AML LAB

Name-Anmol

Batch-20 AIML

Sap-590011794

Submitted to-Prof. Sahinur Laskar

Index

1)Data processing using Python libararies

Using pandas to plot and clean data

Using matplotlib and seaborn to plt the outputs

1.Team Name Normalization

1 Some team names appear in different textual formats (e.g., case differences or extra spaces). Clean the team1 and team2 columns by:

2. Converting text to lowercase
3. Removing leading/trailing spaces
4. Verifying unique team names after cleaning

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
df=pd.read_csv('/content/drive/MyDrive/data.csv')
print(df)
```

```
      id  season        city        date                  team1  \
0      1    2008   Bangalore  2008-04-18  Kolkata Knight Riders   
1      2    2008  Chandigarh  2008-04-19    Chennai Super Kings   
2      3    2008       Delhi  2008-04-19       Rajasthan Royals   
3      4    2008      Mumbai  2008-04-20         Mumbai Indians   
4      5    2008     Kolkata  2008-04-20        Deccan Chargers   
..   ...     ...         ...         ...                    ...   
572  573    2016      Raipur  2016-05-22       Delhi Daredevils   
573  574    2016   Bangalore  2016-05-24          Gujarat Lions   
574  575    2016       Delhi  2016-05-25    Sunrisers Hyderabad   
575  576    2016       Delhi  2016-05-27          Gujarat Lions   
576  577    2016   Bangalore  2016-05-29    Sunrisers Hyderabad   

                           team2                  toss_winner toss_decision  \
0    Royal Challengers Bangalore  Royal Challengers Bangalore         field   
1                Kings XI Punjab          Chennai Super Kings           bat   
2               Delhi Daredevils             Rajasthan Royals           bat   
3    Royal Challengers Bangalore               Mumbai Indians           bat   
4          Kolkata Knight Riders              Deccan Chargers           bat   
..                           ...                          ...           ...   
572  Royal Challengers Bangalore  Royal Challengers Bangalore         field   
573  Royal Challengers Bangalore  Royal Challengers Bangalore         field   
574        Kolkata Knight Riders        Kolkata Knight Riders         field   
575          Sunrisers Hyderabad          Sunrisers Hyderabad         field   
576  Royal Challengers Bangalore          Sunrisers Hyderabad           bat   

     result  dl_applied                       winner  win_by_runs  \
0    normal           0        Kolkata Knight Riders          140   
1    normal           0          Chennai Super Kings           33   
2    normal           0             Delhi Daredevils            0   
3    normal           0  Royal Challengers Bangalore            0   
4    normal           0        Kolkata Knight Riders            0   
..      ...         ...                          ...          ...   
572  normal           0  Royal Challengers Bangalore            0   
573  normal           0  Royal Challengers Bangalore            0   
574  normal           0          Sunrisers Hyderabad           22   
575  normal           0          Sunrisers Hyderabad            0   
576  normal           0          Sunrisers Hyderabad            8   

     win_by_wickets player_of_match  \
0                 0     BB McCullum   
1                 0      MEK Hussey   
2                 9     MF Maharoof   
3                 5      MV Boucher   
4                 5       DJ Hussey   
..              ...             ...   
572               6         V Kohli   
573               4  AB de Villiers   
574               0    MC Henriques   
575               4       DA Warner   
576               0     BCJ Cutting   

                                          venue         umpire1  \
0                         M Chinnaswamy Stadium       Asad Rauf   
1    Punjab Cricket Association Stadium, Mohali       MR Benson   
2                              Feroz Shah Kotla       Aleem Dar   
3                              Wankhede Stadium        SJ Davis   
4                                  Eden Gardens       BF Bowden   
```

```
df.shape
```

```
(577, 18)
```

```
print(df['team1'], df['team2'])
```

```
0      Kolkata Knight Riders
1        Chennai Super Kings
2           Rajasthan Royals
3             Mumbai Indians
4            Deccan Chargers
               ...
572         Delhi Daredevils
573            Gujarat Lions
574      Sunrisers Hyderabad
575            Gujarat Lions
576      Sunrisers Hyderabad
Name: team1, Length: 577, dtype: object 0      Royal Challengers Bangalore
1                  Kings XI Punjab
2                 Delhi Daredevils
3      Royal Challengers Bangalore
4            Kolkata Knight Riders
                  ...
572    Royal Challengers Bangalore
573    Royal Challengers Bangalore
574          Kolkata Knight Riders
575            Sunrisers Hyderabad
576    Royal Challengers Bangalore
Name: team2, Length: 577, dtype: object
```

