```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore") #all warnings are filter out
```

IPL 2022 Capstone Project

The Indian Premier League (IPL) is a professional T20 cricket league in India, featuring franchises representing cities. This project explores IPL 2022 match-level data to derive meaningful insights and understand match outcomes, player performances, and team dynamics.

These are some of the important columns that we'll focus on for meaningful insights in this project.

column names: Variable Type

- date : string
- venue : string
- stage : string
- team1 : string
- team2 : string
- toss_winner : string
- toss_decision : string
- first_ings_score : integer
- second_ings_score : integer
- match_winner : string
- won_by : string
- margin : integer
- player_of_the_match : string
- top_scorer : string
- highscore : integer
- best_bowling : string
- best_bowling_fgure : string
- gure : string

Loading of dataset

```
ipl=pd.read_csv("IPL.csv")
ipl.head(5)
```

```
   match_id           date
venue  \
```

```
0          1  March 26,2022                        Wankhede Stadium,
Mumbai
1          2  March 27,2022                      Brabourne Stadium,
Mumbai
2          3  March 27,2022            Dr DY Patil Sports Academy,
Mumbai
3          4  March 28,2022                        Wankhede Stadium,
Mumbai
4          5  March 29,2022  Maharashtra Cricket Association
Stadium,Pune

       team1      team2  stage toss_winner toss_decision
first_ings_score  \
0    Chennai    Kolkata  Group     Kolkata         Field
131
1      Delhi     Mumbai  Group       Delhi         Field
177
2   Banglore     Punjab  Group      Punjab         Field
205
3    Gujarat    Lucknow  Group     Gujarat         Field
158
4  Hyderabad  Rajasthan  Group   Hyderabad         Field
210

   first_ings_wkts  second_ings_score  second_ings_wkts match_winner
won_by  \
0                5                133                 4      Kolkata
Wickets
1                5                179                 6        Delhi
Wickets
2                2                208                 5       Punjab
Wickets
3                6                161                 5      Gujarat
Wickets
4                6                149                 7    Rajasthan
Runs

   margin player_of_the_match      top_scorer  highscore
best_bowling  \
0       6         Umesh Yadav        MS Dhoni         50      Dwayne
Bravo
1       4       Kuldeep Yadav    Ishan Kishan         81     Kuldeep
Yadav
2       5         Odean Smith  Faf du Plessis         88    Mohammed
Siraj
3       5      Mohammed Shami    Deepak Hooda         55    Mohammed
Shami
4      61        Sanju Samson   Aiden Markram         57  Yuzvendra
Chahal
```

```
  best_bowling_figure
0               3--20
1               3--18
2               2--59
3               3--25
4               3--22
```

Basic Information

```
ipl.describe()
```

```
        match_id  first_ings_score  first_ings_wkts  second_ings_score
\
count  74.000000         74.000000        74.000000          74.000000

mean   37.500000        171.121622         6.135135         158.540541

std    21.505813         29.048355         2.222699          29.299207

min     1.000000         68.000000         0.000000          72.000000

25%    19.250000        154.250000         5.000000         142.750000

50%    37.500000        169.500000         6.000000         160.000000

75%    55.750000        192.750000         8.000000         176.000000

max    74.000000        222.000000        10.000000         211.000000


       second_ings_wkts     margin   highscore
count         74.000000  74.000000   74.000000
mean           6.175676  16.972973   71.716216
std            2.639832  19.651047   20.705052
min            1.000000   2.000000   28.000000
25%            4.000000   5.250000   57.000000
50%            6.000000   8.000000   68.000000
75%            8.000000  18.000000   87.750000
max           10.000000  91.000000  140.000000
```

```
ipl.shape
```

```
(74, 20)
```

```
ipl.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 74 entries, 0 to 73
Data columns (total 20 columns):
 #   Column               Non-Null Count  Dtype
---  ------               --------------  -----
```

```
 0   match_id              74 non-null     int64
 1   date                  74 non-null     object
 2   venue                 74 non-null     object
 3   team1                 74 non-null     object
 4   team2                 74 non-null     object
 5   stage                 74 non-null     object
 6   toss_winner           74 non-null     object
 7   toss_decision         74 non-null     object
 8   first_ings_score      74 non-null     int64
 9   first_ings_wkts       74 non-null     int64
 10  second_ings_score     74 non-null     int64
 11  second_ings_wkts      74 non-null     int64
 12  match_winner          74 non-null     object
 13  won_by                74 non-null     object
 14  margin                74 non-null     int64
 15  player_of_the_match   74 non-null     object
 16  top_scorer            74 non-null     object
 17  highscore             74 non-null     int64
 18  best_bowling          74 non-null     object
 19  best_bowling_figure   74 non-null     object
dtypes: int64(7), object(13)
memory usage: 11.7+ KB
```

Matches btw chennai and mumbai

```
mumbai_chennai_ipl_mat=ipl[((ipl['team1'] == 'Chennai') &
(ipl['team2'] == 'Mumbai')) | ((ipl['team1'] == 'Mumbai') &
(ipl['team2'] == 'Chennai')) ]
mumbai_chennai_ipl_mat
```

```
    match_id           date                                  venue
team1  \
32        33  April 21,2022  Dr DY Patil Sports Academy, Mumbai
Chennai
58        59    May 12,2022            Wankhede Stadium, Mumbai
Chennai

     team2  stage toss_winner toss_decision  first_ings_score  \
32  Mumbai  Group     Chennai         Field               155
58  Mumbai  Group      Mumbai         Field                97

    first_ings_wkts  second_ings_score  second_ings_wkts match_winner
\
32                7                156                 7      Chennai

58               10                103                 5       Mumbai


     won_by  margin player_of_the_match   top_scorer  highscore
best_bowling  \
```

```
32  Wickets       3    Mukesh Choudhary  Tilak Varma          51
Daniel Sams
58  Wickets       5         Daniel Sams     MS Dhoni          36
Daniel Sams

   best_bowling_figure
32               4--30
58               3--16
```

