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Theory Activity No. 1

(20 problem statement of IPL dataset Using numpy and pandas)

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Problem statement:

1. Total number of matches played in IPL:

Total_matches = df[‘match_id’].nunique()

Print(“Total Matches Played:”, total_matches)

Untitled1.ipynb

```
[1] import pandas as pd
    import numpy as np
```

```
[7] df = pd.read_csv('/content/sample_ipl_dataset (2).csv')
```

Q1. Total number matches played in

```
[10] total_matches = df['match_id'].nunique()
     print("Total Matches Played:", total_matches)
```

```
Total Matches Played: 5
```

2. Unique teams participated:

Teams = np.unique(df[[‘team1’, ‘team2’]].values)

Print(“Teams Participated:”, teams)

Q2.Unique team participated

```
[11] teams = np.unique(df[['team1', 'team2']].values)
     print("Teams Participated:", teams)
```

```
Teams Participated: ['CSK' 'KKR' 'MI' 'RCB' 'SRH']
```

3. Team with most wins:

Most_wins = df[‘winner’].value_counts().idxmax()

Print(“Team with Most Wins:”, most_wins)

Q3. Team with most wins:

```
[12] most_wins = df['winner'].value_counts().idxmax()
     print("Team with Most Wins:", most_wins)
```

```
Team with Most Wins: MI
```

4. Number of matches played in each venue:

Matches_per_venue = df[‘venue’].value_counts()

Print(matches_per_venue)

Q4 Number of matches played in each venue

```
[13] matches_per_venue = df['venue'].value_counts()
     print(matches_per_venue)
```

```
venue
Wankhede             2
Chepauk              1
Eden Gardens         1
Rajiv Gandhi Intl    1
Name: count, dtype: int64
```

5. Player with most “Player of the Match” awards:

Top_player = df[‘player_of_match’].value_counts().idxmax()

Print(“Most Player of the Match Awards:”, top_player)

Q5 Player with most " player of the match" award :

```
[ ] top_player = df['player_of_match'].value_counts().idxmax()
    print("Most Player of the Match Awards:", top_player)
```

```
Most Player of the Match Awards: Rohit Sharma
```

6. Matches with no result:

No_result_matches = df[‘winner’].isnull().sum()

Print(“Matches with No Result:”, no_result_matches)

Q6.Matches with no results :

```
[37] no_result_matches = df['winner'].isnull().sum()
     print("Matches with No Result:", no_result_matches)
```

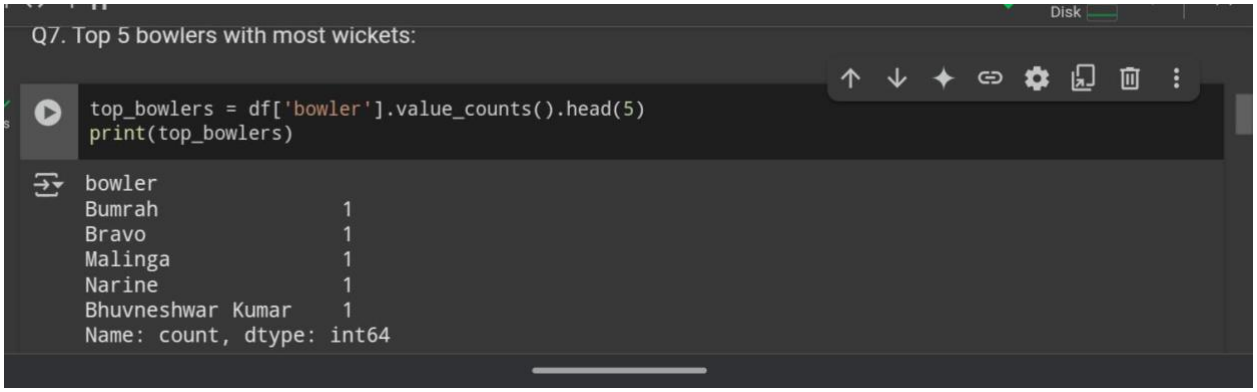
```
Matches with No Result: 0
```

•

7. Top 5 bowlers with most wickets:

Top_bowlers = df[‘bowler’].value_counts().head(5)