```
df['team1']=df['team1'].str.lower().str.strip() #.str.lower() to convert into lower case and space is removed
df['team2']=df['team2'].str.lower().str.lower()
print(df['team1'], df['team2'])
```

```
0      kolkata knight riders
1        chennai super kings
2           rajasthan royals
3             mumbai indians
4            deccan chargers
               ...
572         delhi daredevils
573            gujarat lions
574      sunrisers hyderabad
575            gujarat lions
576      sunrisers hyderabad
Name: team1, Length: 577, dtype: object 0      royal challengers bangalore
1                  kings xi punjab
2                 delhi daredevils
3      royal challengers bangalore
4            kolkata knight riders
                  ...
572    royal challengers bangalore
573    royal challengers bangalore
574          kolkata knight riders
575            sunrisers hyderabad
576    royal challengers bangalore
Name: team2, Length: 577, dtype: object
```

```
print(df['team1'].unique())
print(df['team2'].unique())
```

```
['kolkata knight riders' 'chennai super kings' 'rajasthan royals'
 'mumbai indians' 'deccan chargers' 'kings xi punjab'
 'royal challengers bangalore' 'delhi daredevils' 'kochi tuskers kerala'
 'pune warriors' 'sunrisers hyderabad' 'rising pune supergiants'
 'gujarat lions']
['royal challengers bangalore' 'kings xi punjab' 'delhi daredevils'
 'kolkata knight riders' 'rajasthan royals' 'mumbai indians'
 'chennai super kings' 'deccan chargers' 'pune warriors'
 'kochi tuskers kerala' 'sunrisers hyderabad' 'rising pune supergiants'
 'gujarat lions']
```

2.City Name Standardization

Standardize the city column by:

1)Replacing missing city names with "Unknown"

2)Converting all city names to title case

3)Counting matches played in each city

```
print(df['city'].isnull().sum())
```

```
7
```

```
df['city'].fillna('Unknown', inplace=True)
```

```
/tmp/ipython-input-357195196.py:1: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through cha
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col]


  df['city'].fillna('Unknown', inplace=True)
```

```
df['city'] = df['city'].str.title()
print(df['city'])
```

```
0       Bangalore
1      Chandigarh
2           Delhi
3          Mumbai
4         Kolkata
          ...
572        Raipur
573     Bangalore
574         Delhi
575         Delhi
576     Bangalore
Name: city, Length: 577, dtype: object
```

```
cmc=df['city'].value_counts()
print(cmc)
```

```
city
Mumbai            77
Bangalore         58
Kolkata           54
Delhi             53
Chennai           48
Chandigarh        42
Hyderabad         41
Jaipur            33
Pune              25
Durban            15
Centurion         12
Ahmedabad         12
Visakhapatnam     11
Dharamsala         9
Johannesburg       8
Unknown            7
Abu Dhabi          7
Cape Town          7
Port Elizabeth     7
Ranchi             7
Cuttack            7
Raipur             6
Sharjah            6
Rajkot             5
Kochi              5
Kimberley          3
East London        3
Nagpur             3
Bloemfontein       2
Indore             2
Kanpur             2
Name: count, dtype: int64
```

3. Toss Decision Text Analysis

Analyze the toss_decision column:

1)Extract unique decisions

2)Count how many times each decision was taken

3)Visualize the frequency using a bar chart

