In [ ]:
```
EDA Assignment_IPL Dataset
```

In [3]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [4]:
```
df=pd.read_csv('IPL_Dataset.csv')
df
```

Out[4]:

	Jersey No	Player	Matches	Inns	Not Out	Runs	Highest Score	Avg	Balls faced	Strike rate	100	50	4s	6s
0	1	KL Rahul	14	14	2	670	132*	55.83	518	129.34	1	5	58	23
1	2	Shikhar Dhawan	17	17	3	618	106*	44.14	427	144.73	2	4	67	12
2	3	David Warner	16	16	2	548	85*	39.14	407	134.64	0	4	52	14
3	4	Shreyas Iyer	17	17	2	519	88*	34.60	421	123.27	0	3	40	16
4	5	Ishan Kishan	14	13	4	516	99	57.33	354	145.76	0	4	36	30
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
128	129	Khaleel Ahmed	7	1	0	0	0*	0.00	2	0.00	0	0	0	0
129	130	Arshdeep Singh	8	1	0	0	0*	0.00	3	0.00	0	0	0	0
130	131	Daniel Sams	3	1	0	0	0*	0.00	2	0.00	0	0	0	0
131	132	Shreevats Goswami	2	2	0	0	0*	0.00	4	0.00	0	0	0	0
132	133	Trent Boult	15	1	0	0	0*	0.00	1	0.00	0	0	0	0

133 rows × 14 columns

In [5]:
```
df.isnull().sum()
```

Out[5]:
```
Jersey No        0
Player           0
Matches          0
Inns             0
Not Out          0
Runs             0
Highest Score    0
Avg              0
Balls faced      0
Strike rate      0
100              0
50               0
4s               0
6s               0
dtype: int64
```

In [3]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 133 entries, 0 to 132
Data columns (total 14 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Jersey No      133 non-null    int64  
 1   Player         133 non-null    object 
 2   Matches        133 non-null    int64  
 3   Inns           133 non-null    int64  
 4   Not Out        133 non-null    int64  
 5   Runs           133 non-null    int64  
 6   Highest Score  133 non-null    object 
 7   Avg            133 non-null    float64
 8   Balls faced    133 non-null    int64  
 9   Strike rate    133 non-null    float64
 10  100            133 non-null    int64  
 11  50             133 non-null    int64  
 12  4s             133 non-null    int64  
 13  6s             133 non-null    int64  
dtypes: float64(2), int64(10), object(2)
memory usage: 14.7+ KB
```

In [8]:
```
df.describe().T
```

Out[8]:

	count	mean	std	min	25%	50%	75%	max
Jersey No	133.0	67.000000	38.537860	1.0	34.00	67.00	100.0	133.00
Matches	133.0	9.631579	4.893523	1.0	5.00	10.00	14.0	17.00
Inns	133.0	6.631579	5.030925	1.0	2.00	5.00	11.0	17.00
Not Out	133.0	1.616541	1.550766	0.0	0.00	1.00	2.0	7.00
Runs	133.0	139.157895	167.293103	0.0	10.00	59.00	232.0	670.00
Avg	133.0	19.366241	18.053343	0.0	6.00	15.00	29.9	101.00
Balls faced	133.0	105.714286	122.253870	1.0	12.00	53.00	169.0	518.00
Strike rate	133.0	107.364737	44.584031	0.0	88.75	116.84	137.5	191.42
100	133.0	0.037594	0.227170	0.0	0.00	0.00	0.0	2.00
50	133.0	0.827068	1.351269	0.0	0.00	0.00	1.0	5.00
4s	133.0	11.894737	15.521375	0.0	0.00	5.00	20.0	67.00
6s	133.0	5.518797	7.393283	0.0	0.00	2.00	9.0	30.00

In [6]:
```
df.columns
```

Out[6]:
```
Index(['Jersey No', 'Player', 'Matches', 'Inns', 'Not Out', 'Runs',
       'Highest Score', 'Avg', 'Balls faced', 'Strike rate', '100', '50', '4s',
       '6s'],
      dtype='object')
```

In [ ]:
```
Q1. What is the maximum number of matches played by an individual player in a season? Print the player name along with the number of matched played?
```

In [4]:
```
max_matches = df.groupby('Player')['Matches'].max()
max_matches
```

Out[4]:
```
Player
ABD Villiers         15
Aaron Finch          12
Abdul Samad          12
Abhishek Sharma       8
Ajinkya Rahane        9
                     ..
Virat Kohli          15
Washington Sundar    15
Wriddhiman Saha       4
Yashasvi Jaiswal      3
Yuzvendra Chahal     15
Name: Matches, Length: 133, dtype: int64
```

In [ ]:
```
Q2 Top 2 players with maximum Average who have scored atleast 2 half centuries ?
```

In [11]:
```
df1 = df[df["50"]>= 2]
top_players = df1.sort_values('Avg', ascending=False).head(2)
top_players
```

Out[11]:

	Jersey No	Player	Matches	Inns	Not Out	Runs	Highest Score	Avg	Balls faced	Strike rate	100	50	4s	6s
36	37	Wriddhiman Saha	4	4	1	214	87	71.33	153	139.86	0	2	24	5
4	5	Ishan Kishan	14	13	4	516	99	57.33	354	145.76	0	4	36	30

In [ ]:
```
Q3 Create 2 new columns based on Player name. First column will have first name and second column will have last name.
Eg: for the player Shikhar Dhawan, Shikhar will be the first name and Dhawan will be the last name.
```

In [31]:
```
df[['First_Name', 'Last_Name']] = df['Player'].apply(lambda x: pd.Series(x.split(' ', 1)))
print(df[['First_Name', 'Last_Name']].head())
```