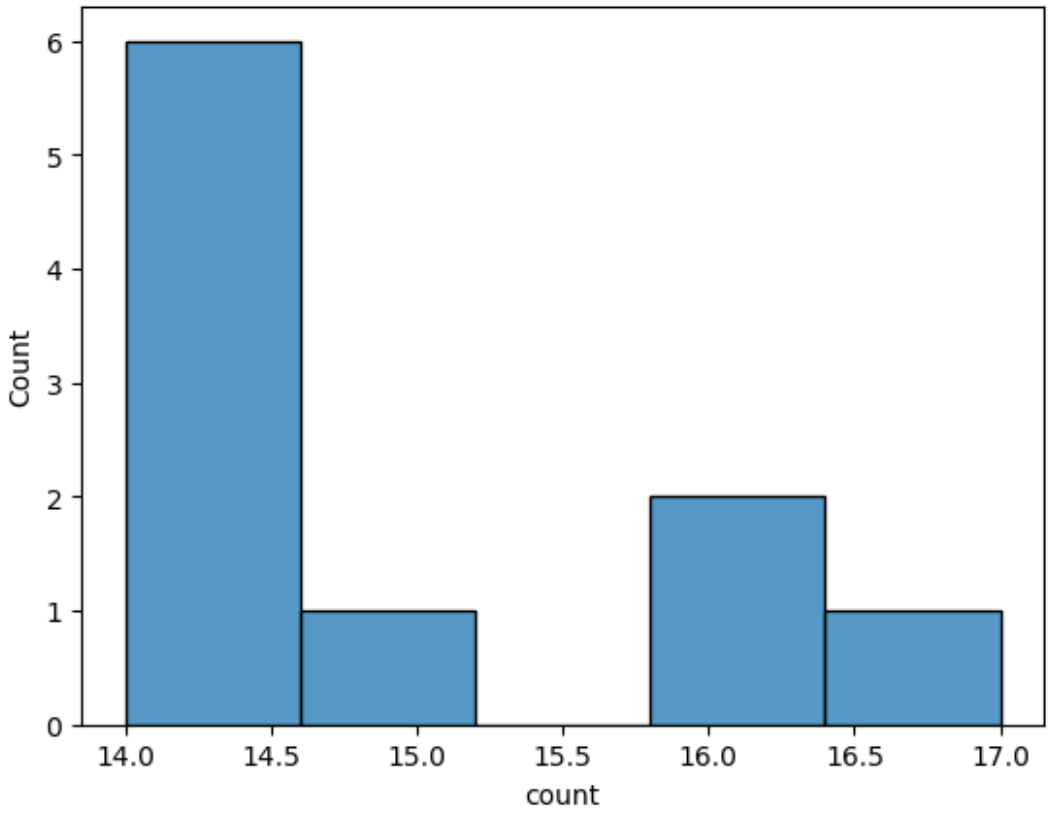
Max Numbers of matches

```
team1=ipl['team1'].value_counts()
team2=ipl['team2'].value_counts()
total_matches=team1.add(team2,fill_value=0)
total_matches
```

```
Banglore     16.0
Chennai      14.0
Delhi        14.0
Gujarat      16.0
Hyderabad    14.0
Kolkata      14.0
Lucknow      15.0
Mumbai       14.0
Punjab       14.0
Rajasthan    17.0
Name: count, dtype: float64
```

```
sns.histplot(total_matches)
```

```
<Axes: xlabel='count', ylabel='Count'>
```




```
total_matches.idxmax()
```

```
'Rajasthan'
```

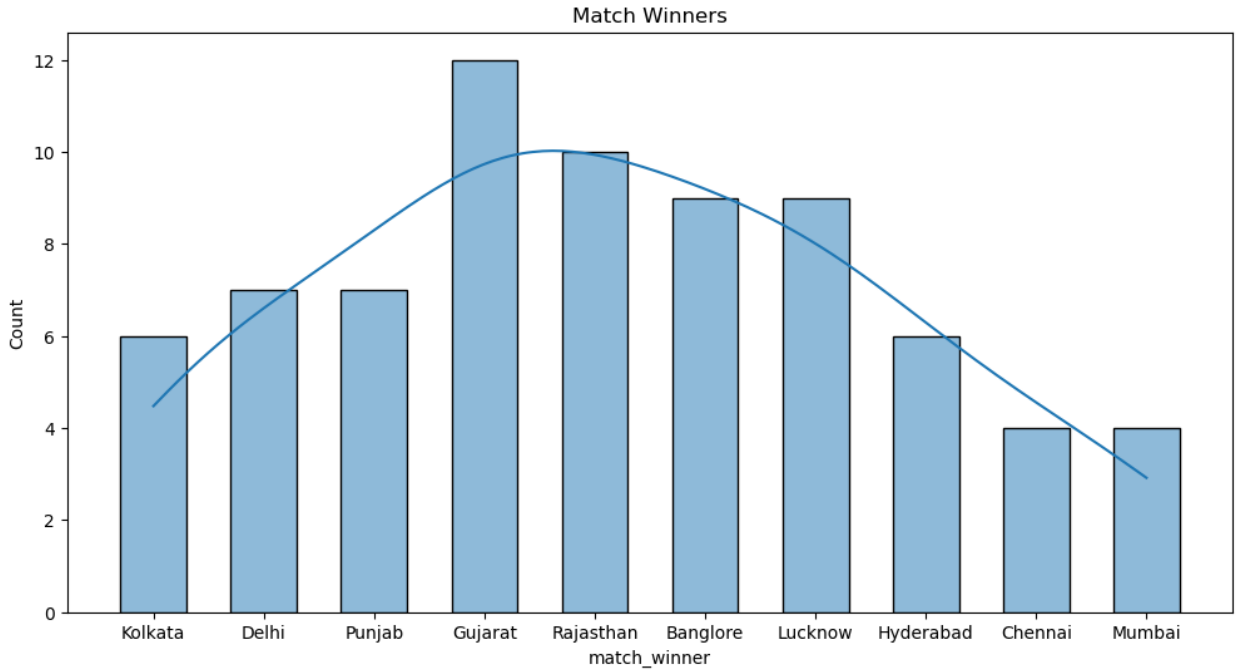
```
total_matches.max()
```

```
17.0
```

Maximum Match Winners

```
plt.figure(figsize=(12, 6))
plt.title("Match Winners")
sns.histplot(ipl['match_winner'],kde=True,shrink=0.6)
```

```
<Axes: title={'center': 'Match Winners'}, xlabel='match_winner',
ylabel='Count'>
```




```
match_winner=ipl['match_winner'].value_counts().idxmax()
match_winner
```

```
'Gujarat'
```