```
ud=df['toss_decision'].unique()
print(ud)
```

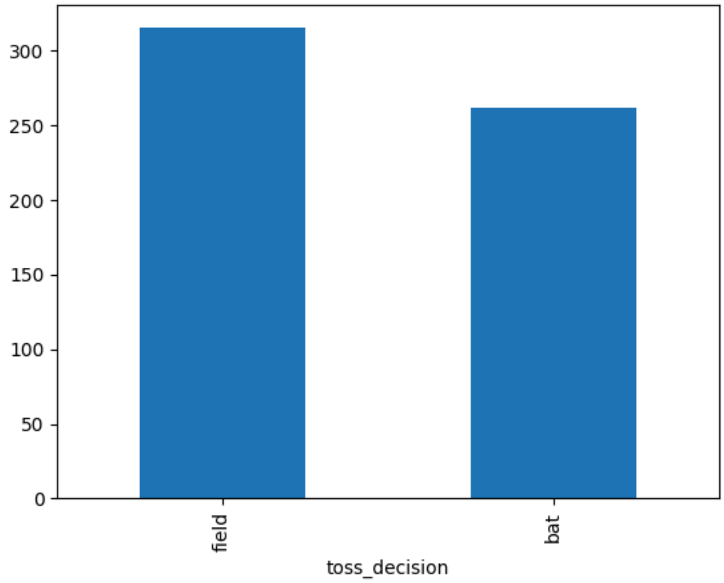
```
['field' 'bat']
```

```
dc=df['toss_decision'].value_counts()
print("Frequency of each toss decision:")
print(dc)
```

```
Frequency of each toss decision:
toss_decision
```

```
field    315
bat      262
Name: count, dtype: int64
```

```
bar=df['toss_decision'].value_counts().plot(kind='bar')
```



4, Winner Name Extraction

From the winner column:

1)Identify and remove rows where the match result was "No Result" or "Tie"

2)Count how many matches each team won after cleaning text values

```
df['result'].value_counts()
```

result	count
normal	568
tie	6
no result	3

dtype: int64

```
df_filtered = df[~df['result'].isin(['no result', 'tie'])]
print(df_filtered)
```

```
Original number of matches: 577
Number of matches after removing 'No Result' and 'Tie': 568
```

```
team_wins = df_filtered['winner'].value_counts()
print(team_wins)
```

```
winner
Mumbai Indians                 80
Chennai Super Kings            79
Royal Challengers Bangalore    69
Kolkata Knight Riders          68
Rajasthan Royals               61
Kings XI Punjab                61
Delhi Daredevils               56
Sunrisers Hyderabad            33
Deccan Chargers                29
Pune Warriors                  12
Gujarat Lions                   9
Kochi Tuskers Kerala            6
Rising Pune Supergiants         5
Name: count, dtype: int64
```

5. Player of the Match Text Frequency

Perform text analysis on player of the match:

1)Remove null values

2)Find the top 10 most frequent player names

3)Plot the results using a Seaborn bar plot

```
pn = df['player_of_match'].dropna()
print(pn)
```

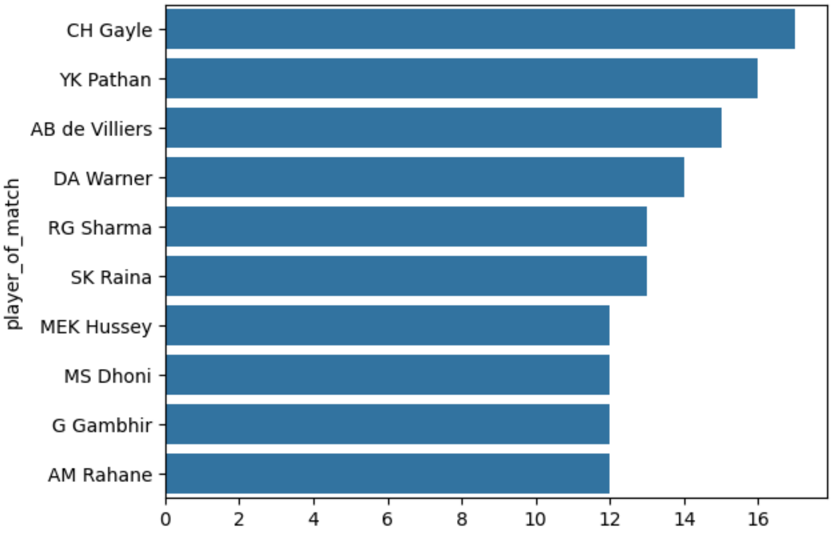
```
0         BB McCullum
1          MEK Hussey
2         MF Maharoof
3          MV Boucher
4           DJ Hussey
             ...
572           V Kohli
573    AB de Villiers
574      MC Henriques
575         DA Warner
576       BCJ Cutting
Name: player_of_match, Length: 574, dtype: object
```

