Monthly Intership Program for Professionals@ THE CODERS READY

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Data Science and Business Analytic

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Task 3: Dataset of INDIAN PREMIER LEAGUE

Problem Statements: 1.Perform 'Exploratory Data Analysis' on dataset of 'INDIAN PLEAGUE LEAGUE'. 2.As a Sports analyst ,try to find out the most successful teams,players and factor contributing to the wins or loss of team. 3.What other suggestions/insights you can derive through this EDA thus suggest teams or players a company should endorse for its products. 4.You can use Python tool to perform this analysis .

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [2]:
```
matches_df = pd.read_csv("matches.csv")
delveries_df = pd.read_csv("delveries.csv")
```

In [3]:
```
matches_df.head()
```

Out[3]:

	id	season	city	date	team1	team2	toss_winner	toss_decision	result	dl_applied	winner	win_by_runs	win_by_wickets	player_of_match	venue	umpire1	umpir
0	1	2017	Hyderabad	05-04-17	Sunrisers Hyderabad	Royal Challengers Bangalore	Royal Challengers Bangalore	field	normal	0	Sunrisers Hyderabad	35	0	Yuvraj Singh	Rajiv Gandhi International Stadium, Uppal	AY Dandekar	NJ Llo
1	2	2017	Pune	06-04-17	Mumbai Indians	Rising Pune Supergiant	Rising Pune Supergiant	field	normal	0	Rising Pune Supergiant	0	7	SPD Smith	Maharashtra Cricket Association Stadium	A Nand Kishore	S Ra
2	3	2017	Rajkot	07-04-17	Gujarat Lions	Kolkata Knight Riders	Kolkata Knight Riders	field	normal	0	Kolkata Knight Riders	0	10	CA Lynn	Saurashtra Cricket Association Stadium	Nitin Menon	CK Nand
3	4	2017	Indore	08-04-17	Rising Pune Supergiant	Kings XI Punjab	Kings XI Punjab	field	normal	0	Kings XI Punjab	0	6	GJ Maxwell	Holkar Cricket Stadium	AK Chaudhary	Shamshud
4	5	2017	Bangalore	08-04-17	Royal Challengers Bangalore	Delhi Daredevils	Royal Challengers Bangalore	bat	normal	0	Royal Challengers Bangalore	15	0	KM Jadhav	M Chinnaswamy Stadium	NaN	Na

In [4]:
```
delveries_df.head()
```

Out[4]:

	match_id	inning	batting_team	bowling_team	over	ball	batsman	non_striker	bowler	is_super_over	...	bye_runs	legbye_runs	noball_runs	penalty_runs	batsman_runs	extra_runs	total_runs
0	1	1	Sunrisers Hyderabad	Royal Challengers Bangalore	1	1	DA Warner	S Dhawan	TS Mills	0	...	0	0	0	0	0	0	0
1	1	1	Sunrisers Hyderabad	Royal Challengers Bangalore	1	2	DA Warner	S Dhawan	TS Mills	0	...	0	0	0	0	0	0	0
2	1	1	Sunrisers Hyderabad	Royal Challengers Bangalore	1	3	DA Warner	S Dhawan	TS Mills	0	...	0	0	0	0	4	0	4
3	1	1	Sunrisers Hyderabad	Royal Challengers Bangalore	1	4	DA Warner	S Dhawan	TS Mills	0	...	0	0	0	0	0	0	0
4	1	1	Sunrisers Hyderabad	Royal Challengers Bangalore	1	5	DA Warner	S Dhawan	TS Mills	0	...	0	0	0	0	0	2	2