```
  First_Name Last_Name
0         KL     Rahul
1    Shikhar    Dhawan
2      David    Warner
3    Shreyas      Iyer
4      Ishan    Kishan
```

In [ ]:
```
Q4 Create a new column (Cleaned_Highest_score) based on Highest score variable.
Remove the Asterik(*) mark and convert the data type into INT.
```

In [44]:
```
df['Cleaned_Highest_score'] = df['Highest Score'].str.replace('*', '', regex=False).astype(int)
print(df[['Highest Score', 'Cleaned_Highest_score']])
```

```
    Highest Score  Cleaned_Highest_score
0            132*                    132
1            106*                    106
2             85*                     85
3             88*                     88
4              99                     99
..            ...                    ...
128            0*                      0
129            0*                      0
130            0*                      0
131            0*                      0
132            0*                      0

[133 rows x 2 columns]
```

In [ ]:
```
Q5 Print the total number of centuries scored in the entire season
```

In [56]:
```
centuries_count = df['100'].sum()
centuries_count
```

Out[56]: 5

In [ ]:
```
Q6 Print all the player names whose strike rate is less than the average strike rate of all players in entire season.
Print the player name, his strike rate and average strike rate
```

In [97]:
```
Avg_Strike_rate=df['Strike rate'].mean()
Below_Avg_Strike_rate=df[df['Strike rate']<Avg_Strike_rate]
Below_Avg_Strike_rate['Avg_Strike_rate']=Avg_Strike_rate
print(Below_Avg_Strike_rate[['Player', 'Strike rate', 'Avg_Strike_rate']])
```

	Player	Strike rate	Avg_Strike_rate
51	Ajinkya Rahane	105.60	107.364737
55	Glenn Maxwell	101.88	107.364737
58	Vijay Shankar	101.04	107.364737
61	Josh Philippe	101.29	107.364737
62	Gurkeerat Singh	88.75	107.364737
65	Kedar Jadhav	93.93	107.364737
70	Yashasvi Jaiswal	90.90	107.364737
71	Shreyas Gopal	94.87	107.364737
77	Murali Vijay	74.41	107.364737
79	Chris Jordan	93.54	107.364737
80	Navdeep Saini	100.00	107.364737
82	Kamlesh Nagarkoti	70.96	107.364737
84	Harshal Patel	87.50	107.364737
85	Jimmy Neesham	105.55	107.364737
86	Tom Banton	90.00	107.364737
89	Prabhsimran Singh	100.00	107.364737
92	Kuldeep Yadav	61.90	107.364737
94	Moeen Ali	75.00	107.364737
95	Sandeep Sharma	80.00	107.364737
96	Shardul Thakur	57.14	107.364737
98	Rinku Singh	100.00	107.364737
99	Shivam Mavi	71.42	107.364737
100	Varun Chakaravarthy	66.66	107.364737
101	Jaydev Unadkat	69.23	107.364737
102	Ankit Rajpoot	90.00	107.364737
104	Shahbaz Nadeem	87.50	107.364737
105	Pravin Dubey	53.84	107.364737
107	Deepak Chahar	58.33	107.364737
108	Ravi Bishnoi	58.33	107.364737
109	Andrew Tye	100.00	107.364737
111	Kartik Tyagi	66.66	107.364737
112	Murugan Ashwin	100.00	107.364737
114	T Natarajan	60.00	107.364737
115	Prasidh Krishna	50.00	107.364737
116	Rahul Chahar	50.00	107.364737
117	Mohammad Shami	66.66	107.364737
118	Nikhil Naik	33.33	107.364737
119	Mujeeb Ur Rahman	33.33	107.364737
120	Dale Steyn	50.00	107.364737
121	Varun Aaron	10.00	107.364737

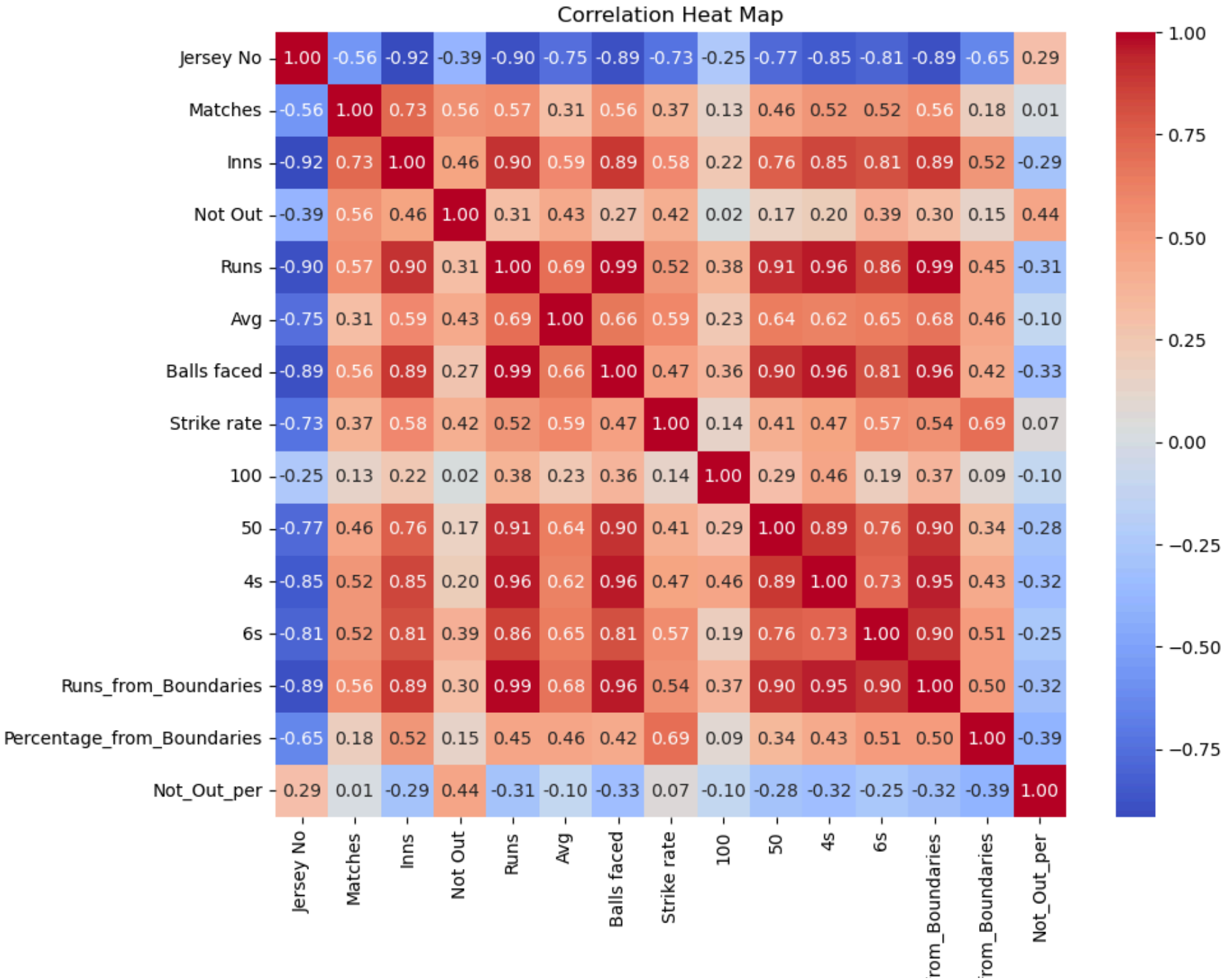
```
122        Shahbaz Ahmed       100.00       107.364737
123     Yuzvendra Chahal        33.33       107.364737
124       Mitchell Marsh         0.00       107.364737
125          Umesh Yadav         0.00       107.364737
126    Bhuvneshwar Kumar         0.00       107.364737
127     Sheldon Cottrell         0.00       107.364737
128        Khaleel Ahmed         0.00       107.364737
129       Arshdeep Singh         0.00       107.364737
130          Daniel Sams         0.00       107.364737
131    Shreevats Goswami         0.00       107.364737
132          Trent Boult         0.00       107.364737