```
tp=df['player_of_match'].value_counts().head(10)
print(tp)
```

```
player_of_match
CH Gayle          17
YK Pathan         16
AB de Villiers    15
DA Warner         14
RG Sharma         13
SK Raina          13
MEK Hussey        12
MS Dhoni          12
G Gambhir         12
AM Rahane         12
Name: count, dtype: int64
```

```
sns.barplot(y=tp.index, x=tp.values)
```

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



6. Venue Tokenization

Count how many matches were played in each venue and plot a bar chart for the top10.

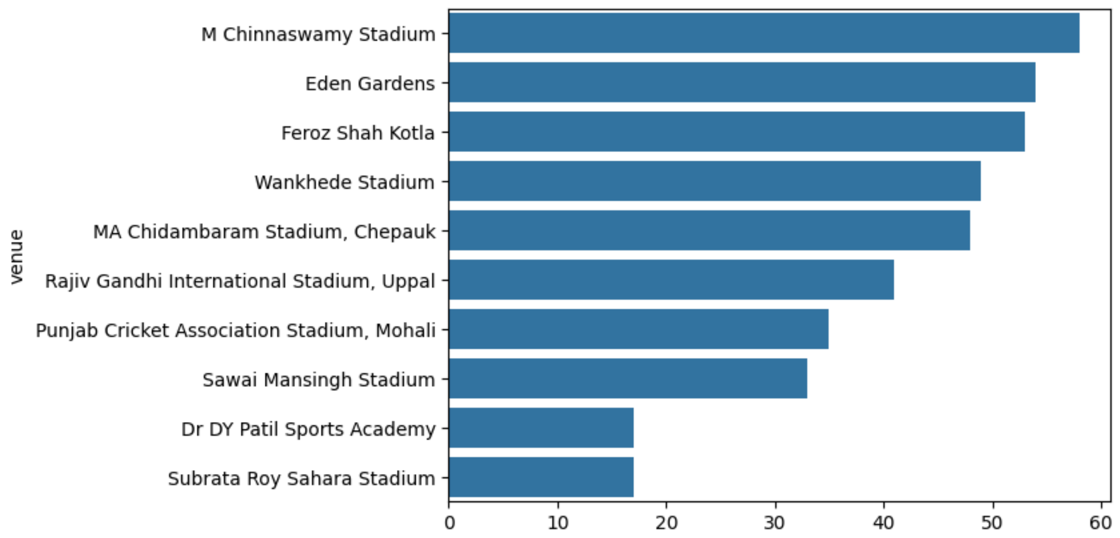
```
venue_counts = df['venue'].value_counts()
print(venue_counts.head(10))
```

```
venue
M Chinnaswamy Stadium                         58
Eden Gardens                                  54
Feroz Shah Kotla                              53
```

```
Wankhede Stadium                               49
MA Chidambaram Stadium, Chepauk                48
Rajiv Gandhi International Stadium, Uppal      41
Punjab Cricket Association Stadium, Mohali     35
Sawai Mansingh Stadium                         33
Dr DY Patil Sports Academy                     17
Subrata Roy Sahara Stadium                     17
Name: count, dtype: int64
```

```
sns.barplot(y=venue_counts.head(10).index, x=venue_counts.head(10).values)
```

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



7. Umpire Name Cleaning

Clean umpire columns (umpire1, umpire2, umpire3) by:

1)Replacing missing values with "Not Assigned"

2)Removing duplicate umpire names per match

3)Finding the most frequently officiating umpire

```
print(df['umpire1'].isnull().sum())
print(df['umpire2'].isnull().sum())
print(df['umpire3'].isnull().sum())
```

```
0
0
0
```

```
df['umpire3'].fillna('Not Assigned')
```

	umpire3
0	Not Assigned
1	Not Assigned
2	Not Assigned
3	Not Assigned
4	Not Assigned
...	...
572	Not Assigned
573	Not Assigned
574	Not Assigned
575	Not Assigned
576	Not Assigned

577 rows × 1 columns

dtype: object