5 rows × 21 columns

DATA INFORMATION

In [5]:
```
print(matches_df.info())
print(delveries_df.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 756 entries, 0 to 755
Data columns (total 18 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   id               756 non-null    int64
 1   season           756 non-null    int64
 2   city             749 non-null    object
 3   date             756 non-null    object
 4   team1            756 non-null    object
 5   team2            756 non-null    object
 6   toss_winner      756 non-null    object
 7   toss_decision    756 non-null    object
 8   result           756 non-null    object
 9   dl_applied       756 non-null    int64
 10  winner           752 non-null    object
 11  win_by_runs      756 non-null    int64
 12  win_by_wickets   756 non-null    int64
 13  player_of_match  752 non-null    object
 14  venue            756 non-null    object
 15  umpire1          754 non-null    object
 16  umpire2          754 non-null    object
 17  umpire3          119 non-null    object
dtypes: int64(5), object(13)
memory usage: 106.4+ KB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 179078 entries, 0 to 179077
Data columns (total 21 columns):
 #   Column            Non-Null Count   Dtype
---  ------            --------------   -----
 0   match_id          179078 non-null  int64
 1   inning            179078 non-null  int64
 2   batting_team      179078 non-null  object
 3   bowling_team      179078 non-null  object
 4   over              179078 non-null  int64
 5   ball              179078 non-null  int64
 6   batsman           179078 non-null  object
 7   non_striker       179078 non-null  object
 8   bowler            179078 non-null  object
 9   is_super_over     179078 non-null  int64
 10  wide_runs         179078 non-null  int64
 11  bye_runs          179078 non-null  int64
 12  legbye_runs       179078 non-null  int64
 13  noball_runs       179078 non-null  int64
 14  penalty_runs      179078 non-null  int64
 15  batsman_runs      179078 non-null  int64
 16  extra_runs        179078 non-null  int64
 17  total_runs        179078 non-null  int64
 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
None
```

In [6]:
```
matches_df["umpire3"].isnull().sum()
```

Out[6]:
```
637
```

In [7]:
```
matches_df["umpire3"].tail(10)
```

Out[7]:
```
746              Nanda Kishore
747      KN Ananthapadmanabhan
748                Nitin Menon
749               Ulhas Gandhe
750             Bruce Oxenford
751                     S Ravi
752                 Ian Gould
753                        NaN
754    Chettithody Shamshuddin
755                Nigel Llong
Name: umpire3, dtype: object
```

In [8]:
```
matches_df.describe()
```

Out[8]:

	id	season	dl_applied	win_by_runs	win_by_wickets
count	756.000000	756.000000	756.000000	756.000000	756.000000
mean	1792.178571	2013.444444	0.025132	13.283069	3.350529
std	3464.478148	3.366895	0.156630	23.471144	3.387963
min	1.000000	2008.000000	0.000000	0.000000	0.000000
25%	189.750000	2011.000000	0.000000	0.000000	0.000000
50%	378.500000	2013.000000	0.000000	0.000000	4.000000
75%	567.250000	2016.000000	0.000000	19.000000	6.000000
max	11415.000000	2019.000000	1.000000	146.000000	10.000000

In [9]:
```
matches_df['id'].max()   # Matches we have got in the dataset
```

Out[9]:
```
11415
```

In [10]:
```
matches_df['season'].unique()
```

Out[10]:
```
array([2017, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2018,
       2019], dtype=int64)
```

Team won by Maximum Runs

In [11]:
```
matches_df.iloc[matches_df['win_by_runs'].idxmax()]
```

Out[11]:
```
id                               44
season                         2017
city                          Delhi
date                       06-05-17
team1                Mumbai Indians
team2              Delhi Daredevils
toss_winner        Delhi Daredevils
toss_decision                 field
result                       normal
dl_applied                        0
winner               Mumbai Indians
win_by_runs                     146
win_by_wickets                    0
player_of_match         LMP Simmons
venue              Feroz Shah Kotla
umpire1                 Nitin Menon
umpire2                   CK Nandan
umpire3                         NaN
Name: 43, dtype: object
```

Team won by minimum runs

In [12]:
```
matches_df.iloc[matches_df['win_by_runs'].idxmax()]['winner']
```

Out[12]:
```
'Mumbai Indians'
```

Team won by Maximum Wickets

In [13]:
```
matches_df.iloc[matches_df['win_by_wickets'].idxmax()]['winner']
```

