Exploratory Data Analysis (EDA)
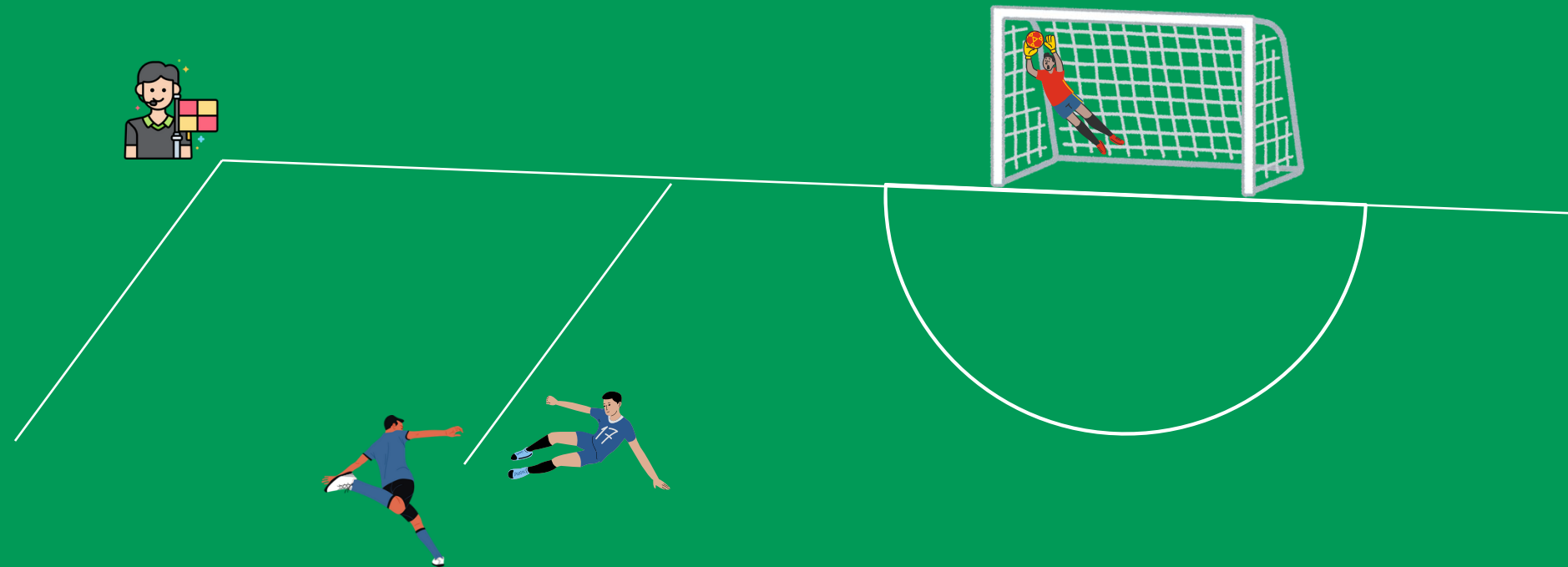# on Premier League Data From 2017/18
Using Python

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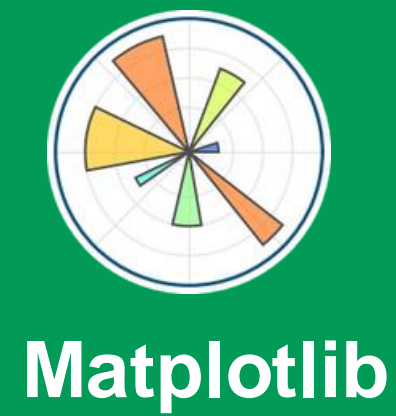
Research Questions and Hypothesis

Data Preperation

Analysis and Results

Conclusion

Libraries used in this Data Analysis

Pandas

Matplotlib

seaborn

Requests

Scipy

Data Source

FotMob is a popular mobile app for football (soccer) fans, providing live scores, match stats, news, and updates for teams and leagues worldwide. It offers in-depth match analyses, and real-time commentary, making it a go-to app for following football events.

```
[2]  import requests
     import pandas as pd
     import matplotlib.pyplot as plt
     import seaborn as sns


⏵   test_url = 'https://www.fotmob.com/api/leagues?id=47&ccode3=JPN&season=2017%2F2018'

    data_1 = requests.get(url = test_url).json()
```