```
print(df['umpire1'].isnull().sum())
print(df['umpire2'].isnull().sum())
print(df['umpire3'].isnull().sum())
```

```
0
0
0
```

```
umpire1=df['umpire1'].unique
umpire2=df['umpire2'].unique()
umpire3=df['umpire3'].unique()
```

```
print(df["umpire1"].head(10))
```

```
0    Asad Rauf
1    MR Benson
2    Aleem Dar
3     SJ Davis
4    BF Bowden
5    Aleem Dar
6    IL Howell
7    DJ Harper
8    Asad Rauf
9    Aleem Dar
Name: umpire1, dtype: object
```

8. Create a new text column match_summary by

combining:

team1, team2, winner, and season

Example: “MI vs CSK – MI won in 2019”

Display sample summaries.

```
pd.set_option('display.max_colwidth', None)
df['Match_Summary'] = df['team1'] + ' vs ' + df['team2'] + ' - ' + df['winner'].astype(str) + ' won in ' + df['season'].as
print(df['Match_Summary'].head())
```

```
0    kolkata knight riders vs royal challengers bangalore - Kolkata Knight Riders won in 2008
1                    chennai super kings vs kings xi punjab - Chennai Super Kings won in 2008
2                         rajasthan royals vs delhi daredevils - Delhi Daredevils won in 2008
3     mumbai indians vs royal challengers bangalore - Royal Challengers Bangalore won in 2008
4                deccan chargers vs kolkata knight riders - Kolkata Knight Riders won in 2008
Name: Match_Summary, dtype: object
```

9. Result Type Text Analysis

Analyze the result column:

Identify different textual result types

Count their occurrences

Visualize the distribution using a count plot

```
print(df['result'].unique())
```

```
['normal' 'tie' 'no result']
```

```
print(df['result'].value_counts())
```

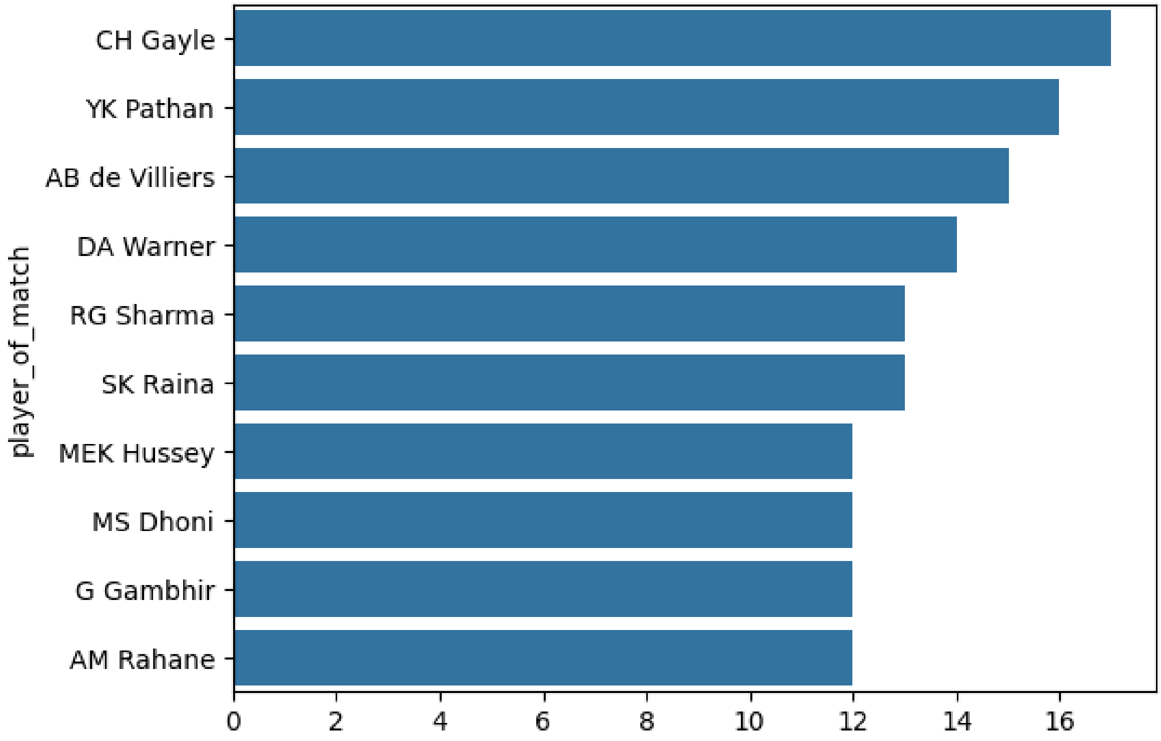
```
result
normal       568
tie            6
no result      3
Name: count, dtype: int64
```

