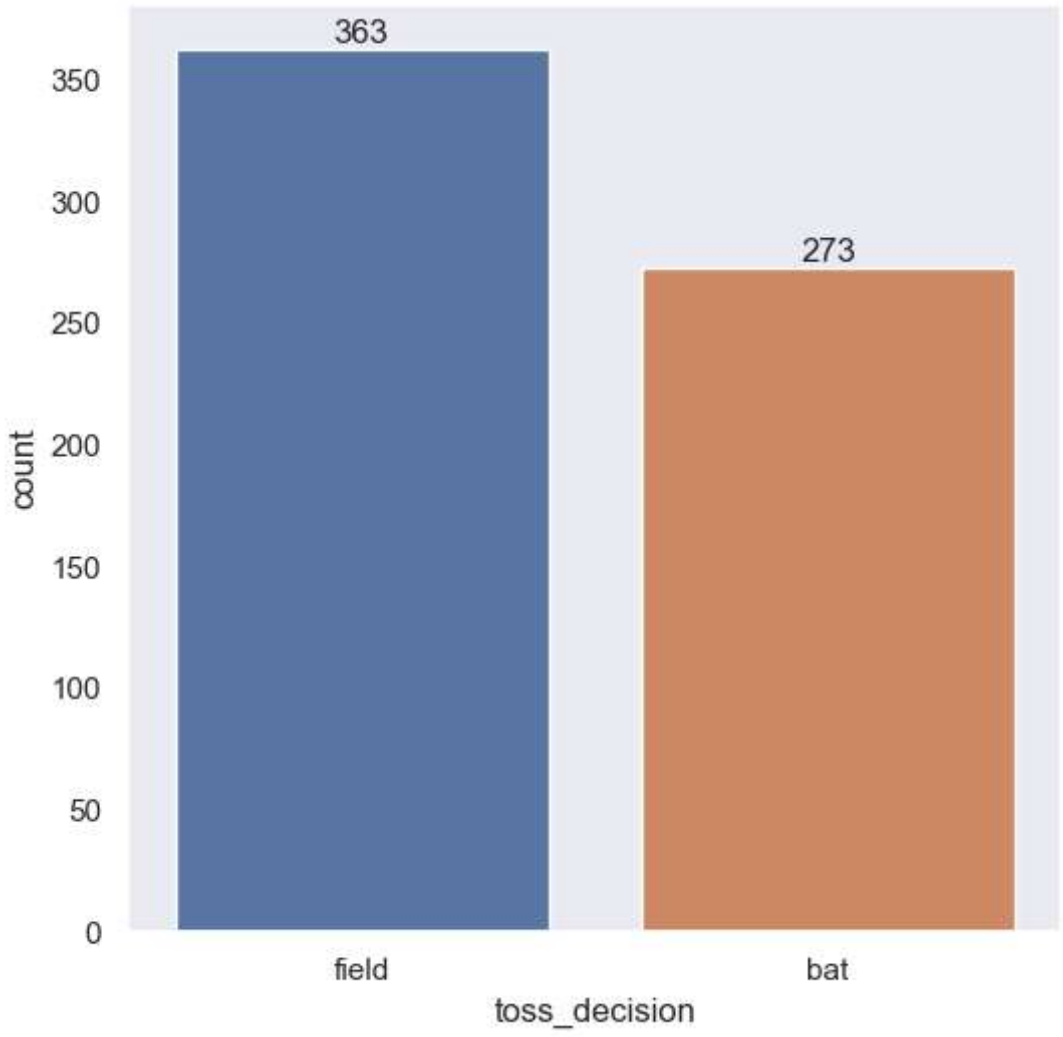
In [58]:
```
plt.figure(figsize=(28,12),dpi=100)
ax=sns.barplot(y='Award',x='Year',hue='Name',data=min_man_of_match,palette='Set1')
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

No of matches after toss decision from 2008-17

In [72]:
```
dt.toss_decision.value_counts()
```

Out[72]:
```
field    363
bat      273
Name: toss_decision, dtype: int64
```

In [119]:
```
plt.figure(figsize=(6,6),dpi=100)
ax=sns.countplot(x='toss_decision',data=dt)
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```