The data we extracted

{"tabs":["overview","table","matches","stats"],"allAvailableSeasons":
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{"ccode":"ENG","leagueId":47,"pageUrl":"/leagues/47/overview/premier-league?season=2017-2018","leagueName":"Premier League","legend":[{"title":"Champions League","tKey":"championsleague","color":"#2AD572","indices":[0,1,2,3]},{"title":"Europa League","tKey":"europaleague","color":"#0046A7","indices":[4,5]},{"title":"Relegation","tKey":"relegation","color":"#FF4646","indices":[17,18,19]}],"ongoing":[],"table":{"all":[{"name":"Manchester City","shortName":"Man City","id":8456,"pageUrl":"/teams/8456/overview/manchester-city","deduction":null,"ongoing":null,"played":38,"wins":32,"draws":4,"losses":2,"scoresStr":"106-27","goalConDiff":79,"pts":100,"idx":1,"qualColor":"#2AD572"},{"name":"Manchester United","shortName":"Man United","id":10260,"pageUrl":"/teams/10260/overview/manchester-united","deduction":null,"ongoing":null,"played":38,"wins":25,"draws":6,"losses":7,"scoresStr":"68-28","goalConDiff":40,"pts":81,"idx":2,"qualColor":"#2AD572"},{"name":"Tottenham Hotspur","shortName":"Tottenham","id":8586,"pageUrl":"/teams/8586/overview/tottenham-hotspur","deduction":null,"ongoing":null,"played":38,"wins":23,"draws":8,"losses":7,"scoresStr":"74-36","goalConDiff":38,"pts":77,"idx":3,"qualColor":"#2AD572"},
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API JSON Data

	Name	PL	W	D	L	GD	PTS	Goals_Scored	Goals_Conceded	Draws_Home	Goals_Scored_Home	Goals_Conceded_Home	Draws_Away	Goals_Scored_Away	Goals_Conceded_Away
0	Man City	38	32	4	2	79	100	106	27	2	61	14	2	45	13
1	Man United	38	25	6	7	40	81	68	28	2	38	9	4	30	19
2	Tottenham	38	23	8	7	38	77	74	36	4	40	16	4	34	20
3	Liverpool	38	21	12	5	46	75	84	38	7	45	10	5	39	28
4	Chelsea	38	21	7	10	24	70	62	38	4	30	16	4	32	22
5	Arsenal	38	19	6	13	23	63	74	51	2	54	20	4	20	31
6	Burnley	38	14	12	12	-3	54	36	39	5	16	17	7	20	22
7	Everton	38	13	10	15	-14	49	44	58	4	28	22	4	16	36
8	Leicester	38	12	11	15	-4	47	56	60	6	25	22	5	31	38
9	Newcastle	38	12	8	18	-8	44	39	47	4	21	17	4	18	30
10	Crystal Palace	38	11	11	16	-10	44	45	55	5	29	27	6	16	28
11	Bournemouth	38	11	11	16	-16	44	45	61	5	26	30	6	19	31
12	West Ham	38	10	12	16	-20	42	48	68	6	26	26	6	24	42
13	Watford	38	11	8	19	-20	41	44	64	6	27	31	2	17	33
14	Brighton	38	9	13	16	-20	40	34	54	8	24	25	5	10	29
15	Huddersfield	38	9	10	19	-30	37	28	58	5	16	25	5	12	33
16	Southampton	38	7	15	16	-19	36	37	56	7	20	26	8	17	30
17	Swansea	38	8	9	21	-28	33	28	56	3	17	24	6	11	32
18	Stoke	38	7	12	19	-33	33	35	68	5	20	30	7	15	38
19	West Brom	38	6	13	19	-25	31	31	56	9	21	29	4	10	27

Pandas Dataframe

Research Questions
& Hypothesis

Question 1:

Do top five teams score more goals than bottom five teams?

Hypothesis 1: Top teams have better attacking and defending than bottom teams.

Question 2:

Do teams perform better at home than away?