```
sns.countplot(x=df['result'])
```

```
SK Raina          13
MEK Hussey        12
MS Dhoni          12
G Gambhir         12
AM Rahane         12
Name: count, dtype: int64
```

```
sns.barplot(y=tp.index, x=tp.values)
```

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



6. Venue Tokenization

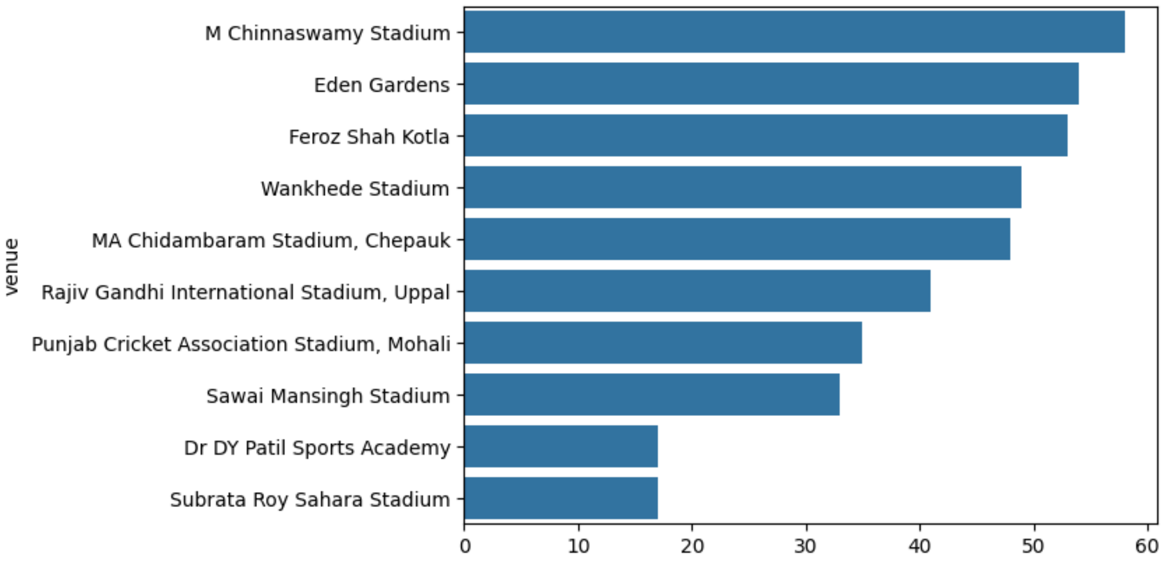
Count how many matches were played in each venue and plot a bar chart for the top10.

```
venue_counts = df['venue'].value_counts()
print(venue_counts.head(10))
```

```
venue
M Chinnaswamy Stadium                                58
Eden Gardens                                         54
Feroz Shah Kotla                                     53
Wankhede Stadium                                     49
MA Chidambaram Stadium, Chepauk                      48
Rajiv Gandhi International Stadium, Uppal            41
Punjab Cricket Association Stadium, Mohali           35
Sawai Mansingh Stadium                               33
Dr DY Patil Sports Academy                           17
Subrata Roy Sahara Stadium                           17
Name: count, dtype: int64
```

```
sns.barplot(y=venue_counts.head(10).index, x=venue_counts.head(10).values)
```

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



7. Umpire Name Cleaning

Clean umpire columns (umpire1, umpire2, umpire3) by:

1)Replacing missing values with "Not Assigned"

2)Removing duplicate umpire names per match

3)Finding the most frequently officiating umpire