Out[13]:
```
'Kolkata Knight Riders'
```

Team won by minimum runs

In [14]:
```
matches_df.iloc[matches_df[matches_df['win_by_runs'].ge(1)].win_by_runs.idxmin()]['winner']
```

Out[14]:
```
'Mumbai Indians'
```

Team won by Minimum Wickets

In [15]:
```
matches_df.iloc[matches_df[matches_df['win_by_wickets'].ge(1)].win_by_wickets.idxmin()]
```

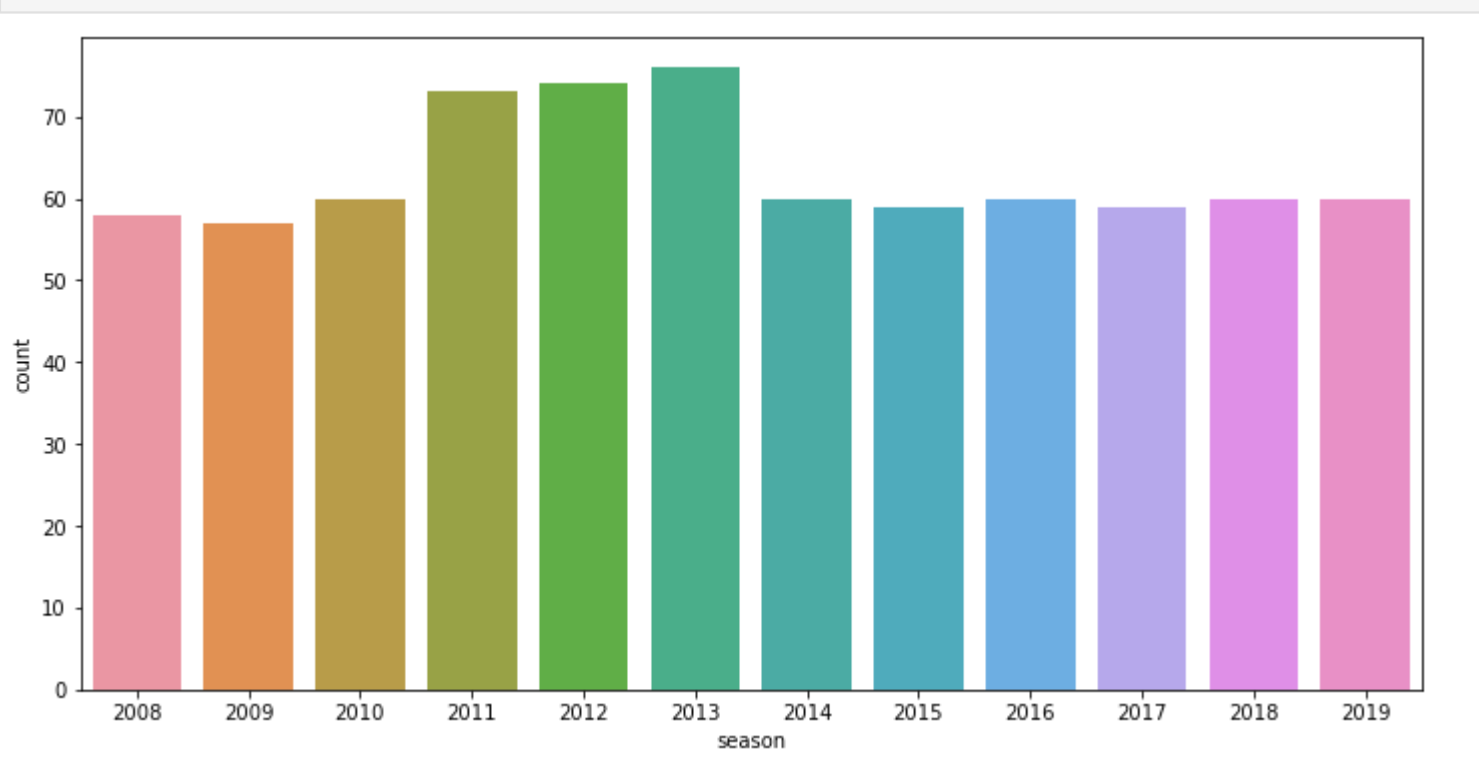
Out[15]:
```
id                                   560
season                              2015
city                             Kolkata
date                            09-05-15
team1                    Kings XI Punjab
team2              Kolkata Knight Riders
toss_winner              Kings XI Punjab
toss_decision                        bat
result                            normal
dl_applied                             0
winner             Kolkata Knight Riders
win_by_runs                            0
win_by_wickets                         1
player_of_match                AD Russell
venue                        Eden Gardens
umpire1                      AK Chaudhary
umpire2                    HDPK Dharmasena
umpire3                              NaN
Name: 559, dtype: object
```