Checking for any null

```
ipl.isnull().sum()
```

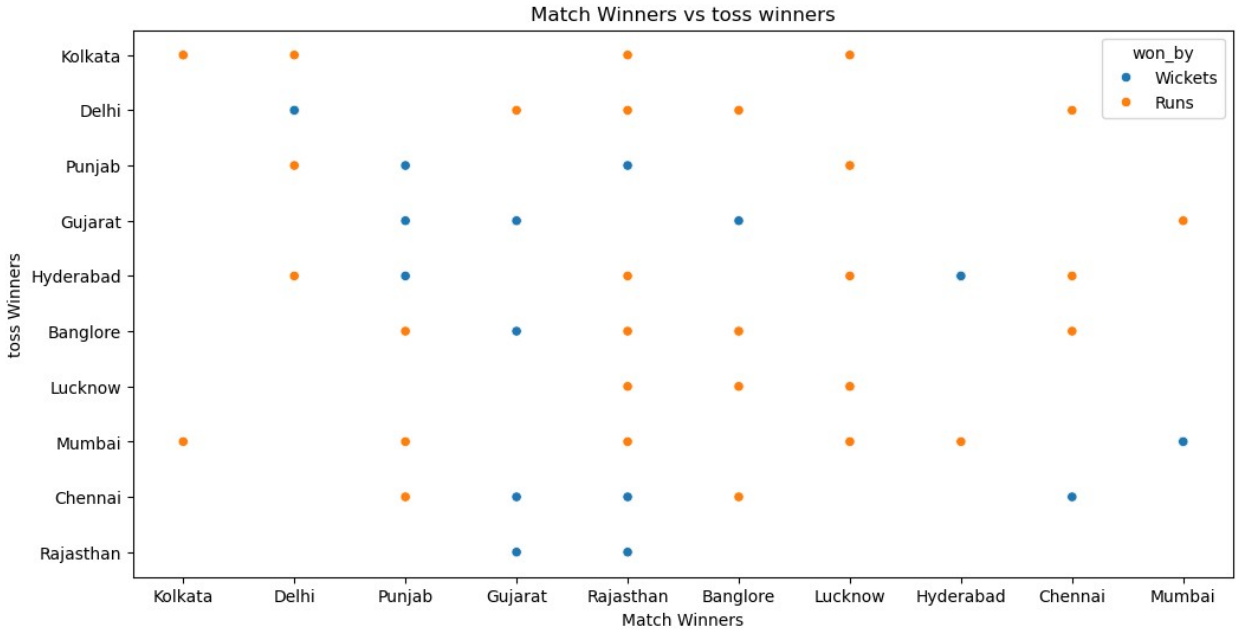
```
match_id                0
date                    0
venue                   0
team1                   0
team2                   0
stage                   0
toss_winner             0
toss_decision           0
first_ings_score        0
first_ings_wkts         0
second_ings_score       0
second_ings_wkts        0
match_winner            0
won_by                  0
margin                  0
player_of_the_match     0
top_scorer              0
highscore               0
best_bowling            0
```

```
best_bowling_figure    0
dtype: int64
```

Match winners vs Toss Winners

```
plt.figure(figsize=(12, 6))
plt.title("Match Winners vs toss winners")
plt.xlabel("Match Winners")
plt.ylabel("toss Winners")
sns.scatterplot(data=ipl, x="match_winner", y="toss_winner",
hue="won_by")
```

```
<Axes: title={'center': 'Match Winners vs toss winners'},
xlabel='Match Winners', ylabel='toss Winners'>
```




```
count=ipl[ipl['toss_winner'] == ipl['match_winner']]
['match_id'].count()
percentage=(count*100)/ipl.shape[0]
percentage
```

```
np.float64(48.648648648648646)
```

Highest score by each team

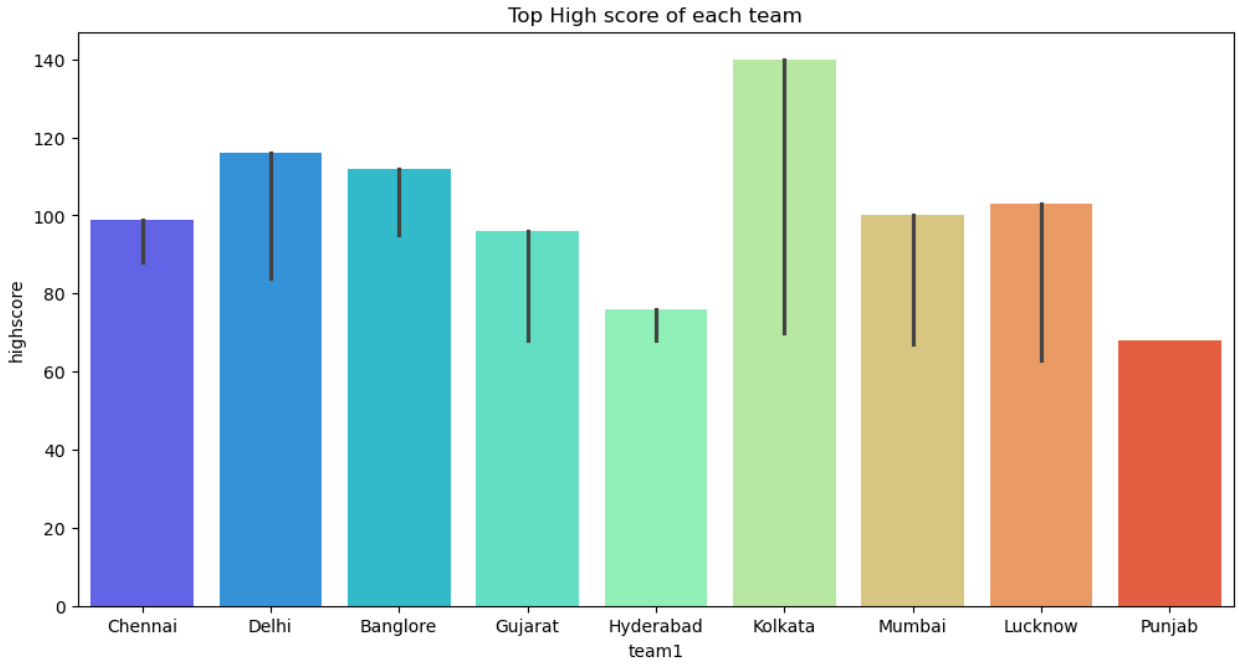
```
high_score=ipl[['team1','highscore']]
high_score
```

```
        team1  highscore
0     Chennai         50
1       Delhi         81
```

```
2    Banglore          88
3     Gujarat          55
4   Hyderabad          57
..        ...         ...
69  Hyderabad          49
70    Gujarat          89
71   Banglore         112
72   Banglore         106
73    Gujarat          45

[74 rows x 2 columns]
```

```
plt.figure(figsize=(12, 6))
plt.title('Top High score of each team')
sns.barplot(x='team1',y='highscore',
data=high_score,estimator=np.max,palette='rainbow')
```

```
<Axes: title={'center': 'Top High score of each team'},
xlabel='team1', ylabel='highscore'>
```




```
ipl[ipl['team1'] == 'Mumbai']['highscore'].max()
```

```
100
```