```
print(df['umpire1'].isnull().sum())
print(df['umpire2'].isnull().sum())
print(df['umpire3'].isnull().sum())
```

```
0
0
0
```

```
df['umpire3'].fillna('Not Assigned')
```

	umpire3
0	Not Assigned
1	Not Assigned
2	Not Assigned
3	Not Assigned
4	Not Assigned
...	...
572	Not Assigned
573	Not Assigned
574	Not Assigned
575	Not Assigned
576	Not Assigned

577 rows × 1 columns

dtype: object

```
print(df['umpire1'].isnull().sum())
print(df['umpire2'].isnull().sum())
print(df['umpire3'].isnull().sum())
```

```
0
0
0
```

```
umpire1=df['umpire1'].unique
umpire2=df['umpire2'].unique()
umpire3=df['umpire3'].unique()
```

```
print(df["umpire1"].head(10))
```

```
0    Asad Rauf
1    MR Benson
2    Aleem Dar
3     SJ Davis
4    BF Bowden
5    Aleem Dar
6    IL Howell
7    DJ Harper
8    Asad Rauf
9    Aleem Dar
Name: umpire1, dtype: object
```

8. Create a new text column match_summary by

combining:

team1, team2, winner, and season

Example: “MI vs CSK – MI won in 2019”

Display sample summaries.

```
pd.set_option('display.max_colwidth', None)
df['Match_Summary'] = df['team1'] + ' vs ' + df['team2'] + ' - ' + df['winne
print(df['Match_Summary'].head())
```

```
0    kolkata knight riders vs royal challengers bangalore - Kolkata Knight Ri
1                    chennai super kings vs kings xi punjab - Chennai Super K
2                         rajasthan royals vs delhi daredevils - Delhi Darede
3     mumbai indians vs royal challengers bangalore - Royal Challengers Banga
4                deccan chargers vs kolkata knight riders - Kolkata Knight Ri
Name: Match_Summary, dtype: object
```

9. Result Type Text Analysis

Analyze the result column:

Identify different textual result types

Count their occurrences

Visualize the distribution using a count plot

```
print(df['result'].unique())
```

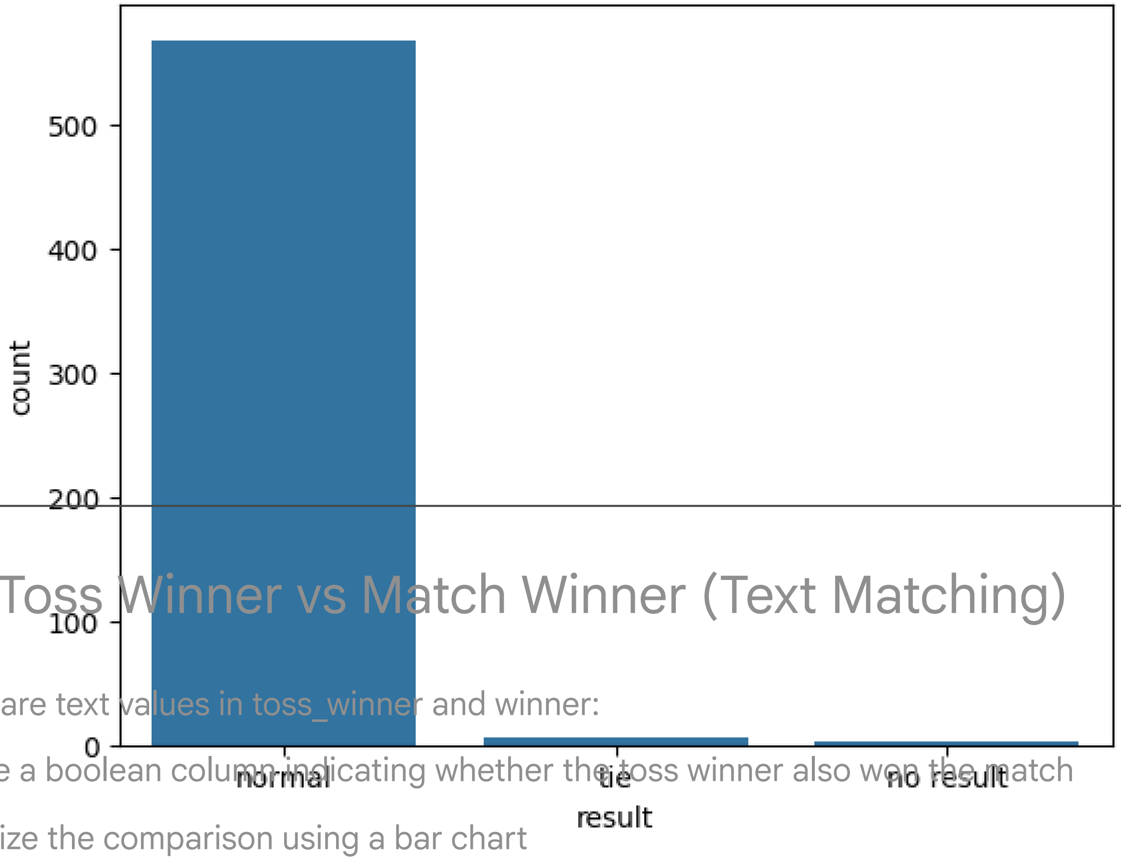
```
['normal' 'tie' 'no result']
```