In [16]:
```
matches_df.iloc[matches_df[matches_df['win_by_wickets'].ge(1)].win_by_wickets.idxmin()]['winner']
```

Out[16]:
```
'Kolkata Knight Riders'
```

Season Which had most number of matches

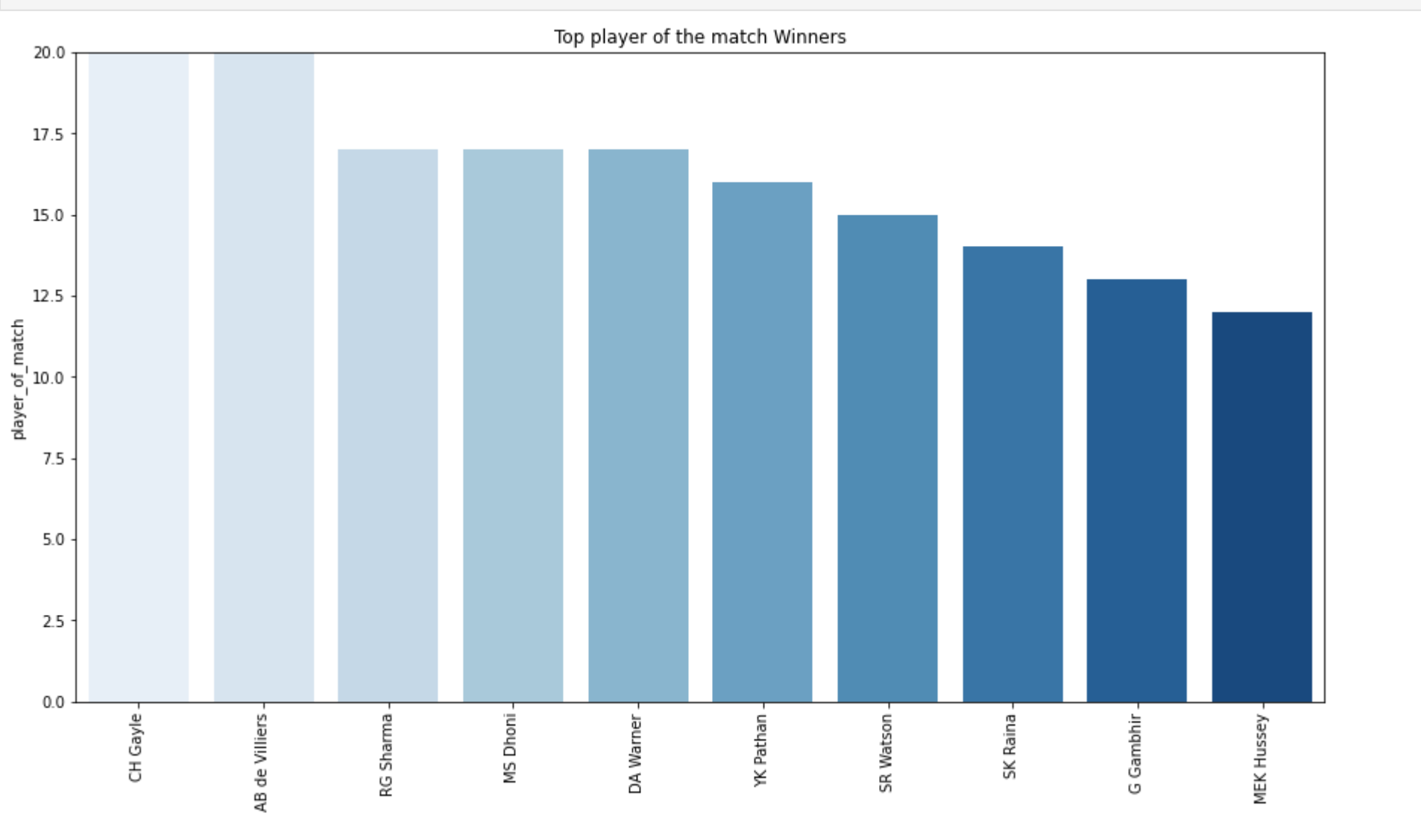
In [17]:
```
plt.figure(figsize=(12,6))
sns.countplot(x='season', data=matches_df)
plt.show()
```