C:\Users\amiglani\AppData\Local\Temp\ipykernel_12884\1924471840.py:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning
-a-view-versus-a-copy
  Below_Avg_Strike_rate['Avg_Strike_rate']=Avg_Strike_rate
```

In [ ]:
```
Q7. Please check the correlation between the features and create a heat map.
```

In [40]:
```
num_df=df.select_dtypes(include=['float64','int64'])
correlation_matrix=num_df.corr()
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt='.2f')
plt.title('Correlation Heat Map')
plt.show()
```


Correlation Heat Map
Jersey No 1.00 -0.56 -0.92 -0.39 -0.90 -0.75 -0.89 -0.73 -0.25 -0.77 -0.85 -0.81 -0.89 -0.65 0.29
Matches -0.56 1.00 0.73 0.56 0.57 0.31 0.56 0.37 0.13 0.46 0.52 0.52 0.56 0.18 0.01
Inns -0.92 0.73 1.00 0.46 0.90 0.59 0.89 0.58 0.22 0.76 0.85 0.81 0.89 0.52 -0.29
Not Out -0.39 0.56 0.46 1.00 0.31 0.43 0.27 0.42 0.02 0.17 0.20 0.39 0.30 0.15 0.44
Runs -0.90 0.57 0.90 0.31 1.00 0.69 0.99 0.52 0.38 0.91 0.96 0.86 0.99 0.45 -0.31
Avg -0.75 0.31 0.59 0.43 0.69 1.00 0.66 0.59 0.23 0.64 0.62 0.65 0.68 0.46 -0.10
Balls faced -0.89 0.56 0.89 0.27 0.99 0.66 1.00 0.47 0.36 0.90 0.96 0.81 0.96 0.42 -0.33
Strike rate -0.73 0.37 0.58 0.42 0.52 0.59 0.47 1.00 0.14 0.41 0.47 0.57 0.54 0.69 0.07
100 -0.25 0.13 0.22 0.02 0.38 0.23 0.36 0.14 1.00 0.29 0.46 0.19 0.37 0.09 -0.10
50 -0.77 0.46 0.76 0.17 0.91 0.64 0.90 0.41 0.29 1.00 0.89 0.76 0.90 0.34 -0.28
4s -0.85 0.52 0.85 0.20 0.96 0.62 0.96 0.47 0.46 0.89 1.00 0.73 0.95 0.43 -0.32
6s -0.81 0.52 0.81 0.39 0.86 0.65 0.81 0.57 0.19 0.76 0.73 1.00 0.90 0.51 -0.25
Runs_from_Boundaries -0.89 0.56 0.89 0.30 0.99 0.68 0.96 0.54 0.37 0.90 0.95 0.90 1.00 0.50 -0.32
Percentage_from_Boundaries -0.65 0.18 0.52 0.15 0.45 0.46 0.42 0.69 0.09 0.34 0.43 0.51 0.50 1.00 -0.39
Not_Out_per 0.29 0.01 -0.29 0.44 -0.31 -0.10 -0.33 0.07 -0.10 -0.28 -0.32 -0.25 -0.32 -0.39 1.00
Jersey No
Matches
Inns
Not Out
Runs
Avg
Balls faced
Strike rate
100
50
4s
6s
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75

Runs_f

Percentage_f

In [ ]:
```
Q8. Check the list of players who has an average greater than 50 as well strike rate above 120. Print player name, ave
rage and strike rate.
```

In [116]:
```
df1=df[(df['Avg']>= 50) & (df['Strike rate']>= 120)]
print(df1[['Player', 'Avg', 'Strike rate']])
```