```
print(df['result'].value_counts())
```

```
result
normal       568
tie            6
no result      3
Name: count, dtype: int64
```

```
sns.countplot(x=df['result'])
```

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



10. Toss Winner vs Match Winner (Text Matching)

Compare text values in toss_winner and winner:

Create a boolean column indicating whether the toss winner also won the match

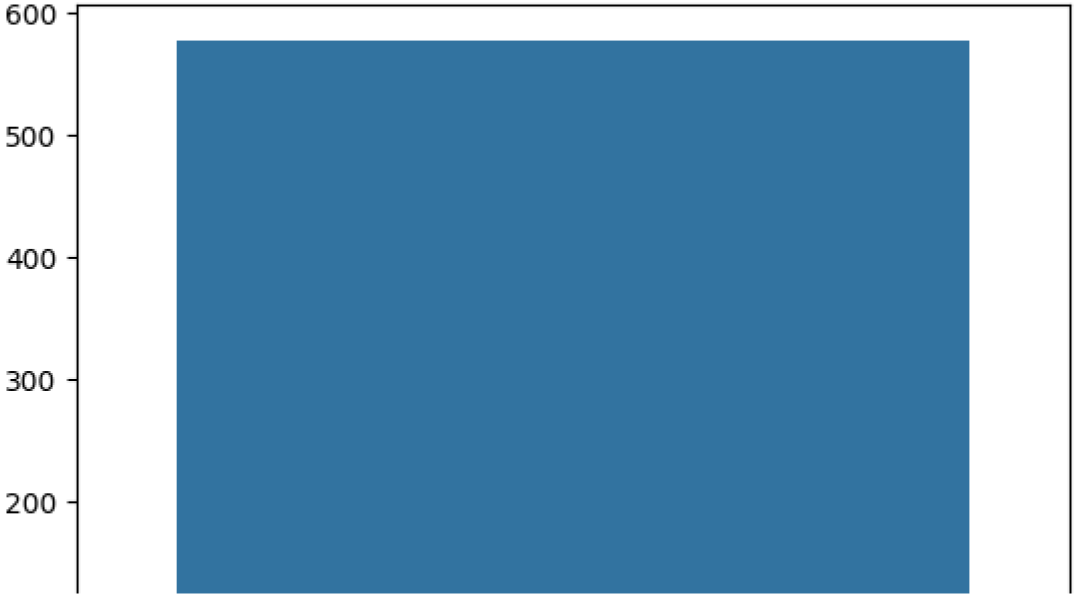
Visualize the comparison using a bar chart

```
df['toss_decision']=df['toss_winner'].str.strip().str.lower()
df['winner']=df['winner'].str.strip().str.lower()
df['toss_won']=df['toss_winner']==df['winner']
print(df['toss_won'].value_counts())
```

```
toss_won
False    577
Name: count, dtype: int64
```

```
sns.barplot(x=df['toss_won'].value_counts().index, y=df['toss_won'].value_cou
```

```
<Axes: xlabel='toss_won'>
```


600
500
400
300
200