Hypothesis 2: Teams tend to score more goals at home.

Question 3:

Does the location of the game (home vs. away) influence the likelihood of a draw?

Hypothesis 3: The location of the game does not significantly affect the likelihood of a draw.

Data Preparation

Top-left tables

	name	shortName	id	pageUrl	deduction	ongoing	played	wins	draws	losses	scoresStr	goalConDiff	pts	idx	qualColor
0	Manchester City	Man City	8456	/teams/8456/overview/manchester-city	None	None	38	32	4	2	106-27	79	100	1	#2AD572
1	Manchester United	Man United	10260	/teams/10260/overview/manchester-united	None	None	38	25	6	7	68-28	40	81	2	#2AD572
2	Tottenham Hotspur	Tottenham	8586	/teams/8586/overview/tottenham-hotspur	None	None	38	23	8	7	74-36	38	77	3	#2AD572
3	Liverpool	Liverpool	8650	/teams/8650/overview/liverpool	None	None	38	21	12	5	84-38	46	75	4	#2AD572
4	Chelsea	Chelsea	8455	/teams/8455/overview/chelsea	None	None	38	21	7	10	62-38	24	70	5	#0046A7

```
df_2 = pd.DataFrame(data_1['table'][0]['data']['table']['home'])
df_2.head()
```

	name	shortName	id	pageUrl	deduction	ongoing	played	wins	draws	losses	scoresStr	goalConDiff	pts	idx	qualColor
0	Manchester City	Man City	8456	/teams/8456/overview/manchester-city	None	None	19	16	2	1	61-14	47	50	1	#2AD572
1	Arsenal	Arsenal	9825	/teams/9825/overview/arsenal	None	None	19	15	2	2	54-20	34	47	2	#2AD572
2	Manchester United	Man United	10260	/teams/10260/overview/manchester-united	None	None	19	15	2	2	38-9	29	47	3	#2AD572
3	Liverpool	Liverpool	8650	/teams/8650/overview/liverpool	None	None	19	12	0	45-10	35	43	4	#2AD572
4	Tottenham Hotspur	Tottenham	8586	/teams/8586/overview/tottenham-hotspur	None	None	19	13	2	40-16	24	43	5	#0046A7

```
df_3 = pd.DataFrame(data_1['table'][0]['data']['table']['away'])
df_3.head()
```

	name	shortName	id	pageUrl	deduction	ongoing	played	wins	draws	losses	scoresStr	goalConDiff	pts	idx	qualColor
0	Manchester City	Man City	8456	/teams/8456/overview/manchester-city	None	None	19	16	5	45-13	32	50	1	#2AD572
1	Tottenham Hotspur	Tottenham	8586	/teams/8586/overview/tottenham-hotspur	None	None	19	10	4	5	34-20	14	34	2	#2AD572
2	Manchester United	Man United	10260	/teams/10260/overview/manchester-united	None	None	19	10	5	30-19	11	34	3	#2AD572
3	Chelsea	Chelsea	8455	/teams/8455/overview/chelsea	None	None	19	10	3	6	32-22	10	33	4	#2AD572
4	Liverpool	Liverpool	8650	/teams/8650/overview/liverpool	None	None	19	9	5	39-28	11	32	5	#0046A7