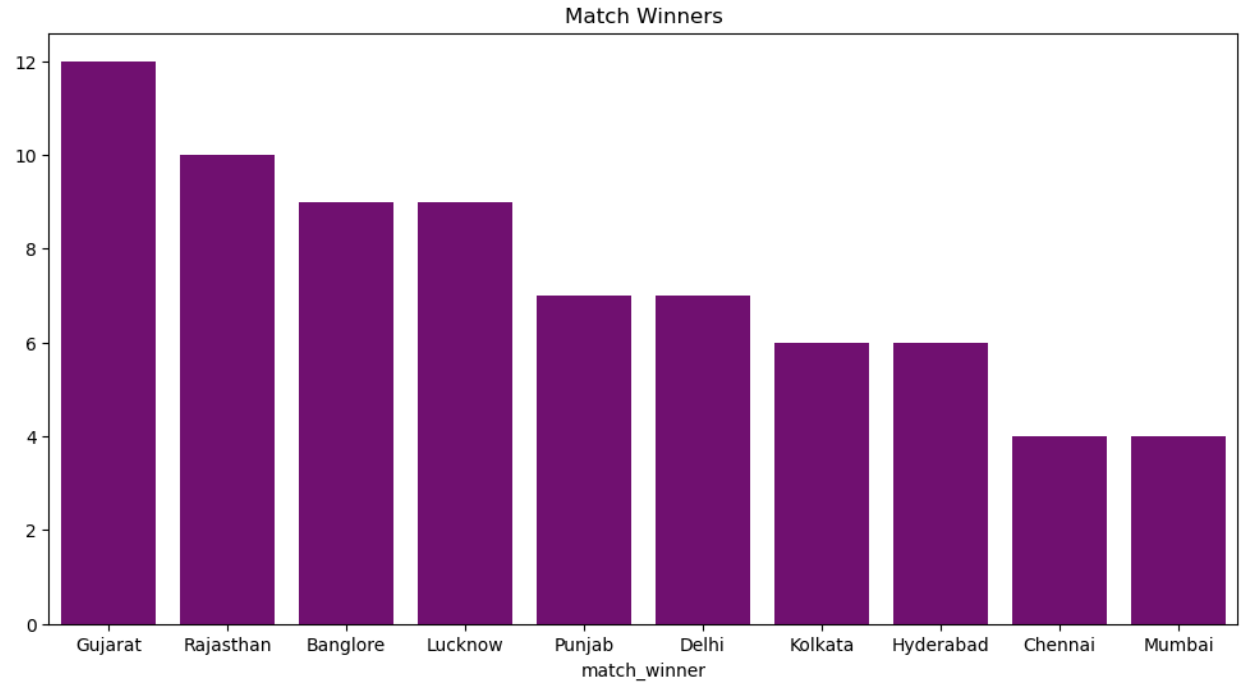
Winner of IPL

```
winner=ipl['match_winner'].value_counts()
winner
```

```
match_winner
Gujarat      12
Rajasthan    10
Banglore      9
Lucknow       9
Punjab        7
Delhi         7
Kolkata       6
Hyderabad     6
Chennai       4
Mumbai        4
Name: count, dtype: int64
```

```
plt.figure(figsize=(12, 6))
plt.title("Match Winners")
sns.barplot(x=winner.index,y=winner.values,color='purple')
```

```
<Axes: title={'center': 'Match Winners'}, xlabel='match_winner'>
```



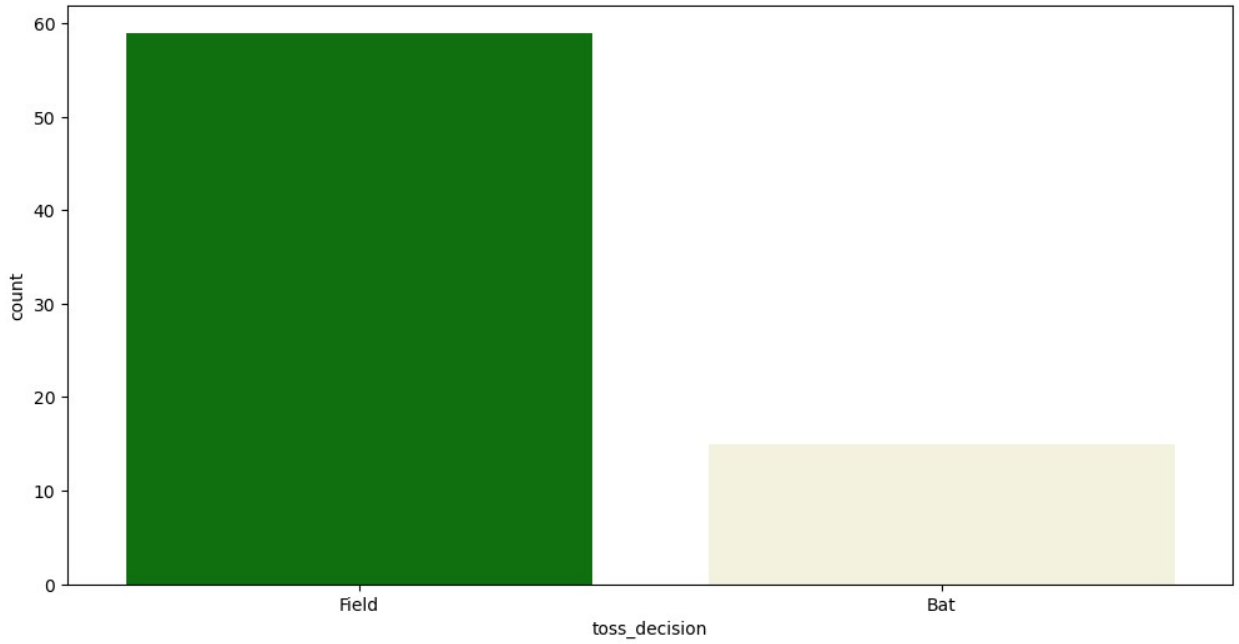

```
winner.idxmax()
```

```
'Gujarat'
```