Observation

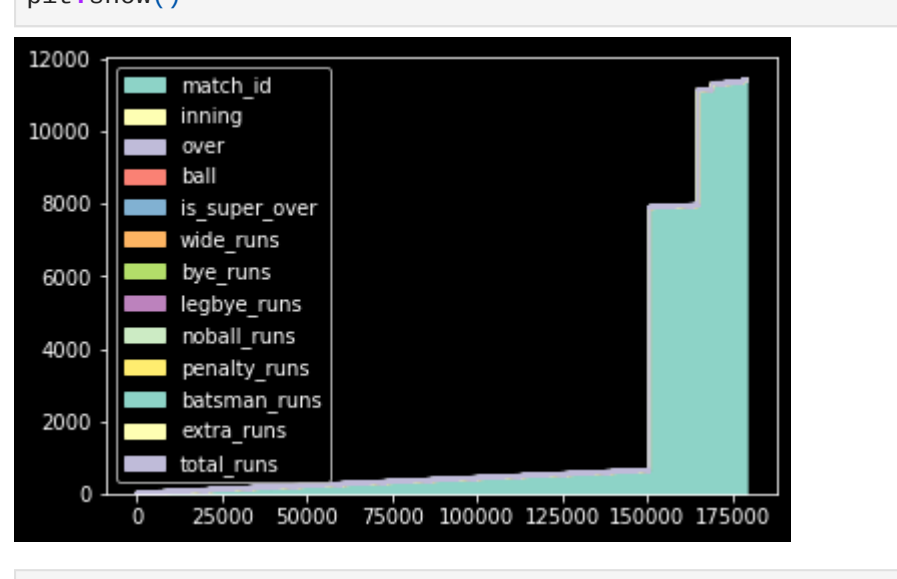
1.Mumbai Indians is the team which won by maximum and minimum runs. 2.Kolkata Knight Riders is the team which won by maximum and minimum wickets.

In [30]:
```
top_players = matches_df.player_of_match.value_counts()[:10]
fig, ax = plt.subplots(figsize=(15,8))
ax.set_ylim([0,20])
ax.set_ylabel("Count")
ax.set_title("Top player of the match Winners")
top_players.plot.bar()
sns.barplot(x = top_players.index, y = top_players, orient='v', palette="Blues");
plt.show()
```