```
             Player     Avg  Strike rate
0          KL Rahul   55.83       129.34
4      Ishan Kishan   57.33       145.76
31   Kieron Pollard   53.60       191.42
36  Wriddhiman Saha   71.33       139.86
37  Ruturaj Gaikwad   51.00       120.71
57     Deepak Hooda  101.00       142.25
60       Tom Curran   83.00       133.87
```

In [ ]:
```
Q9. Please check the list of players who has an average greater than 40 and balls faced above 100. Print player name,
average and balls faced.
```

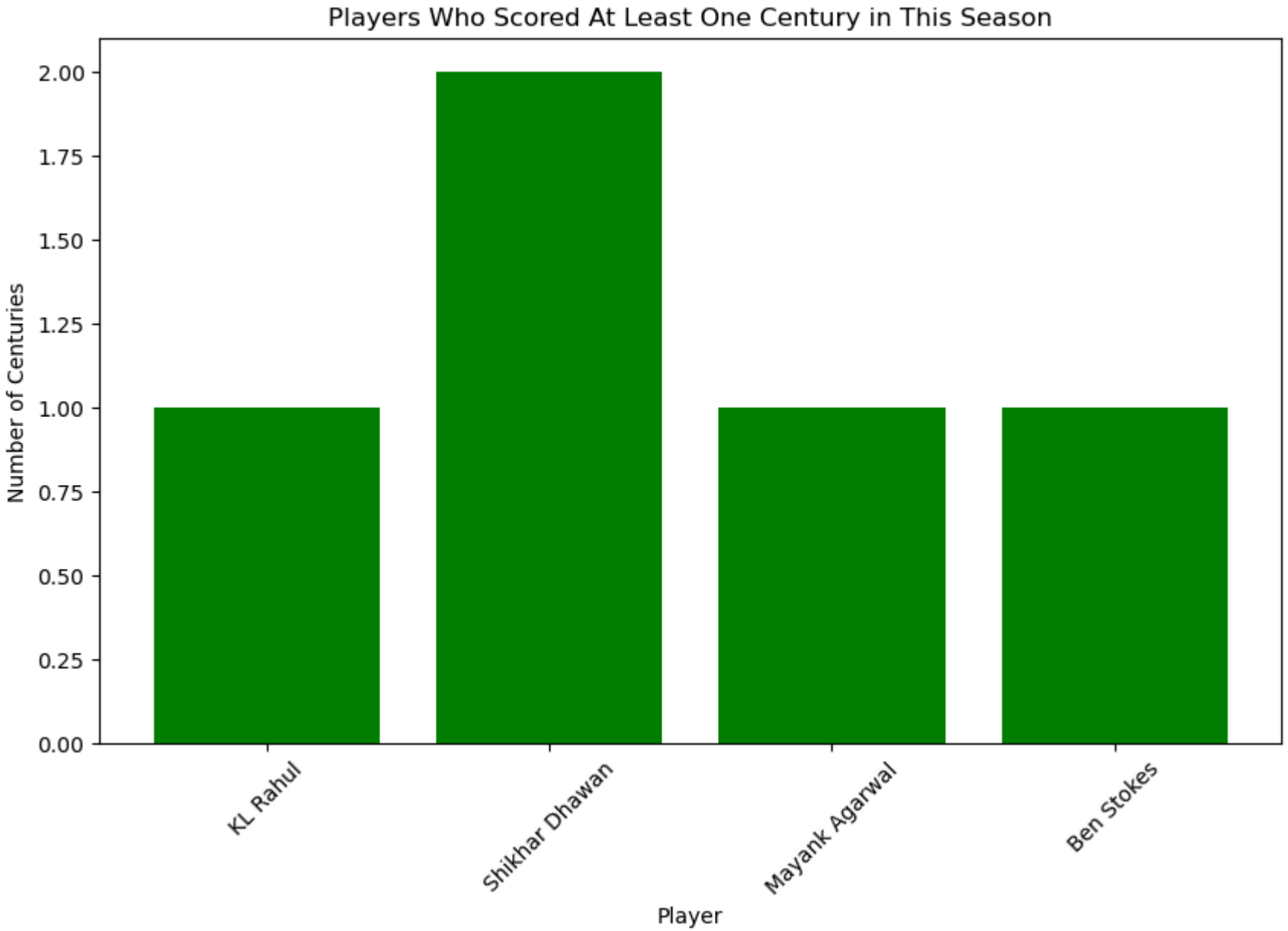
In [117]:
```
df1=df[(df['Avg']>= 40) & (df['Balls faced']>= 100)]
print(df1[['Player', 'Avg', 'Balls faced']])
```

	Player	Avg	Balls faced
0	KL Rahul	55.83	518
1	Shikhar Dhawan	44.14	427
4	Ishan Kishan	57.33	354
6	Suryakumar Yadav	40.00	331
8	Virat Kohli	42.36	384
9	ABD Villiers	45.40	286
10	Faf Duplessis	40.81	319
14	Eoin Morgan	41.80	302
24	Kane Williamson	45.28	237
27	Chris Gayle	41.14	210
28	Ben Stokes	40.71	200
31	Kieron Pollard	53.60	140
32	Rahul Tewatia	42.50	183
33	Ravindra Jadeja	46.40	135
36	Wriddhiman Saha	71.33	153
37	Ruturaj Gaikwad	51.00	169

In [ ]:
```
Q10. Players who scored atleast one century in this season. Create visualization.
```

In [92]:
```
df1 = df[df["100"]>= 1]
print(df1[['Player','100']])
plt.figure(figsize=(10, 6))
plt.bar(df1['Player'], df1['100'], color='Green')
plt.xlabel('Player')
plt.ylabel('Number of Centuries')
plt.title('Players Who Scored At Least One Century in This Season')
plt.xticks(rotation=45)
plt.show()
```

	Player	100
0	KL Rahul	1
1	Shikhar Dhawan	2
13	Mayank Agarwal	1
28	Ben Stokes	1



In [ ]:
```
Q11. Players who scored atleast 4 half centuries in this season.
```

In [86]:
```
df1 = df[df["50"]>= 4]
print(df1[['Player','50']])
```