Right code block

```python
df_1 = pd.DataFrame(data_1['table'][0]['data']['table']['all'])
df_2 = pd.DataFrame(data_1['table'][0]['data']['table']['home'])
df_3 = pd.DataFrame(data_1['table'][0]['data']['table']['away'])

df_1 = df_1.drop(['name', 'id', 'pageUrl', 'deduction', 'ongoing', 'idx', 'qualColor'], axis = 1)
df_2 = df_2.drop(['name', 'id', 'pageUrl', 'deduction', 'ongoing', 'played', 'wins', 'losses', 'goalConDiff', 'pts', 'idx', 'qualColor'], axis = 1)
df_3 = df_3.drop(['name', 'id', 'pageUrl', 'deduction', 'ongoing', 'played', 'wins', 'losses', 'goalConDiff', 'pts', 'idx', 'qualColor'], axis = 1)

df_1.columns = ["Name", "PL", "W", "D", "L", "+/-", "GD", "PTS"]
df_2.columns = ["Name", "Draws_Home", "+/-"]
df_3.columns = ["Name", "Draws_Away", "+/-"]

df_1[['Goals_Scored', 'Goals_Conceded']] = df_1['+/-'].str.split('-', expand=True)

df_1['Goals_Scored'] = df_1['Goals_Scored'].astype(int)
df_1['Goals_Conceded'] = df_1['Goals_Conceded'].astype(int)

df_1 = df_1.drop(columns = ['+/-'])

df_2[['Goals_Scored_Home', 'Goals_Conceded_Home']] = df_2['+/-'].str.split('-', expand=True)

df_2['Goals_Scored_Home'] = df_2['Goals_Scored_Home'].astype(int)
df_2['Goals_Conceded_Home'] = df_2['Goals_Conceded_Home'].astype(int)

df_2 = df_2.drop(columns = ['+/-'])

df_3[['Goals_Scored_Away', 'Goals_Conceded_Away']] = df_3['+/-'].str.split('-', expand=True)

df_3['Goals_Scored_Away'] = df_3['Goals_Scored_Away'].astype(int)
df_3['Goals_Conceded_Away'] = df_3['Goals_Conceded_Away'].astype(int)

df_3 = df_3.drop(columns = ['+/-'])
```