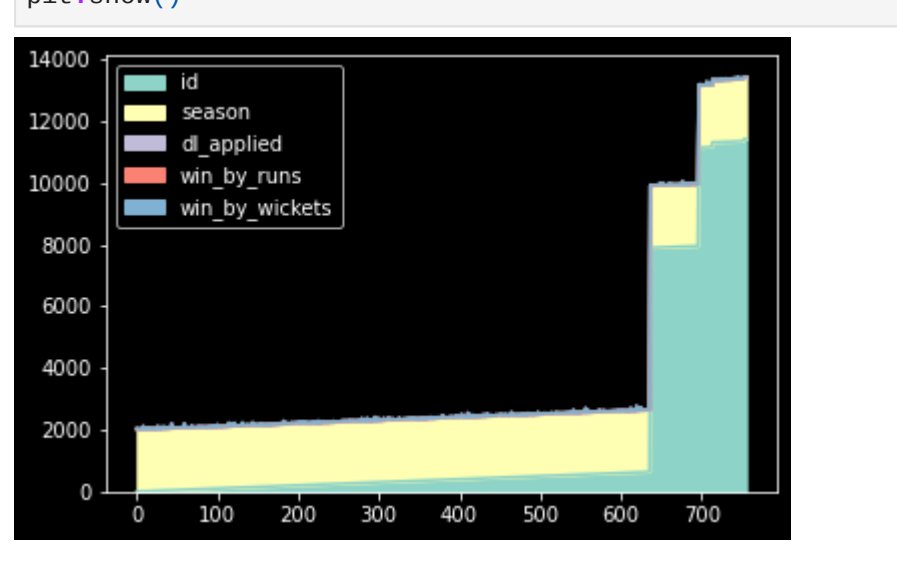


CH Gayle is the most Successful player in all match winners

In [35]:
```
delveries_df.plot(kind='area')
plt.show()
```