Print(top_bowlers)



8. Total runs scored in IPL:

Total_runs = df[‘runs’].sum()

Print(“Total Runs Scored:”, total_runs)

Q8. Total runs scored in IPL:

```
total_runs = df['runs'].sum()
print("Total Runs Scored:", total_runs)
```

```
Total Runs Scored: 890
```

9. Match with highest total runs:

Match_most_runs = df.groupby(‘match_id’)[‘runs’].sum().idxmax()

Print(“Match ID with Most Runs:”, match_most_runs)

Q9. Match with highest total runs:

```
match_most_runs = df.groupby('match_id')['runs'].sum().idxmax()
print("Match ID with Most Runs:", match_most_runs)
```

```
Match ID with Most Runs: 3
```

---

10. Player with most runs in a single match:

Top_batsman = df.groupby([‘match_id’, ‘batsman’])[‘runs’].sum().reset_index()

Top_batsman = top_batsman.sort_values(by=’runs’, ascending=False).head(1)

Print(top_batsman)

Q10. Player with most runs in a single match:

```
[50] top_batsman = df.groupby(['match_id', 'batsman'])['runs'].sum().reset_index()
     top_batsman = top_batsman.sort_values(by='runs', ascending=False).head(1)
     print(top_batsman)
```

```
   match_id        batsman  runs
2         3  Hardik Pandya   200
```

---

11. Bowler with most dot balls:

Dot_balls = df[df[‘runs’] == 0][‘bowler’].value_counts().idxmax()

Print(“Bowler with Most Dot Balls:”, dot_balls)

Q11. Bowler with most dot balls:

```
dot_balls_df = df[df['runs'] == 0]

if not dot_balls_df.empty:
    most_dot_balls_bowler = dot_balls_df['bowler'].value_counts().idxmax()
    print("Bowler with Most Dot Balls:", most_dot_balls_bowler)
else:
    print("No dot balls found in the dataset.")
```

```
No dot balls found in the dataset.
```

12. Strike rate of each batsman:

Balls_faced = df.groupby(‘batsman’).size()

Runs_scored = df.groupby(‘batsman’)[‘runs’].sum()

Strike_rate = (runs_scored / balls_faced) * 100

Print(strike_rate.sort_values(ascending=False))

Q12. Strike rate of each batsman:

```
[40] balls_faced = df.groupby('batsman').size()
     runs_scored = df.groupby('batsman')['runs'].sum()
     strike_rate = (runs_scored / balls_faced) * 100
     print(strike_rate.sort_values(ascending=False))
```

```
batsman
Hardik Pandya    20000.0
David Warner     19000.0
Rohit Sharma     18000.0
Andre Russell    17000.0
```

13. Season with most matches:

Season_most_matches = df[‘season’].value_counts().idxmax()

Print(“Season with Most Matches:”, season_most_matches)

Q13. Season with most matches:

```
season_most_matches = df['season'].value_counts().idxmax()
print("Season with Most Matches:", season_most_matches)
```

```
Season with Most Matches: 2017
```

---

14. Team with highest win percentage:

Matches_played = df[‘team1’].value_counts() + df[‘team2’].value_counts()

Win_percentage = (df[‘winner’].value_counts() / matches_played) * 100

Print(win_percentage.sort_values(ascending=False))

Q14. Team with highest win percentage:

```
matches_played = df['team1'].value_counts() + df['team2'].value_counts()
win_percentage = (df['winner'].value_counts() / matches_played) * 100
print(win_percentage.sort_values(ascending=False))
```

```
MI     100.0
CSK     50.0
KKR     50.0
SRH     50.0
RCB      NaN
Name: count, dtype: float64
```

15. Top 5 bowlers with best economy rate:

(Assuming you have columns total_runs_given and overs_bowled)

Assuming ‘runs_conceded’ and ‘overs_bowled’ columns exist

Economy_rate = df.groupby(‘bowler’).apply(lambda x: x[‘runs’].sum() / x[‘overs’].sum())

Print(economy_rate.sort_values().head(5))