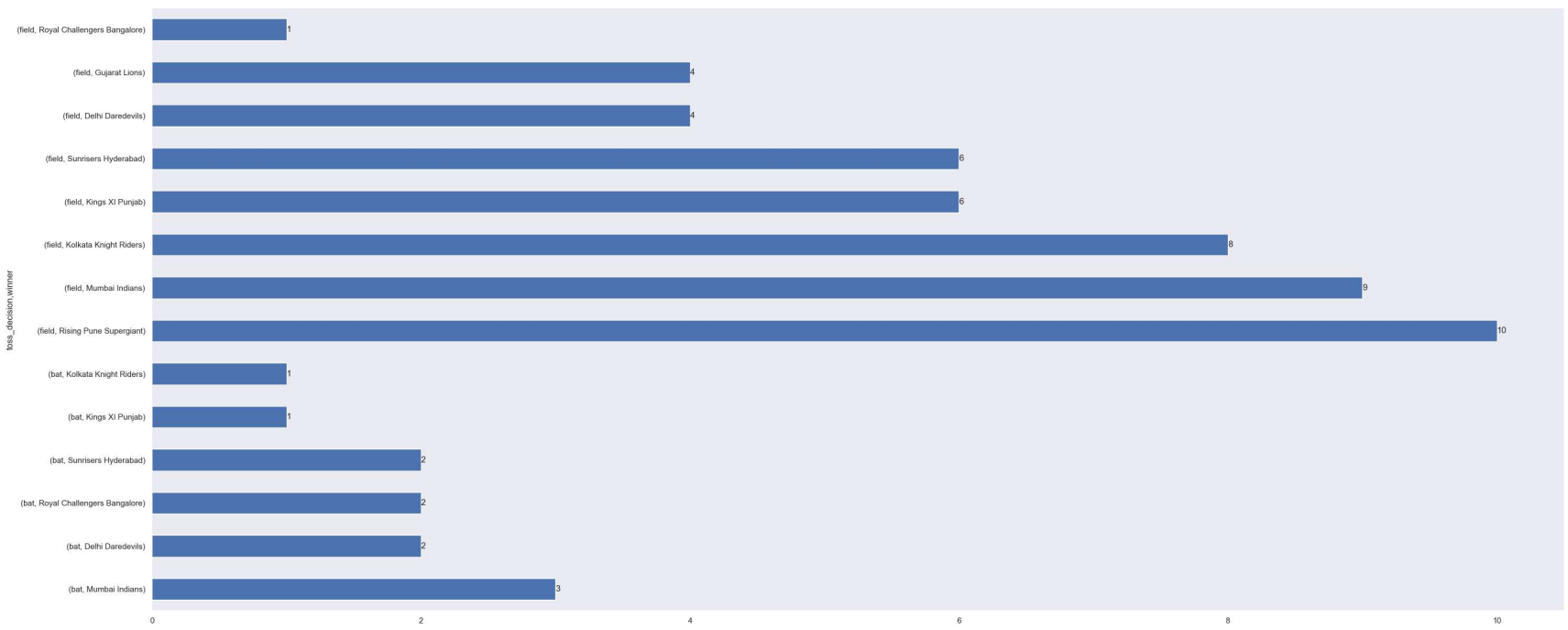


No of match won by teams after the toss decision in the season 2017

In [59]:
```
dt[dt['season']==2017].groupby('toss_decision').winner.value_counts()
```