```
              Player  50
0           KL Rahul   5
1      Shikhar Dhawan   4
2        David Warner   4
4        Ishan Kishan   4
5        Quinton Kock   4
6    Suryakumar Yadav   4
7    Devdutt Padikkal   5
9        ABD Villiers   5
10      Faf Duplessis   4
```

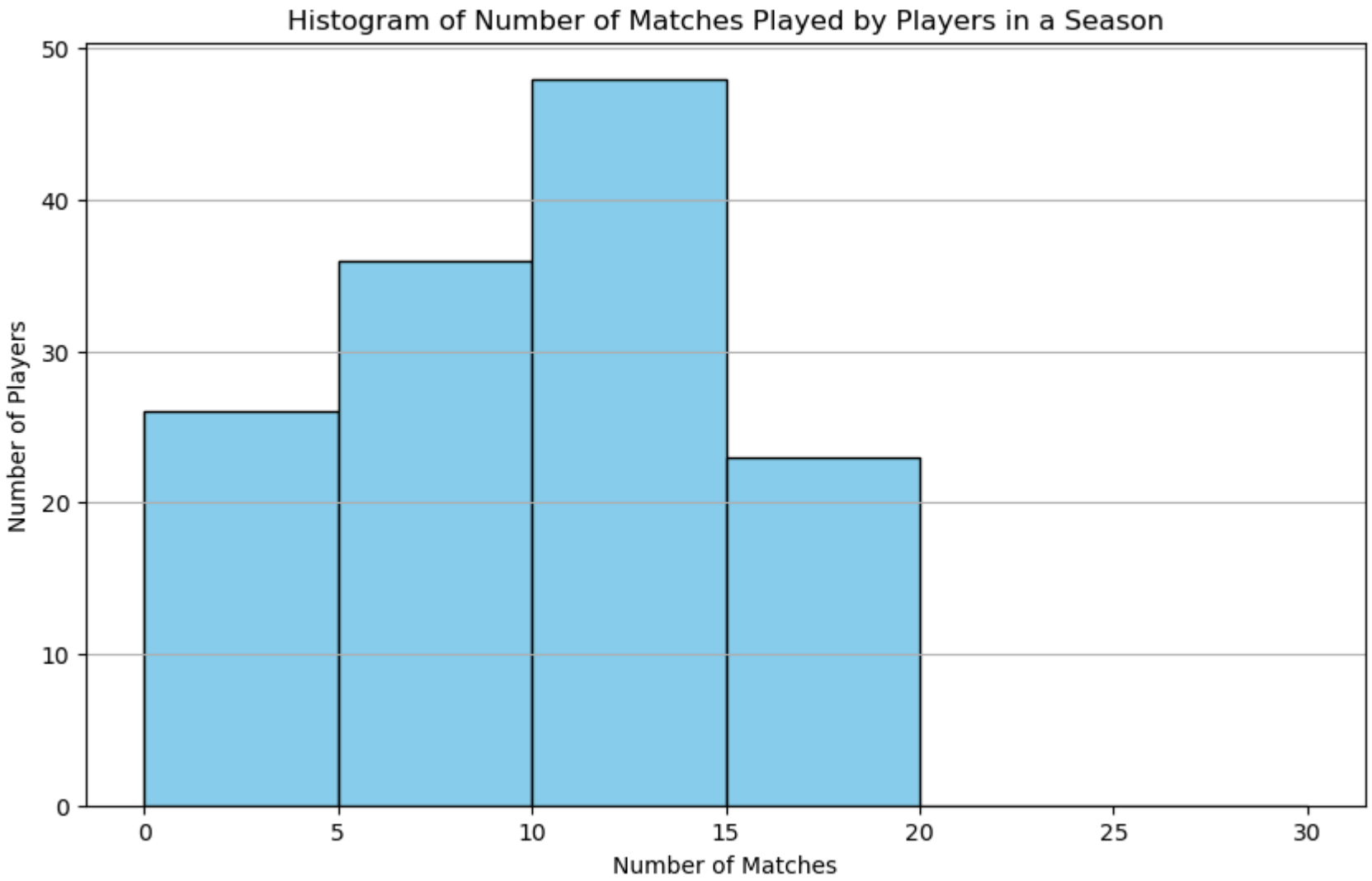
In [ ]:
```
Q12. Check the list of players who hit more than 45 boundaries and more than 10 sixes in this season.
```

In [118]:
```
df1=df[(df['4s']>= 45) & (df['6s']>= 10)]
print(df1[['Player', '4s', '6s']])
```