Bottom merge block

```python
merged_data = pd.merge(df_1, df_2, on=['Name'])
merged_data = pd.merge(merged_data, df_3, on=['Name'])
merged_data.head()
```
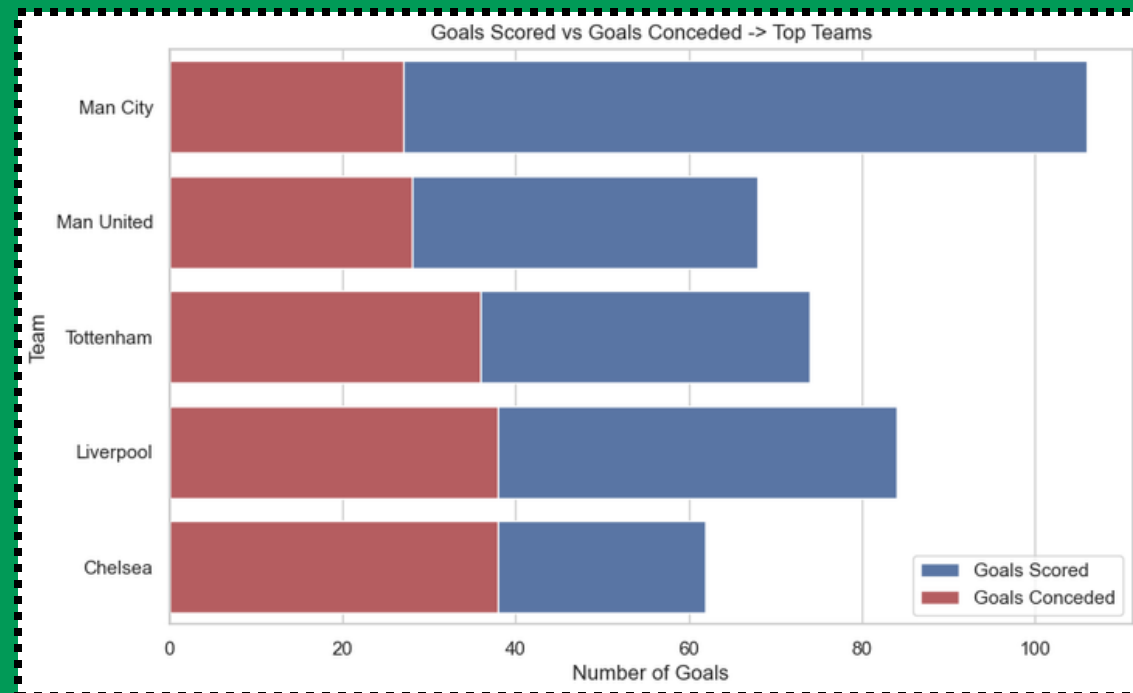
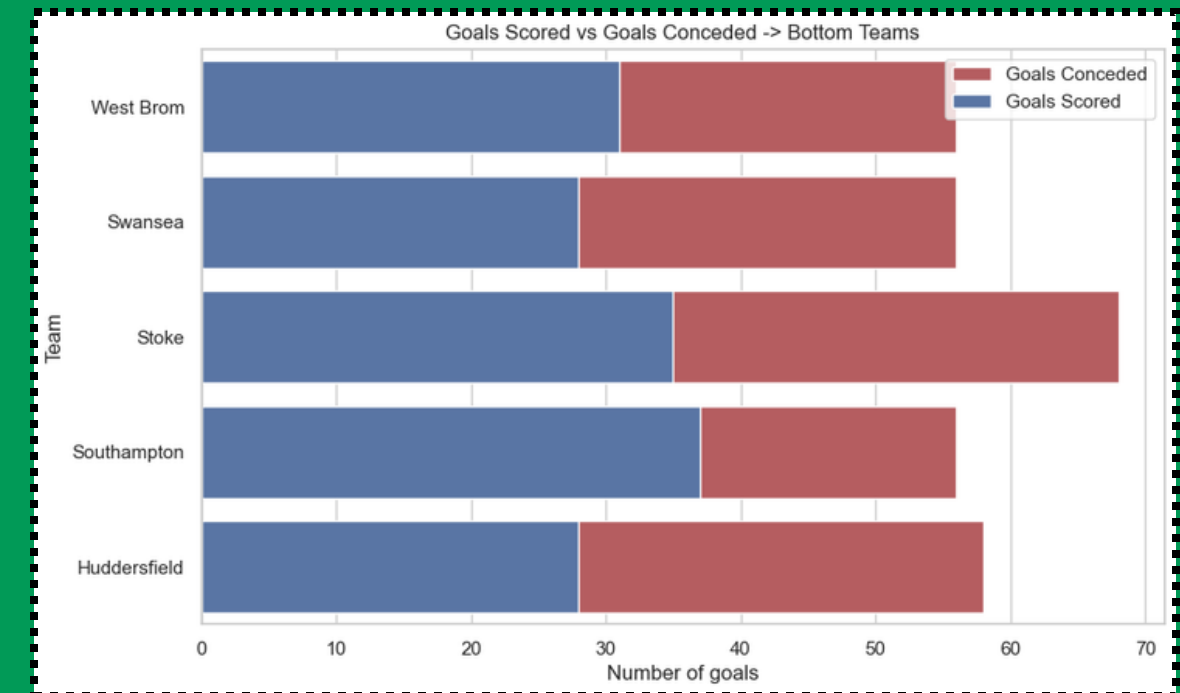|	Name	PL	W	D	L	GD	PTS	Goals_Scored	Goals_Conceded	Draws_Home	Goals_Scored_Home	Goals_Conceded_Home	Draws_Away	Goals_Scored_Away	Goals_Conceded_Away
0	Man City	38	32	4	2	79	100	106	27	2	61	14	2	45	13
1	Man United	38	25	6	7	40	81	68	28	2	38	9	4	30	19
2	Tottenham	38	23	8	7	38	77	74	36	4	40	16	4	34	20
3	Liverpool	38	21	12	5	46	75	84	38	7	45	10	5	39	28
4	Chelsea	38	21	7	10	24	70	62	38	4	30	16	3	32	22