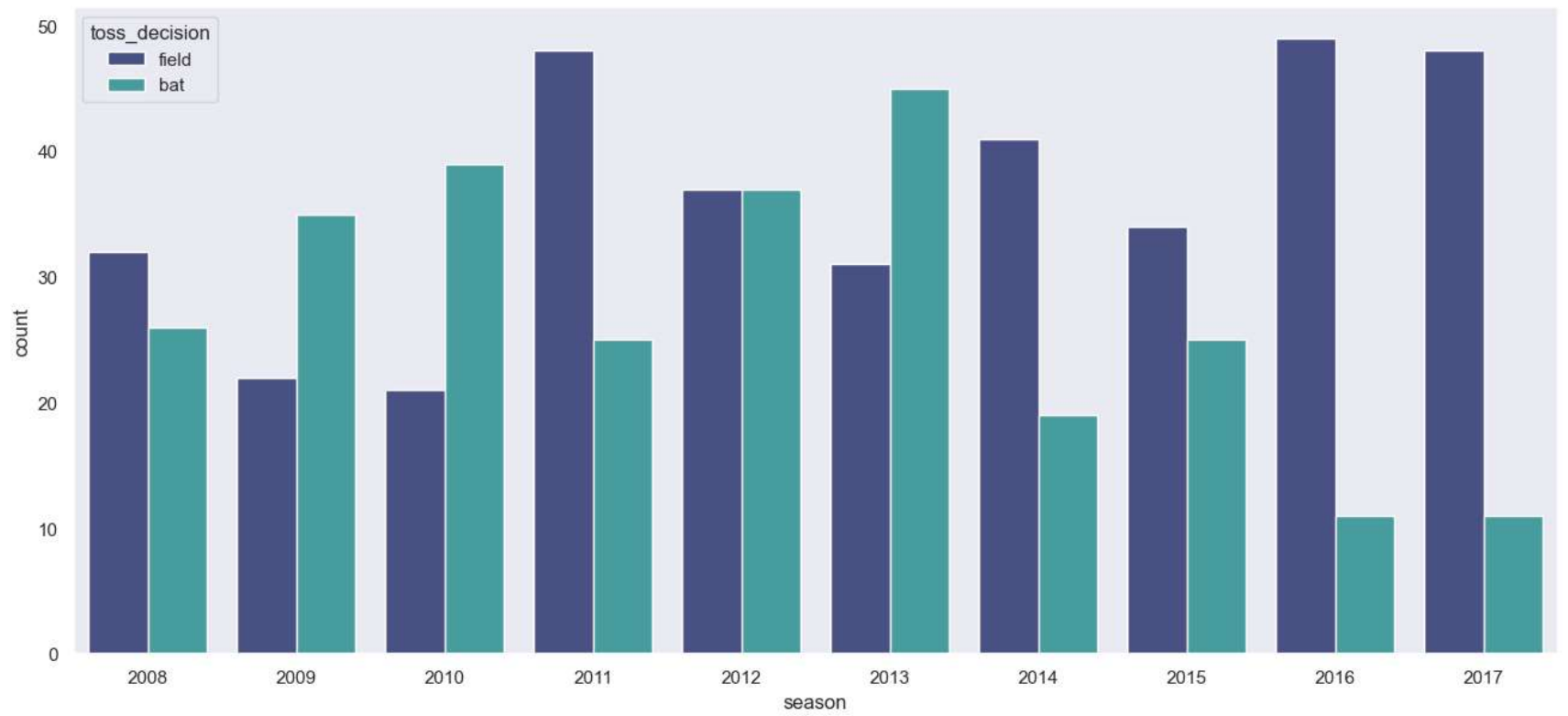
Out[59]:
```
toss_decision  winner
bat            Mumbai Indians                 3
               Delhi Daredevils               2
               Royal Challengers Bangalore    2
               Sunrisers Hyderabad            2
               Kings XI Punjab                1
               Kolkata Knight Riders          1
field          Rising Pune Supergiant        10
               Mumbai Indians                 9
               Kolkata Knight Riders          8
               Kings XI Punjab                6
               Sunrisers Hyderabad            6
               Delhi Daredevils               4
               Gujarat Lions                  4
               Royal Challengers Bangalore    1
Name: winner, dtype: int64
```

In [60]:
```
plt.figure(figsize=(35,15),dpi=100)
ax=dt[dt['season']==2017].groupby('toss_decision').winner.value_counts().plot.barh()
for i in ax.containers:
    ax.bar_label(i)
plt.show()
```



Toss decision in each year

In [135]:
```
plt.figure(figsize=(16,7),dpi=100)
sns.countplot(x='season',data=dt,hue='toss_decision',palette='mako')
plt.show()
```



Winning by wickets seasonwise and teamwise

In [146]:
```
df=dt[dt['season']==2016].groupby(['season','team1']).win_by_wickets.value_counts()
df
```

Out[146]:
```
season  team1                       win_by_wickets
2016    Delhi Daredevils            0                3
                                    6                1
                                    7                1
                                    9                1
        Gujarat Lions               4                2
                                    0                1
                                    5                1
                                    8                1
                                    10               1
        Kings XI Punjab             0                2
                                    5                2
                                    4                1
                                    6                1
                                    7                1
                                    8                1
        Kolkata Knight Riders       6                3
                                    0                2
                                    5                1
                                    9                1
        Mumbai Indians              0                2
                                    7                2
                                    3                1
                                    6                1
                                    9                1
        Rising Pune Supergiants     7                2
                                    8                2
                                    2                1
                                    3                1
                                    6                1
        Royal Challengers Bangalore 0                5
                                    6                3
                                    5                1
                                    7                1
        Sunrisers Hyderabad         0                6
                                    6                1
                                    7                1
                                    8                1
Name: win_by_wickets, dtype: int64
```