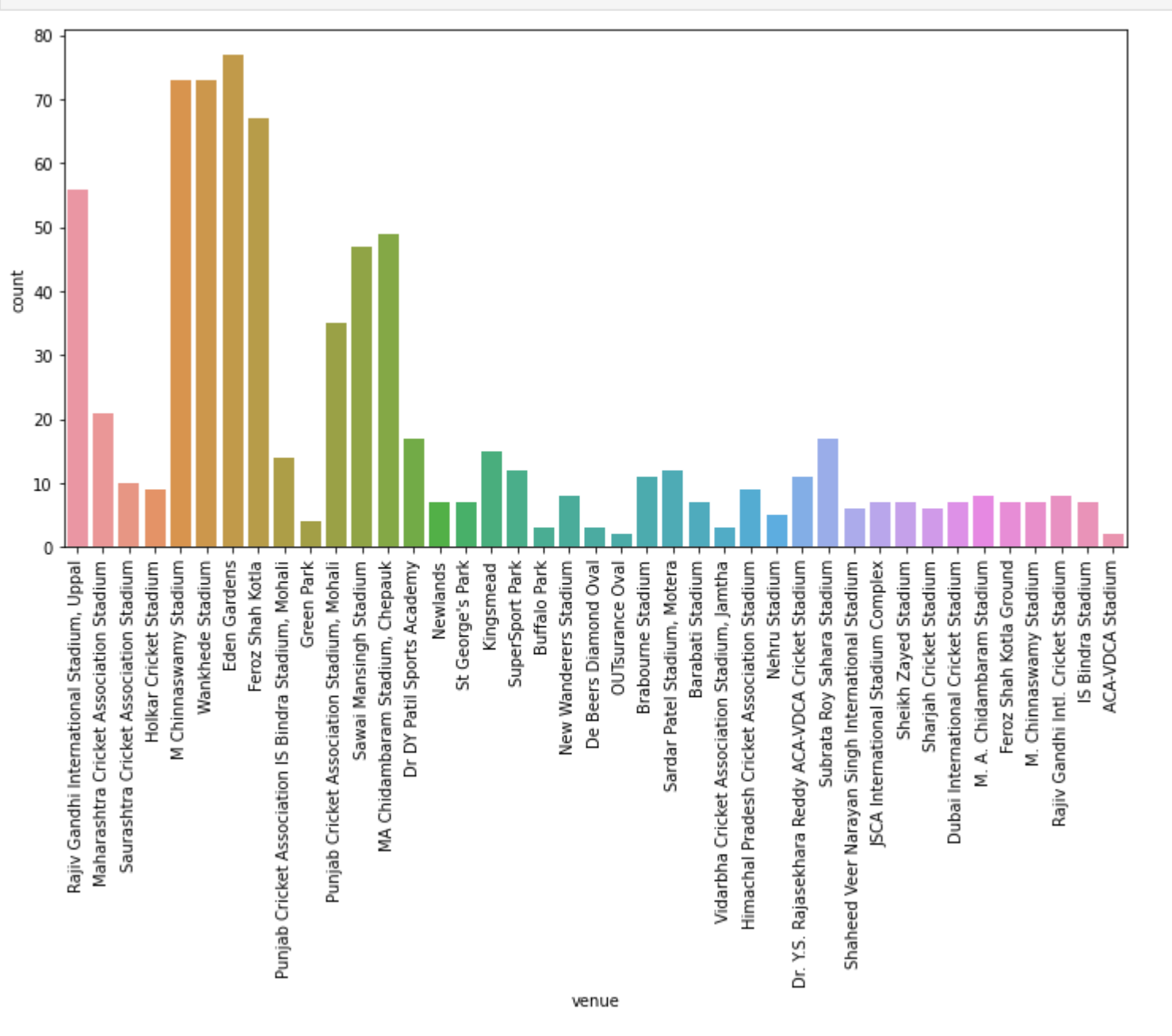


In [36]:
```
matches_df.plot(kind='area')
plt.show()
```



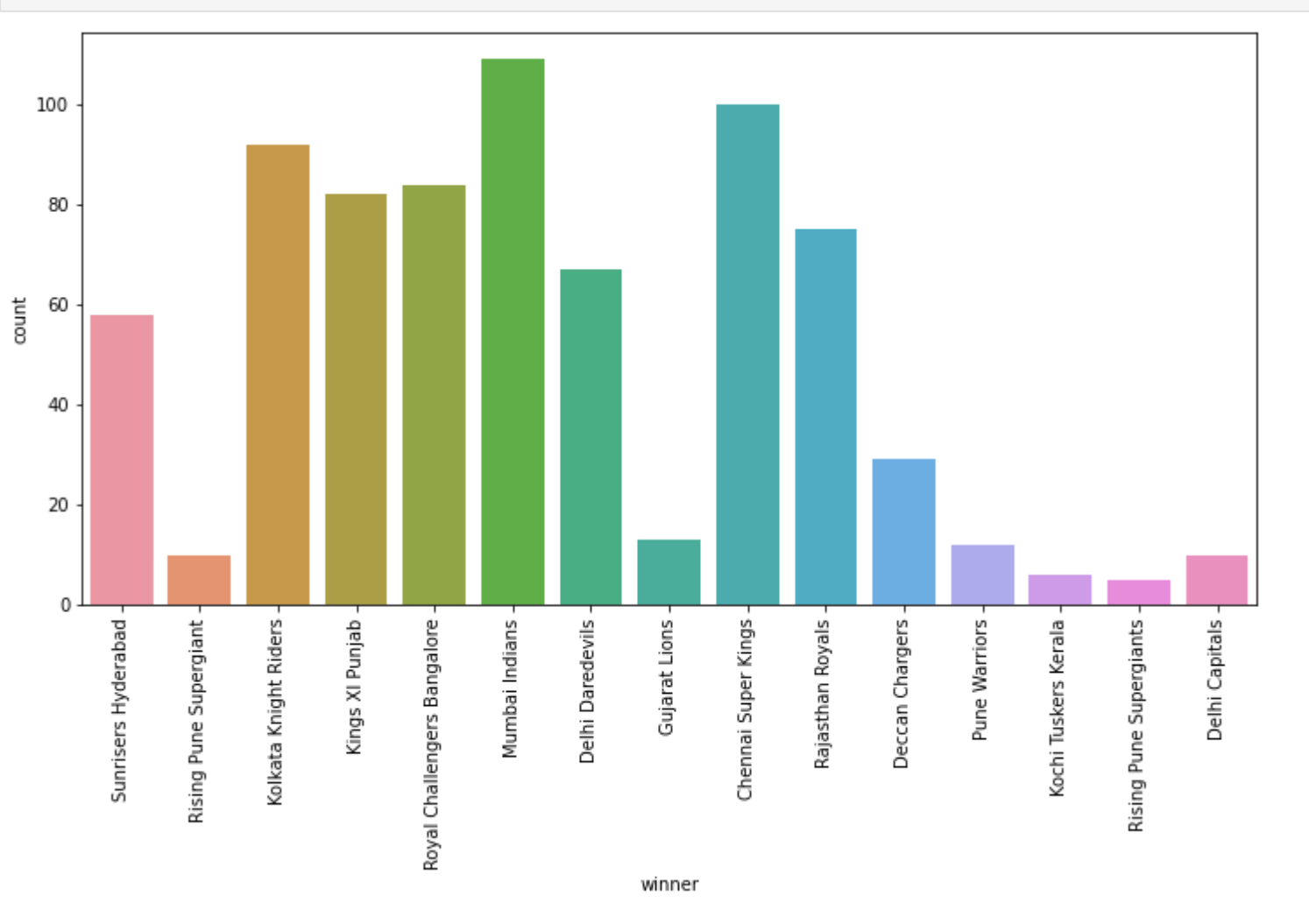
Number of matches in each venue:

In [19]:
```
plt.figure(figsize=(12,6))
sns.countplot(x='venue', data=matches_df)
plt.xticks(rotation='vertical')
plt.show()
```



Number of wins per team:

In [20]:
```
plt.figure(figsize=(12,6))
sns.countplot(x='winner', data=matches_df)
plt.xticks(rotation=90)
plt.show()
```



Champions each season:

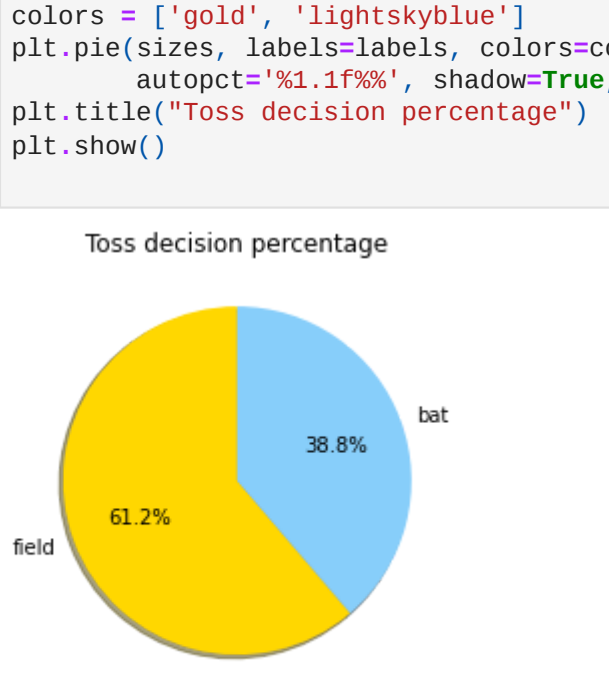
In [21]:
```
temp_df = matches_df.drop_duplicates(subset=['season'], keep='last')[['season', 'winner']].reset_index(drop=True)
temp_df
```

Out[21]:

	season	winner
0	2017	Mumbai Indians
1	2008	Rajasthan Royals
2	2009	Deccan Chargers
3	2010	Chennai Super Kings
4	2011	Chennai Super Kings
5	2012	Kolkata Knight Riders
6	2013	Mumbai Indians
7	2014	Kolkata Knight Riders
8	2015	Mumbai Indians
9	2016	Sunrisers Hyderabad
10	2018	Chennai Super Kings
11	2019	Mumbai Indians

Toss decision:

In [22]:
```
temp_series = matches_df.toss_decision.value_counts()
labels = (np.array(temp_series.index))
sizes = (np.array((temp_series / temp_series.sum())*100))
colors = ['gold', 'lightskyblue']
plt.pie(sizes, labels=labels, colors=colors,
        autopct='%1.1f%%', shadow=True, startangle=90)
plt.title("Toss decision percentage")
plt.show()
```



In [23]:
```
plt.figure(figsize=(12,6))
sns.countplot(x='season', hue='toss_decision', data=matches_df)
plt.xticks(rotation='vertical')
plt.show()
```