Final Data

Hypothesis 1:
The top five teams exhibit superior attacking and defensive capabilities compared to the bottom five teams.
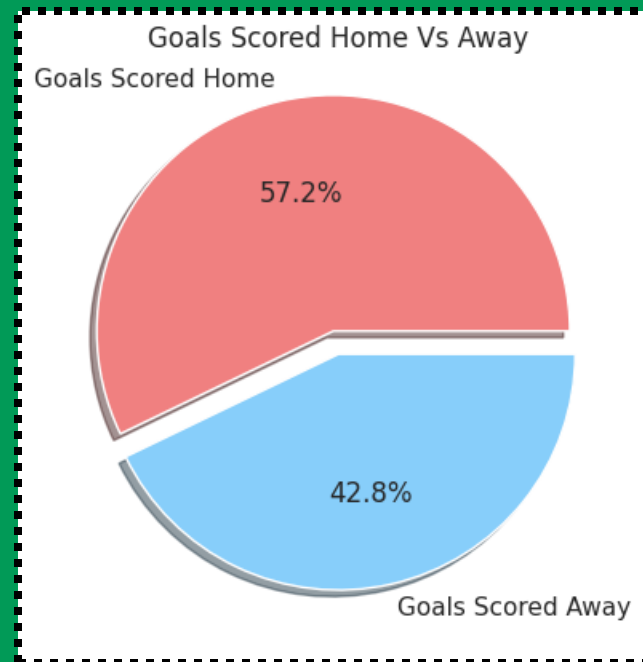

Top five teams

Bottom five teams

Statistical Testing:

1. *T-test correlation coefficient (Goals Scored, Top vs. Bottom):* 5.93180959610318l
2. *P-value: 0.0003490285242457535*

The t-test result showed a significant difference, with a p-value of 0.00035, indicating that top teams score significantly more goals than bottom teams supporting the hypothesis that top-performing teams have a stronger attacking presence compared to teams at the bottom of the table.
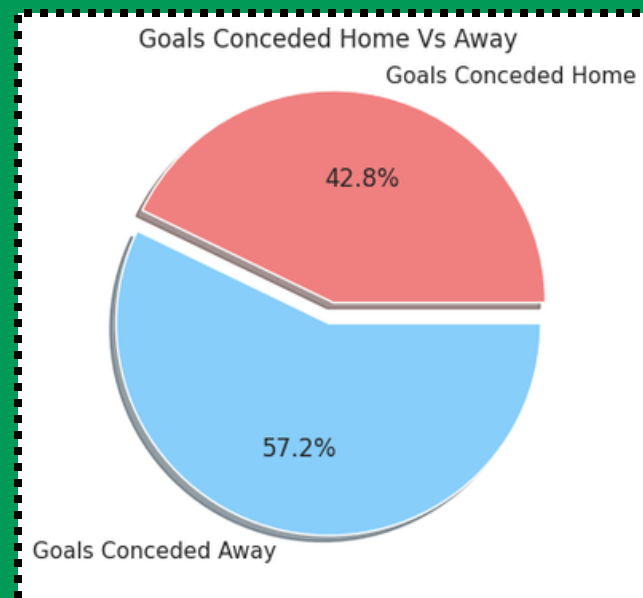
Hypothesis 2:
Teams tend to achieve higher scoring outcomes in home games compared to away games.

Statistical Testing:

1. *T-test correlation coefficient (Home vs. Away Goals Scored)*: 3.7867493091016193
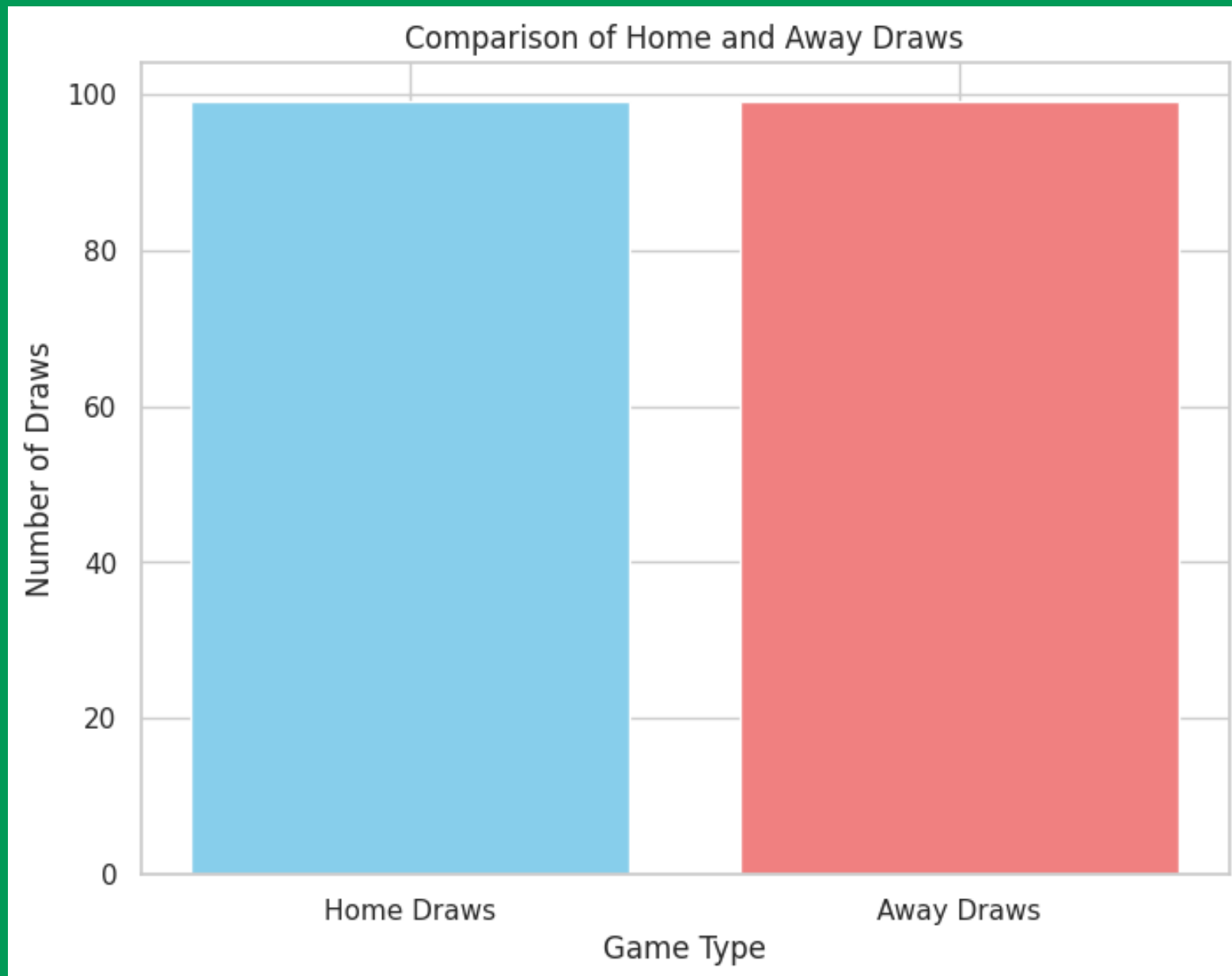2. *P-value*: 0.0012469170419907249

Both tests confirm a statistically significant difference, indicating that teams tend to score more and concede fewer goals at home compared to away games.

Statistical Testing:

1. *T-test correlation coefficient (Home vs. Away Goals Scored)*: 5.505051964024391
2. *P-value*: 2.606115058055847e-05

Hypothesis 3:
The location of the game does not significantly affect the likelihood of a draw.

Comparison of Home and Away Draws

Statistical Testing:

1.T-test correlation coefficient (Home vs. Away Goals Scored): 0.0
2.P-value: 1.0

This result indicates no significant difference between the number of draws in home and away games, as evidenced by the high p-value of 1.0.

Summary and Findings

- Hypothesis 1: Top teams score more goals than bottom teams, supported by a statistically significant p-value.

- Hypothesis 2: Teams score more goals at home and concede less, showing a home advantage in terms of offensive and defensive performance.

- Hypothesis 3: There is no significant difference in draw frequency between home and away games, suggesting that draws are equally likely regardless of location.

Conclusion

The analysis highlights significant patterns in scoring and draws, offering insights into team performance dynamics. While offensive strength varies between top and bottom teams and is influenced by game location, draws are equally likely regardless of whether teams play at home or away.

References

- **Premier League table 2017/2018, form and next opponent. (n.d.). FotMob.**
  https://www.fotmob.com/api/leagues?id=47&ccode3=JPN&season=2017%2F2018

- **Level Up: Mastering statistics with Python - Stack Overflow. (2021, February 16).**
  https://stackoverflow.blog/2021/02/16/level-up-mastering-statistics-with-python/

Thank you for listening!

We will be happy to answer any questions

you may have about the analysis.

Any Questions?