toss decision trends

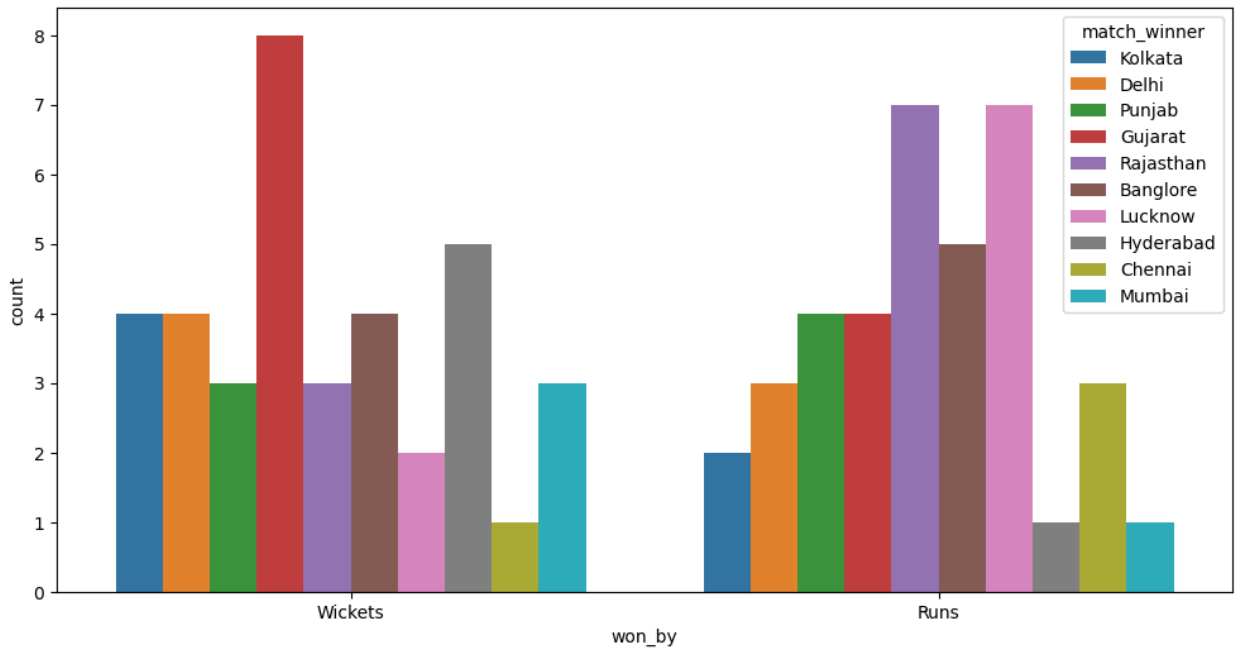
```
plt.figure(figsize=(12, 6))
sns.countplot(x=ipl['toss_decision'],palette=['green','beige'])
```

```
<Axes: xlabel='toss_decision', ylabel='count'>
```



team_wins runs vs wickets

```
plt.figure(figsize=(12, 6))
sns.countplot(x=ipl['won_by'],hue=ipl['match_winner'])

<Axes: xlabel='won_by', ylabel='count'>
```



```
won=ipl[['match_winner','won_by']]
won_by_wickets=won[won['won_by']=='Wickets']
won_by_runs=won[won['won_by']=='Runs']

won_by_runs.value_counts()
```

```
match_winner  won_by
Lucknow       Runs      7
Rajasthan     Runs      7
Banglore      Runs      5
Gujarat       Runs      4
Punjab        Runs      4
Chennai       Runs      3
Delhi         Runs      3
Kolkata       Runs      2
Hyderabad     Runs      1
Mumbai        Runs      1
Name: count, dtype: int64
```

```
won_by_wickets.value_counts()
```

```
match_winner  won_by
Gujarat       Wickets    8
Hyderabad     Wickets    5
Delhi         Wickets    4
Banglore      Wickets    4
Kolkata       Wickets    4
Mumbai        Wickets    3
Rajasthan     Wickets    3
Punjab        Wickets    3
Lucknow       Wickets    2
Chennai       Wickets    1
Name: count, dtype: int64
```

Player of the match

```
ipl.head(5)
```

```
   match_id           date
venue  \
0         1  March 26,2022                        Wankhede Stadium,
Mumbai
1         2  March 27,2022                      Brabourne Stadium,
Mumbai
2         3  March 27,2022            Dr DY Patil Sports Academy,
Mumbai
3         4  March 28,2022                        Wankhede Stadium,
Mumbai
4         5  March 29,2022  Maharashtra Cricket Association
Stadium,Pune
```

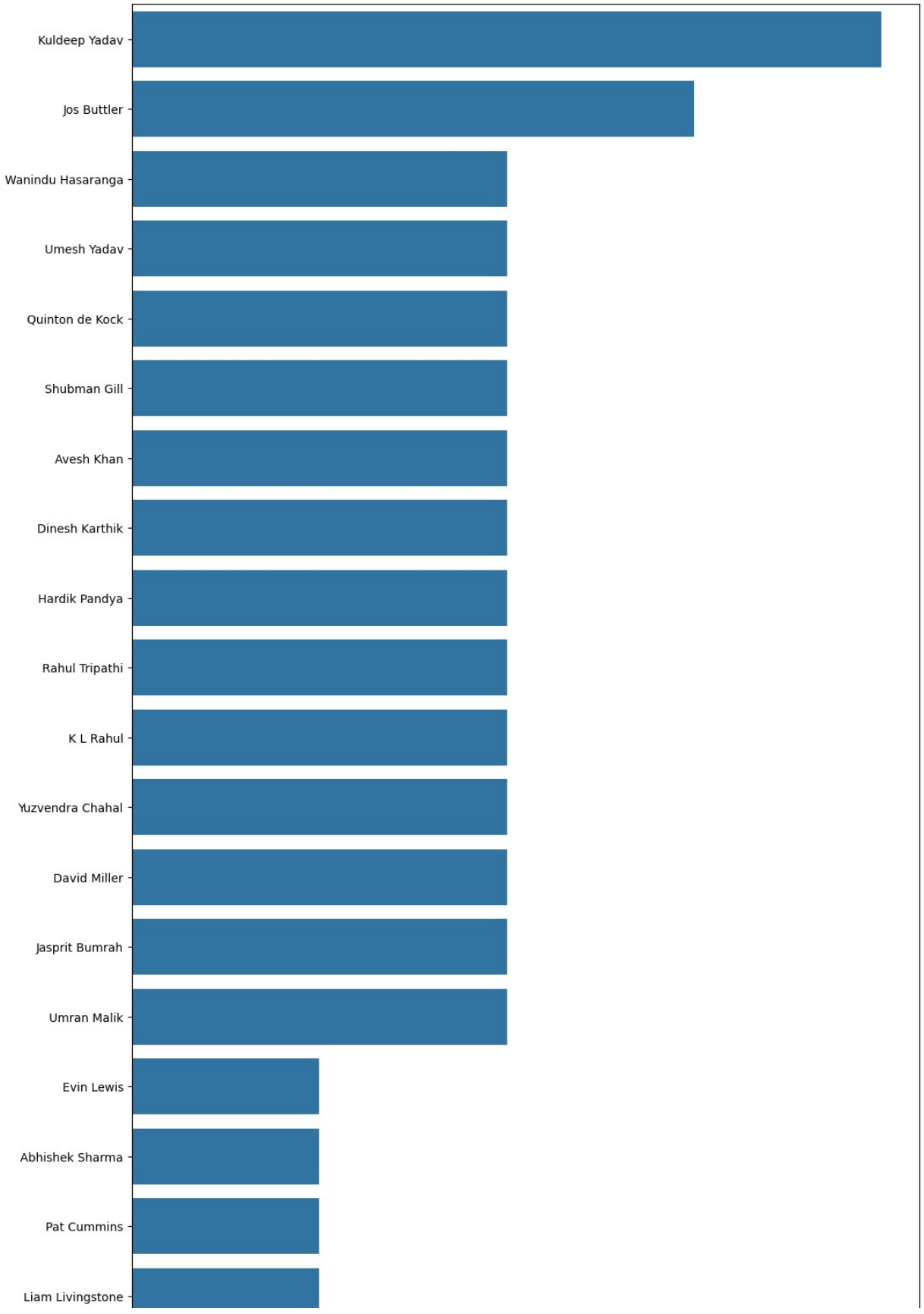
```
       team1      team2  stage toss_winner toss_decision
first_ings_score  \
0    Chennai    Kolkata  Group     Kolkata         Field
131
1      Delhi     Mumbai  Group       Delhi         Field
177
2   Banglore     Punjab  Group      Punjab         Field
205
3    Gujarat    Lucknow  Group     Gujarat         Field
158
4  Hyderabad  Rajasthan  Group   Hyderabad         Field
210

   first_ings_wkts  second_ings_score  second_ings_wkts match_winner
won_by  \
0                5                133                 4      Kolkata
Wickets
1                5                179                 6        Delhi
Wickets
2                2                208                 5       Punjab
Wickets
3                6                161                 5      Gujarat
Wickets
4                6                149                 7    Rajasthan
Runs

   margin player_of_the_match      top_scorer  highscore
best_bowling  \
0       6         Umesh Yadav        MS Dhoni         50      Dwayne
Bravo
1       4       Kuldeep Yadav    Ishan Kishan         81     Kuldeep
Yadav
2       5         Odean Smith  Faf du Plessis         88    Mohammed
Siraj
3       5      Mohammed Shami    Deepak Hooda         55    Mohammed
Shami
4      61        Sanju Samson   Aiden Markram         57  Yuzvendra
Chahal

  best_bowling_figure
0               3--20
1               3--18
2               2--59
3               3--25
4               3--22

pom=ipl['player_of_the_match'].value_counts()
pom
```

player_of_the_match	
Kuldeep Yadav	4
Jos Buttler	3
Wanindu Hasaranga	2
Umesh Yadav	2
Quinton de Kock	2
Shubman Gill	2
Avesh Khan	2
Dinesh Karthik	2
Hardik Pandya	2
Rahul Tripathi	2
K L Rahul	2
Yuzvendra Chahal	2
David Miller	2
Jasprit Bumrah	2
Umran Malik	2
Evin Lewis	1
Abhishek Sharma	1
Pat Cummins	1
Liam Livingstone	1
Lockie Ferguson	1
Shivam Dube	1
Sanju Samson	1
Odean Smith	1
Mohammed Shami	1
Mayank Agarwal	1
Anuj Rawat	1
Kane Williamson	1
Faf du Plessis	1
Rashid Khan	1
Marco Jansen	1
Shikhar Dhawan	1
Mukesh Choudhary	1
Krunal Pandya	1
Rahul Tewatia	1
Suruakumar Yadav	1
Mohsin Khan	1
Ruturaj Gaikwad	1
Rinku Singh	1
Kagiso Rabada	1
Riyan Parag	1
Harshal Patel	1
David Warner	1
Yashasvi Jaiswal	1
Tim David	1
Devon Conway	1
Mitchell Marsh	1
Daniel Sams	1
Jonny Bairstow	1
Andre Russell	1

```
W. Saha               1
Trent Boult           1
Shardul Thakur        1
Virat Kohli           1
R Aswin               1
Harpreet Brar         1
Rajat Patidar         1
Name: count, dtype: int64
```

```
plt.figure(figsize=(12, 60))
sns.barplot(y=pom.index,x=pom.values)
```

```
<Axes: ylabel='player_of_the_match'>
```


Kuldeep Yadav
Jos Buttler
Wanindu Hasaranga
Umesh Yadav
Quinton de Kock
Shubman Gill
Avesh Khan
Dinesh Karthik
Hardik Pandya
Rahul Tripathi
K L Rahul
Yuzvendra Chahal
David Miller
Jasprit Bumrah
Umran Malik
Evin Lewis
Abhishek Sharma
Pat Cummins
Liam Livingstone

```
pom.idxmax()
```

```
'Kuldeep Yadav'
```

Top two Scorers

```
scorer=ipl['top_scorer'].value_counts()

scorer
```

```
top_scorer
Jos Buttler             7
Quinton de Kock         5
Liam Livingstone        4
Shubman Gill            4
KL Rahul                4
Ishan Kishan            3
David Warner            3
W. Saha                 3
Faf du Plessis          3
Shikhar Dhawan          2
Deepak Hooda            2
MS Dhoni                2
Abhishek Sharma         2
Devon Conway            2
Hardik Pandya           2
Rahul Tripathi          2
Mitchell Marsh          2
Andre Russell           2
Virat Kohli             2
Aiden Markram           1
Pat Cummins             1
Kane Williamson         1
Shivam Dube             1
Suryakumar Yadav        1
Shimron Hetmyer         1
Sherfane Rutherford     1
David Miller            1
Tilak Varma             1
Dinesh Karthik          1
Nitish Rana             1
Riyan Parag             1
Sanju Samson            1
Ruturaj Gaikwad         1
Sai Sudharsan           1
Yashasvi Jaiswal        1
Moeen Ali               1
Rajat Patidar           1
Name: count, dtype: int64
```

```
high=ipl.groupby('top_scorer')
['highscore'].sum().sort_values(ascending=False)
high
```

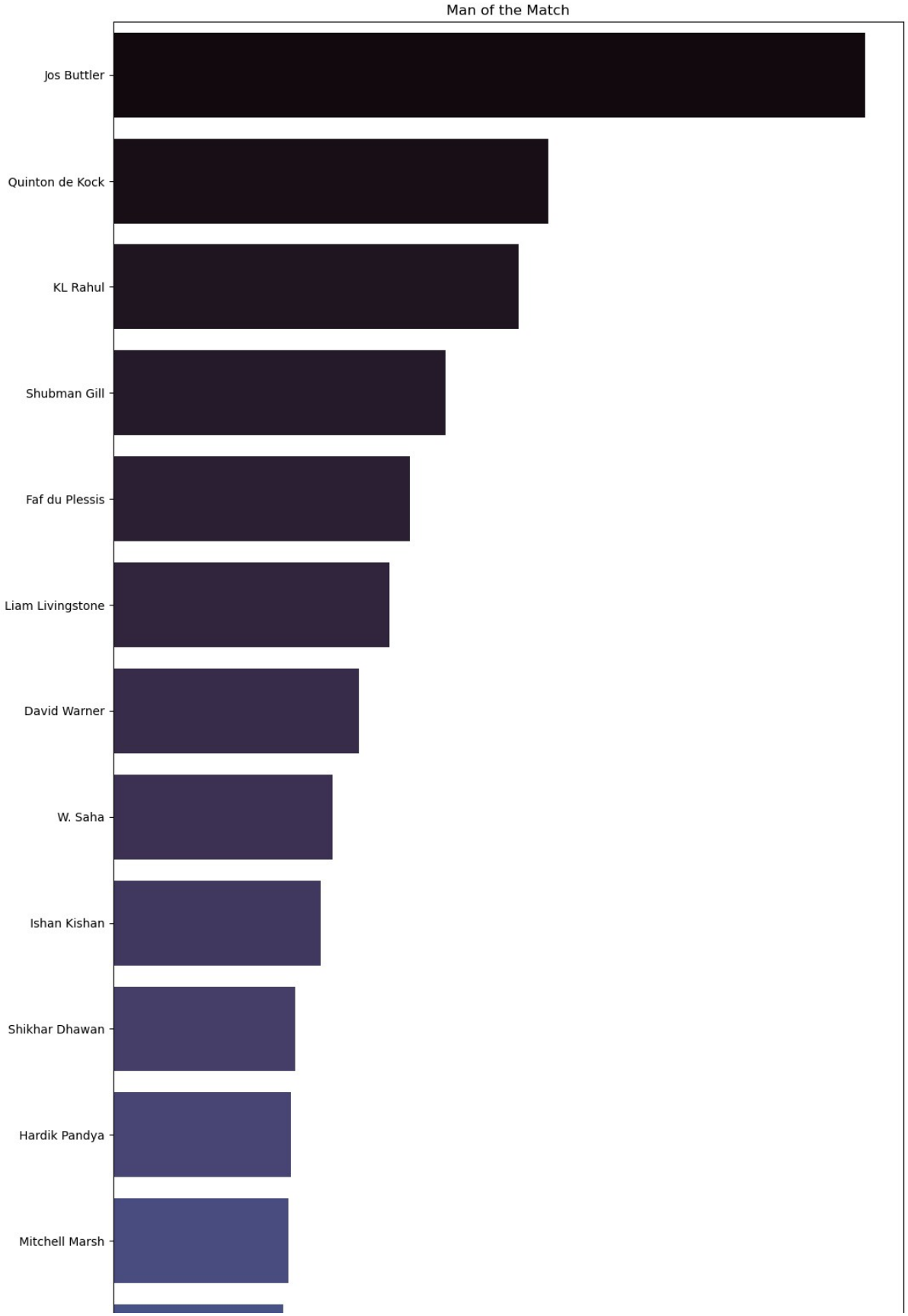
```
top_scorer
Jos Buttler             651
Quinton de Kock         377
KL Rahul                351
Shubman Gill            288
Faf du Plessis          257
Liam Livingstone        239
David Warner            213
W. Saha                 190
Ishan Kishan            180
Shikhar Dhawan          158
Hardik Pandya           154
Mitchell Marsh          152
Rahul Tripathi          147
Devon Conway            143
Virat Kohli             131
Abhishek Sharma         122
Andre Russell           119
Deepak Hooda            114
Rajat Patidar           112
Ruturaj Gaikwad          99
Shivam Dube              95
David Miller             94
Moeen Ali                93
MS Dhoni                 86
Yashasvi Jaiswal         68
Suryakumar Yadav         68
Dinesh Karthik           66
Sai Sudharsan            65
Shimron Hetmyer          59
Aiden Markram            57
Kane Williamson          57
Nitish Rana              57
Pat Cummins              56
Riyan Parag              56
Sanju Samson             54
Tilak Varma              51
Sherfane Rutherford      28
Name: highscore, dtype: int64
```

```
high.head(2)
```

```
top_scorer
Jos Buttler        651
Quinton de Kock    377
Name: highscore, dtype: int64
```

```
plt.figure(figsize=(12, 60))
plt.title("Man of the Match")
sns.barplot(y=high.index,x=high.values,palette='mako')
```

```
<Axes: title={'center': 'Man of the Match'}, ylabel='top_scorer'>
```