Q15. Top 5 bowlers with best economy rate:

```
[49] # Assuming 'runs_conceded' and 'overs_bowled' columns exist
     economy_rate = df.groupby('bowler').apply(lambda x: x['runs'].sum() / x['overs'].sum())
     print(economy_rate.sort_values().head(5))

bowler
Bravo                 7.5
Narine                8.5
Bumrah                9.0
Bhuvneshwar Kumar     9.5
Malinga              10.0
```

16. Most common way of dismissal:

Common_dismissal = df[‘dismissal_kind’].value_counts().idxmax()

Print(“Most Common Dismissal:”, common_dismissal)

Q16. Most common way of dismissal:

```
[48] common_dismissal = df['dismissal_kind'].value_counts().idxmax()
     print("Most Common Dismissal:", common_dismissal)
```

```
Most Common Dismissal: caught
```

17. Batsman with most sixes:

Most_sixes = df[df[‘runs’] == 6][‘batsman’].value_counts().idxmax()

Print(“Most Sixes:”, most_sixes)

Q17. Batsman with most sixes

```
sixes_df = df[df['runs'] == 6]

if not sixes_df.empty:
    most_sixes = sixes_df['batsman'].value_counts().idxmax()
    print("Most Sixes:", most_sixes)
else:
    print("No sixes recorded in dataset.")
```

```
No sixes recorded in dataset.
```

18. Average runs scored per match:

Average_runs_per_match = df.groupby(‘match_id’)[‘runs’].sum().mean()

Print(“Average Runs per Match:”, average_runs_per_match)

Q18. Average runs scored per match:

```
[46] average_runs_per_match = df.groupby('match_id')['runs'].sum().mean()
     print("Average Runs per Match:", average_runs_per_match)
```

```
Average Runs per Match: 178.0
```

19. Match with closest margin (smallest win by runs or wickets):

If you have ‘win_by_runs’ and ‘win_by_wickets’ columns

Closest_match_runs = df[df[‘win_by_runs’] > 0][‘win_by_runs’].min()

Closest_match_wickets = df[df[‘win_by_wickets’] > 0][‘win_by_wickets’].min()

Print(“Closest Win by Runs:”, closest_match_runs)

Print(“Closest Win by Wickets:”, closest_match_wickets)

Q19.Match with closest margin (smallest win by runs or wickets):

```
if 'win_by_runs' in df.columns and 'win_by_wickets' in df.columns:
    closest_match_runs = df[df['win_by_runs'] > 0]['win_by_runs'].min()
    closest_match_wickets = df[df['win_by_wickets'] > 0]['win_by_wickets'].min()

    print("Closest Win by Runs:", closest_match_runs)
    print("Closest Win by Wickets:", closest_match_wickets)
else:
    print("Columns 'win_by_runs' and 'win_by_wickets' are not present in dataset.")
```

```
Columns 'win_by_runs' and 'win_by_wickets' are not present in dataset.
```

---

20. Plot number of matches won by each team across seasons:

```
Import matplotlib.pyplot as plt

Matches_won = df.groupby(['season', 'winner']).size().unstack().fillna(0)

Matches_won.plot(kind='bar', stacked=True, figsize=(15, 8))

Plt.title('Matches Won by Teams Across Seasons')

Plt.ylabel('Number of Matches')

Plt.xlabel('Season')

Plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left')

Plt.tight_layout()
```

Plt.show()

Q20. Plot number of matches won by each team across seasons: .

```
[15] import matplotlib.pyplot as plt

     matches_won = df.groupby(['season', 'winner']).size().unstack().fillna(0)
     matches_won.plot(kind='bar', stacked=True, figsize=(15, 8))
     plt.title('Matches Won by Teams Across Seasons')
     plt.ylabel('Number of Matches')
     plt.xlabel('Season')
     plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left')
     plt.tight_layout()
     plt.show()
```

```
[15]
     matches_won = df.groupby(['season', 'winn
     matches_won.plot(kind='bar', stacked=True
     plt.title('Matches Won by Teams Across Se
     plt.ylabel('Number of Matches')
     plt.xlabel('Season')
     plt.legend(bbox_to_anchor=(1.05, 1), loc=
     plt.tight_layout()
     plt.show()
```