```
              Player  4s  6s
0           KL Rahul  58  23
1      Shikhar Dhawan  67  12
2        David Warner  52  14
5        Quinton Kock  46  22
6    Suryakumar Yadav  61  11
```

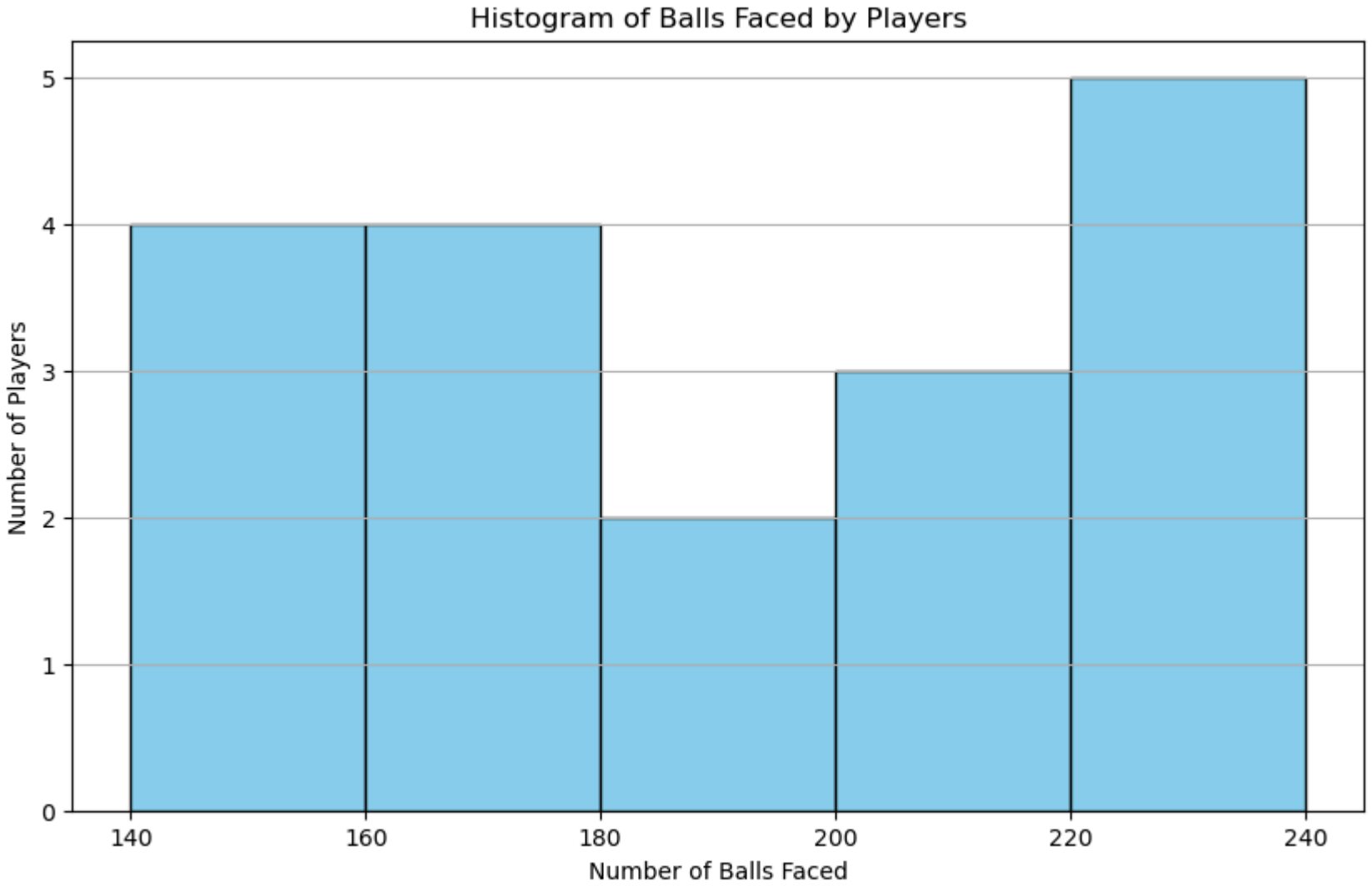
In [ ]:
```
Q13. Plot a histogram of number of matches played in a season by players.
```

In [29]:
```
plt.figure(figsize=(10, 6))
plt.hist(df['Matches'], bins=range(0, 31, 5), edgecolor='black', color='skyblue')
plt.xlabel('Number of Matches')
plt.ylabel('Number of Players')
plt.title('Histogram of Number of Matches Played by Players in a Season')
plt.xticks(range(0, 31, 5))
plt.grid(axis='y')
plt.show()
```



In [ ]:
```
Q14. Plot the histogram of balls faced by players.
```

In [30]:
```
plt.figure(figsize=(10, 6))
plt.hist(df['Balls faced'], bins=range(140, 241, 20), edgecolor='black', color='skyblue')
plt.xlabel('Number of Balls Faced')
plt.ylabel('Number of Players')
plt.title('Histogram of Balls Faced by Players')
plt.xticks(range(140, 241, 20))
plt.grid(axis='y')
plt.show()
```



In [ ]:
```
Q15. Top 10 players with most runs in a season.
```

In [8]:
```
df1=df.sort_values(by='Runs',ascending=False)
top_10=df1.head(11)
print(top_10[['Player','Runs']])
```