Man of the Match
Jos Buttler
Quinton de Kock
KL Rahul
Shubman Gill
Faf du Plessis
Liam Livingstone
David Warner
W. Saha
Ishan Kishan
Shikhar Dhawan
Hardik Pandya
Mitchell Marsh

```
scorer[0:2]
```

```
top_scorer
Jos Buttler        7
Quinton de Kock    5
Name: count, dtype: int64
```

```
scorer[0:2].index
```

```
Index(['Jos Buttler', 'Quinton de Kock'], dtype='object',
name='top_scorer')
```

10 Best Bowling figures

```
bowling_fig=ipl['best_bowling_figure'].value_counts()
```

```
bowling_fig[0:11]
```

```
best_bowling_figure
3--22    5
3--25    3
3--20    3
2--24    3
2--23    3
3--17    2
4--28    2
4--24    2
4--20    2
4--30    2
4--33    2
Name: count, dtype: int64
```

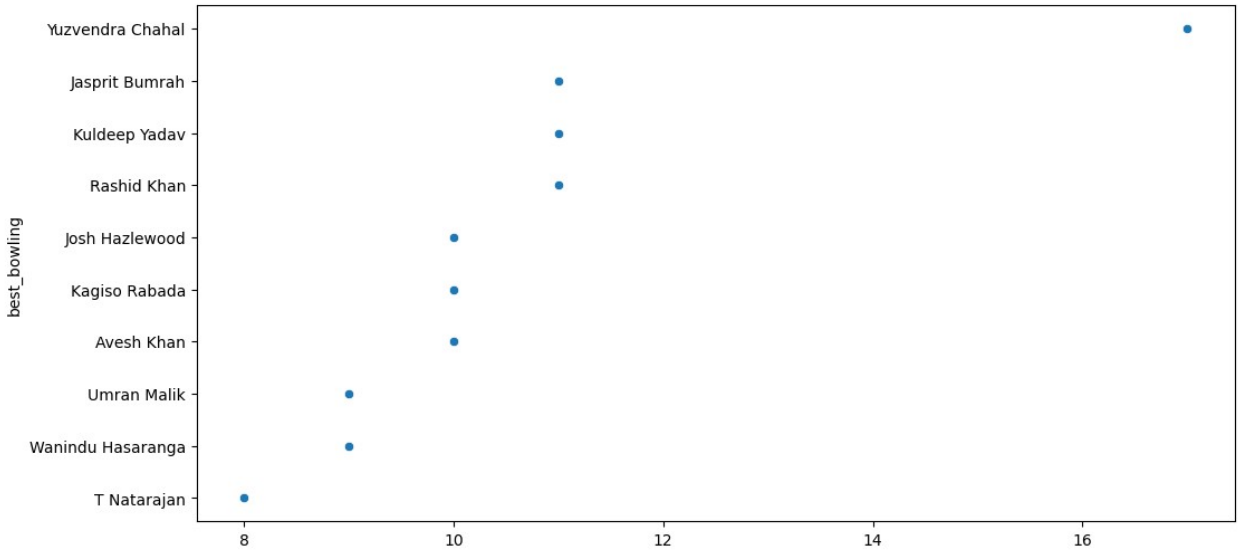
```
ipl['highest_wickets']=ipl['best_bowling_figure'].apply(lambda
x:x.split('--')[0])
ipl['highest_wickets']=ipl['highest_wickets'].astype(int)
```

```
bf=ipl.groupby('best_bowling')
['highest_wickets'].sum().sort_values(ascending=False).head(10)
```

```
bf
```

```
best_bowling
Yuzvendra Chahal     17
Jasprit Bumrah       11
Kuldeep Yadav        11
Rashid Khan          11
Josh Hazlewood       10
Kagiso Rabada        10
Avesh Khan           10
Umran Malik           9
Wanindu Hasaranga     9
```

```
T Natarajan           8
Name: highest_wickets, dtype: int64

plt.figure(figsize=(12, 6))
sns.scatterplot(x=bf.values,y=bf.index)

<Axes: ylabel='best_bowling'>
```



Most Match played by venue

```
venue=ipl['venue'].value_counts()
venue

venue
Wankhede Stadium, Mumbai                        21
Dr DY Patil Sports Academy, Mumbai              20
Brabourne Stadium, Mumbai                       16
Maharashtra Cricket Association Stadium,Pune    13
Eden Gardens, Kolkata                            2
Narendra Modi Stadium, Ahmedabad                 2
Name: count, dtype: int64

venue.idxmax()

'Wankhede Stadium, Mumbai'
```

Who won the match by highest margin Through runs

```
runs=ipl[ipl['won_by']=='Runs'].groupby('top_scorer')
['margin'].max().sort_values(ascending=False)
runs
```

```
top_scorer
Devon Conway         91
Quinton de Kock      75
Faf du Plessis       67
Shubman Gill         62
Aiden Markram        61
Andre Russell        54
Liam Livingstone     54
Ishan Kishan         52
David Warner         44
Hardik Pandya        37
KL Rahul             36
Riyan Parag          29
Deepak Hooda         24
Shivam Dube          23
Jos Buttler          23
Mitchell Marsh       17
Dinesh Karthik       16
Rajat Patidar        14
Ruturaj Gaikwad      13
Shikhar Dhawan       12
W. Saha               5
Rahul Tripathi        3
Shimron Hetmyer       3
Name: margin, dtype: int64
```

```
run_team=ipl[ipl['won_by']=='Runs'].groupby('team1')
['margin'].max().sort_values(ascending=False)
run_team
```

```
team1
Chennai      91
Kolkata      75
Banglore     67
Lucknow      62
Hyderabad    61
Delhi        44
Gujarat      37
Mumbai       23
Name: margin, dtype: int64
```

```
plt.figure(figsize=(12, 6))
sns.bar
```