```
              Player  Runs
0           KL Rahul   670
1     Shikhar Dhawan   618
2       David Warner   548
3       Shreyas Iyer   519
4       Ishan Kishan   516
5       Quinton Kock   503
6   Suryakumar Yadav   480
7   Devdutt Padikkal   473
8        Virat Kohli   466
9       ABD Villiers   454
10     Faf Duplessis   449
```

In [ ]:
```
Q16. Print the players who played the match but didn't get the batting.
```

In [17]:
```
players_not_bat = df[df['Inns'] == 0]
print(players_not_bat[['Player','Inns']])
```

```
Empty DataFrame
Columns: [Player, Inns]
Index: []
```

In [ ]:
```
17. Create a new column to show the percentage of total runs scored in 4s and 6s. Then print the top 5 players with ma
ximum percentage.
```

In [26]:
```
df['Runs_from_Boundaries'] = df['4s'] * 4 + df['6s'] *6
df['Percentage_from_Boundaries'] = (df['Runs_from_Boundaries'] / df['Runs']) *100
top_5_players = df.sort_values(by='Percentage_from_Boundaries', ascending=False).head(6)
print(top_5_players[['Player','Percentage_from_Boundaries']])
```

```
            Player  Percentage_from_Boundaries
109     Andrew Tye                  100.000000
48   Andre Russell                   76.923077
74    Chris Morris                   76.470588
29   Hardik Pandya                   73.309609
47    Sunil Narine                   72.727273
97   Mohammad Nabi                   72.727273
```

In [ ]:
```
Q18. Print the players with top 5 Not out percentages (Not Out percentage can be calculated as number of Not outs divi
ded by Innings).
```

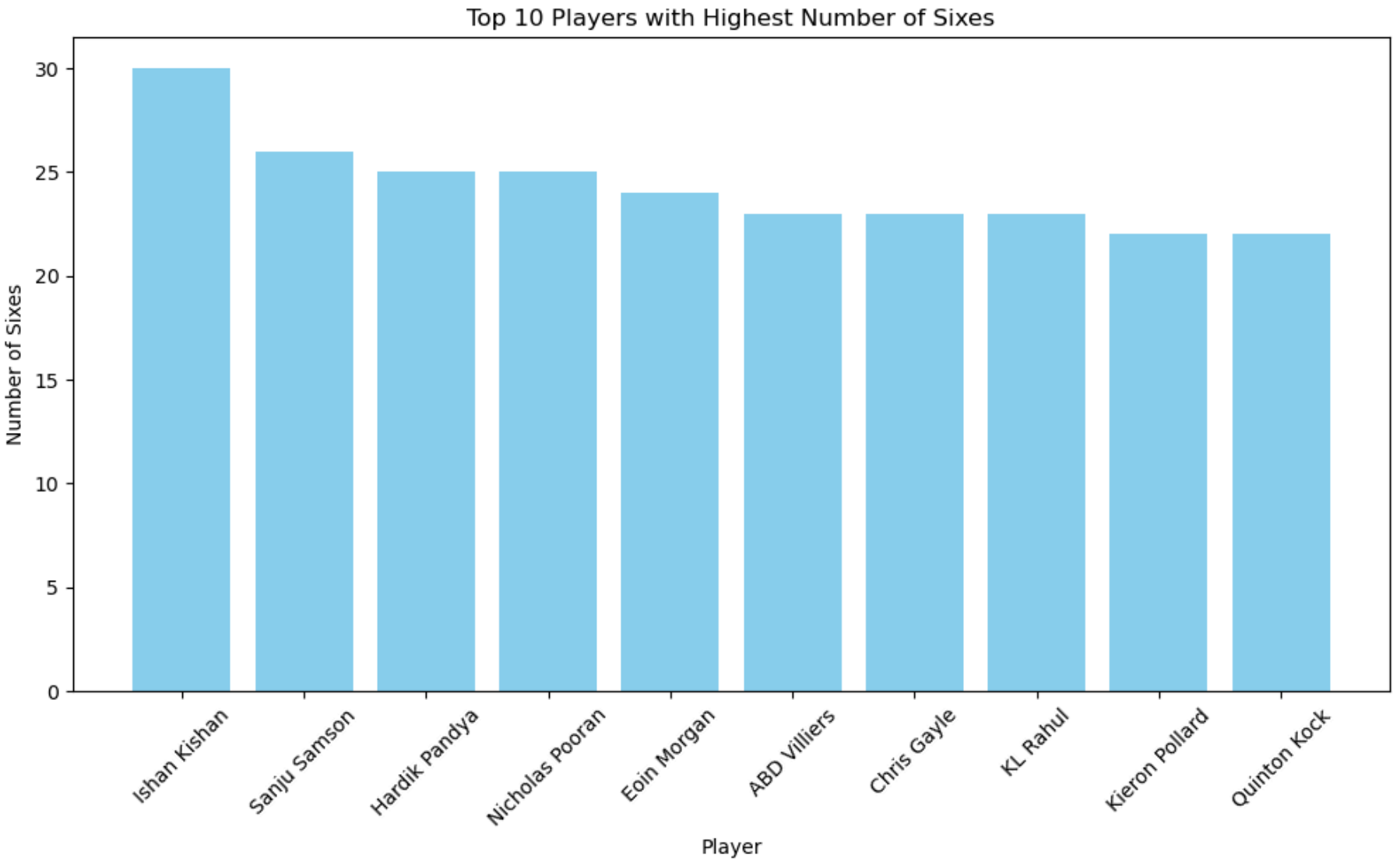
In [27]:
```
df['Not_Out_per'] = df['Not Out']/df['Inns']*100
top_5_players = df.sort_values(by='Not_Out_per', ascending=False).head(6)
print(top_5_players[['Player','Not_Out_per']])
```

```
              Player  Not_Out_per
122    Shahbaz Ahmed        100.0
97     Mohammad Nabi        100.0
114      T Natarajan        100.0
116     Rahul Chahar        100.0
113  Dhawal Kulkarni        100.0
68   Lockie Ferguson        100.0
```

In [ ]:
```
Q19. Create visualization of top 10 players with highest number of sixes.
```

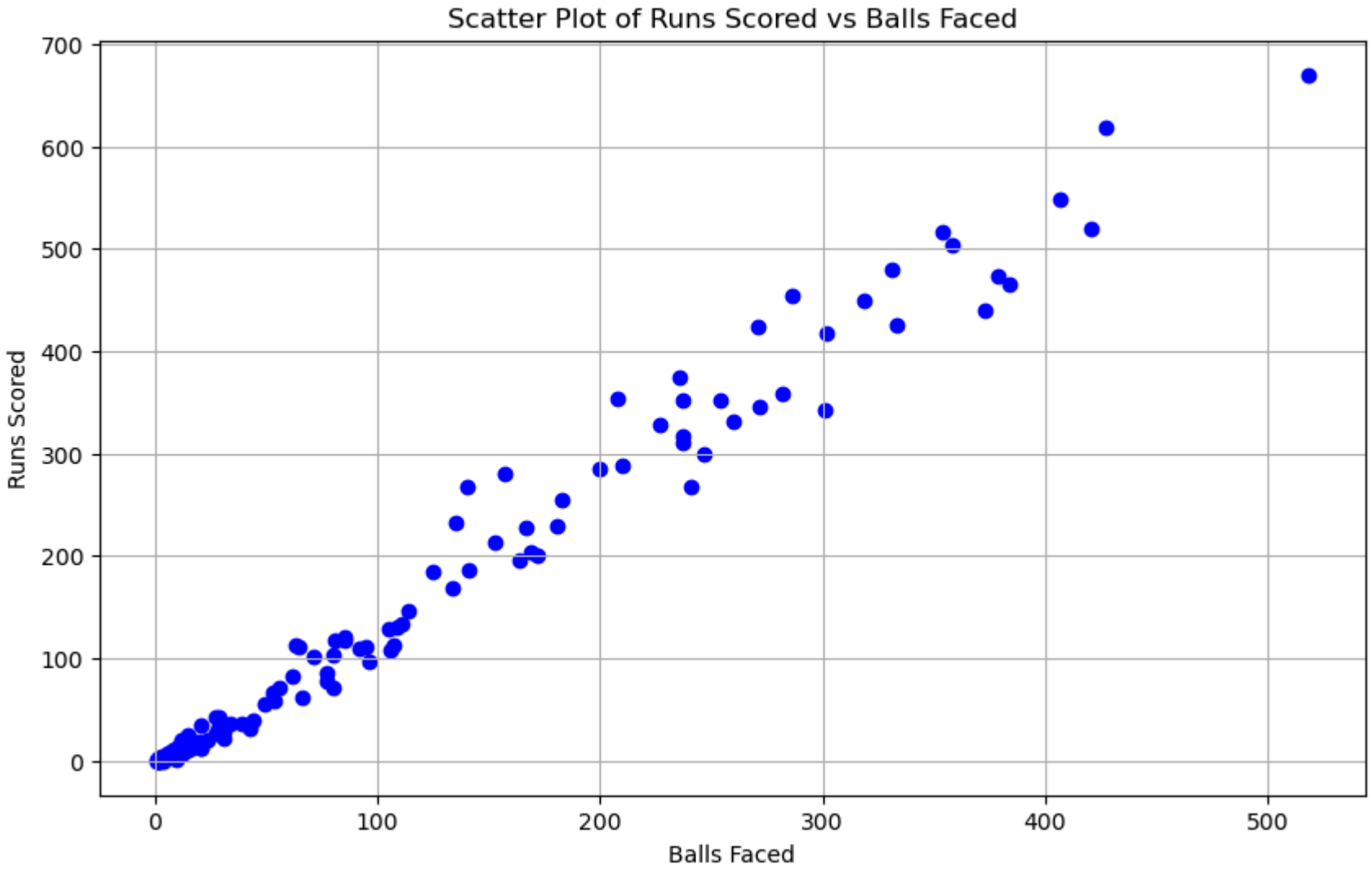
In [33]:
```
top_10_six_hitters = df.sort_values(by='6s', ascending=False).head(10)
plt.figure(figsize=(12, 6))
plt.bar(top_10_six_hitters['Player'],
top_10_six_hitters['6s'],
color='skyblue')
plt.xlabel('Player')
plt.ylabel('Number of Sixes')
plt.title('Top 10 Players with Highest Number of Sixes')
plt.xticks(rotation=45)
plt.show()
```

```
<Figure size 1200x600 with 0 Axes>
```



In [ ]:
```
Q20. Scatter plot of runs scored by a player v/s balls faced in a season. Then find the relationship between these 2 v
ariables.
```

In [34]:
```
plt.figure(figsize=(10, 6))
plt.scatter(df['Balls faced'], df['Runs'], color='blue')
plt.xlabel('Balls Faced')
plt.ylabel('Runs Scored')
plt.title('Scatter Plot of Runs Scored vs Balls Faced')
plt.grid(True)
plt.show()
```



In [ ]: