Import Libraries and dataset

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
wc_history = pd.read_csv("/content/drive/MyDrive/data/team_performances_all_wcs.csv")
wc_history.head()
```

Out[2]:

	Team_name	Team_ranking	Titles	Win_percentage_ODI	WC_matches	WC_match_won	Win_percent_WC	WC_m
0	Australia	1	5	60.73	94	69	73.40	
1	Pakistan	2	1	52.78	79	45	56.96	
2	India	3	2	52.38	84	53	63.09	
3	New Zealand	4	0	45.89	89	54	60.67	
4	England	5	1	50.32	83	48	57.83	

In [3]:
```
odi_results = pd.read_csv("/content/drive/MyDrive/data/odi_results_2015_after.csv")
odi_results.head()
```

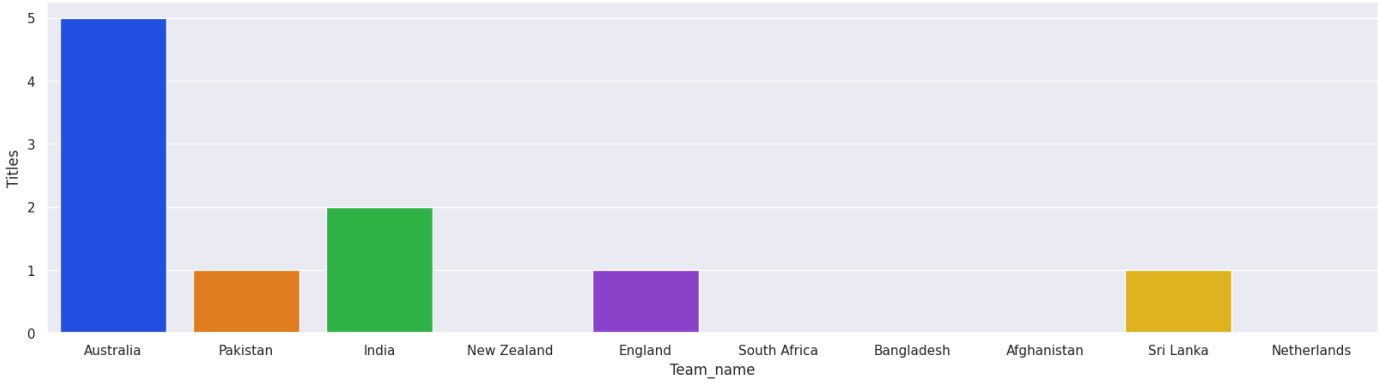
Out[3]:

	Date	Team_1	Team_2	Winner	Margin	Ground
0	17/04/2015	Bangladesh	Pakistan	Bangladesh	won by 79 runs	Shere Bangla National Stadium
1	19/04/2015	Bangladesh	Pakistan	Bangladesh	won by 7 wickets	Shere Bangla National Stadium
2	22/04/2015	Bangladesh	Pakistan	Bangladesh	won by 8 wickets	Shere Bangla National Stadium
3	08/05/2015	Ireland	England	No result	No result	The Village
4	26/05/2015	Pakistan	Zimbabwe	Pakistan	won by 41 runs	Gaddafi Stadium

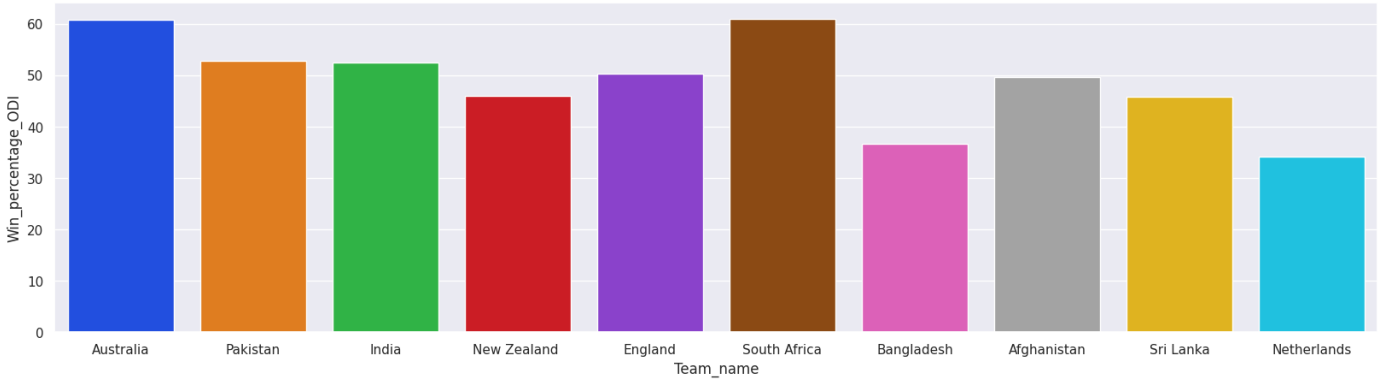
In [4]:
```
odi_results.drop(odi_results[(odi_results['Winner'] == 'Match abandoned' )].index, inpla
odi_results.drop(odi_results[(odi_results['Winner'] == 'No result' )].index, inplace=Tru
```

Data Exploration

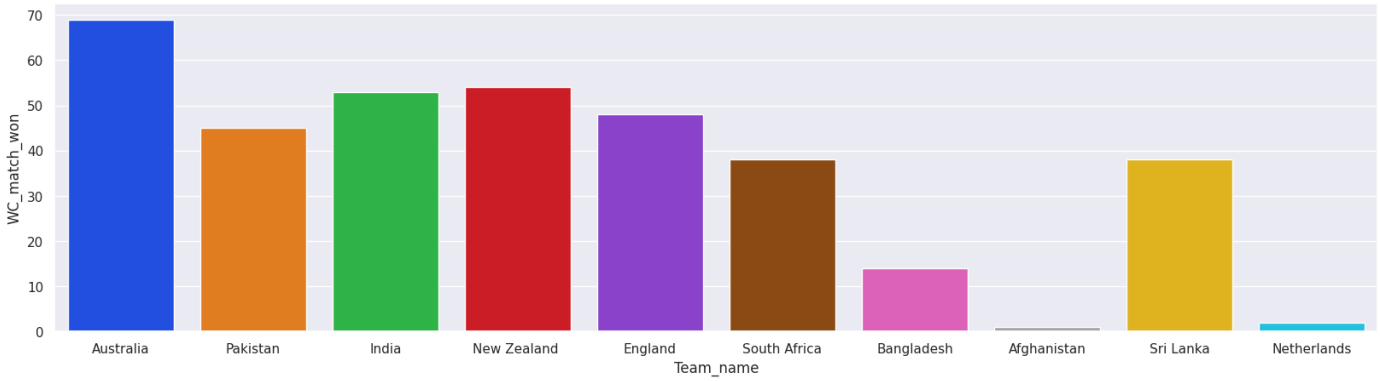
In [5]:
```
# Number of titles won by each team

sns.set(rc={'figure.figsize' : (20,5)}) # Set the figure size and color palette
sns.set_palette("bright")

sns.barplot(x='Team_name', y='Titles', data=wc_history)
plt.show()
```



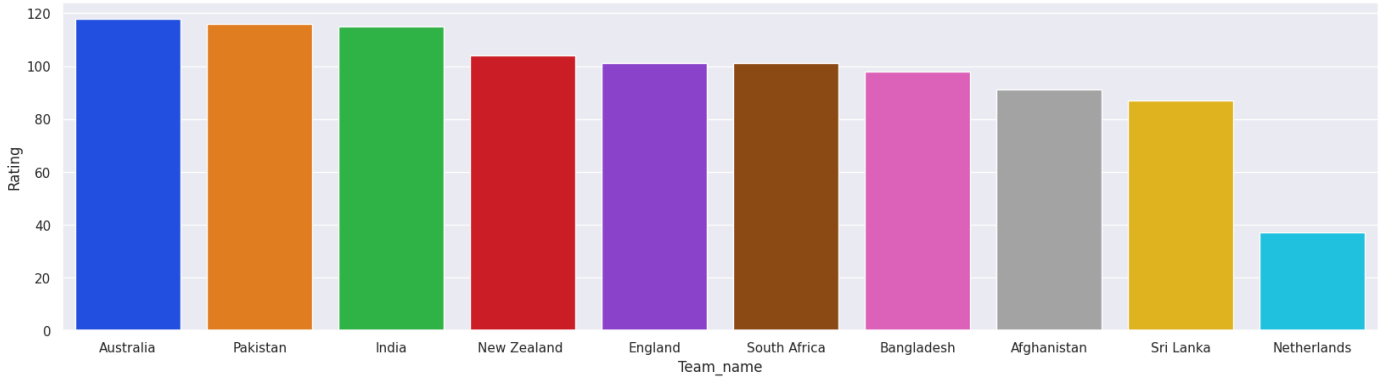
In [6]:
```
# Win percentage in ODI by each team
sns.barplot(x='Team_name', y='Win_percentage_ODI', data=wc_history)
plt.show()
```



In [7]:
```
# Number of matches won in world cup by each team
sns.barplot(x='Team_name', y='WC_match_won', data=wc_history)
plt.show()
```



In [8]:
```
# Recent ICC ODI rating
sns.barplot(x='Team_name', y='Rating', data=wc_history)
plt.show()
```



Stats of top five teams in the ODI World Cup 2023

Stats of Team India:

In [9]:
```
india = odi_results[(odi_results['Team_1'] == 'India') | (odi_results['Team_2'] == 'Indi
india.head()
```

Out[9]:

	Date	Team_1	Team_2	Winner	Margin	Ground
11	18/06/2015	Bangladesh	India	Bangladesh	won by 79 runs	Shere Bangla National Stadium
13	21/06/2015	Bangladesh	India	Bangladesh	won by 6 wickets	Shere Bangla National Stadium
14	24/06/2015	Bangladesh	India	India	won by 77 runs	Shere Bangla National Stadium
16	10/07/2015	Zimbabwe	India	India	won by 4 runs	Harare Sports Club
19	12/07/2015	Zimbabwe	India	India	won by 62 runs	Harare Sports Club

In [10]:
```
india_wins = india[india['Winner'] == 'India']
```

In [11]:
```
# Exclude Team India's name
excluded_value = 'India'

# Filtering out rows with the excluded value
filtered_df = india_wins[india_wins['Team_2'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_2'].value_counts()

# Print the value counts
print(value_counts)
```

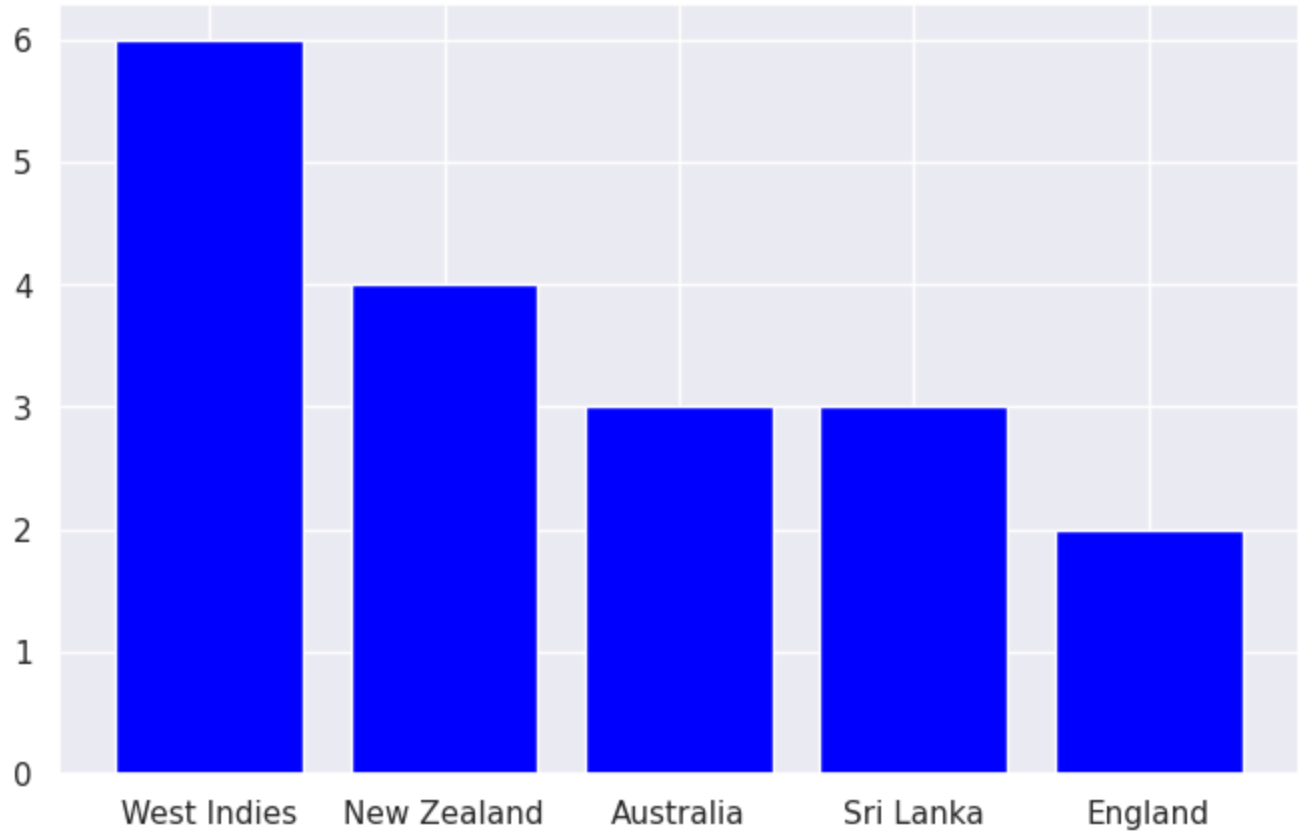
```
West Indies     6
New Zealand     4
Australia       3
Sri Lanka       3
England         2
South Africa    2
Name: Team_2, dtype: int64
```

In [12]:
```
# Exclude Team India's name
excluded_value = 'India'

# Filtering out rows with the excluded value
filtered_df = india_wins[india_wins['Team_1'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_1'].value_counts()

# Print the value counts
print(value_counts)
```

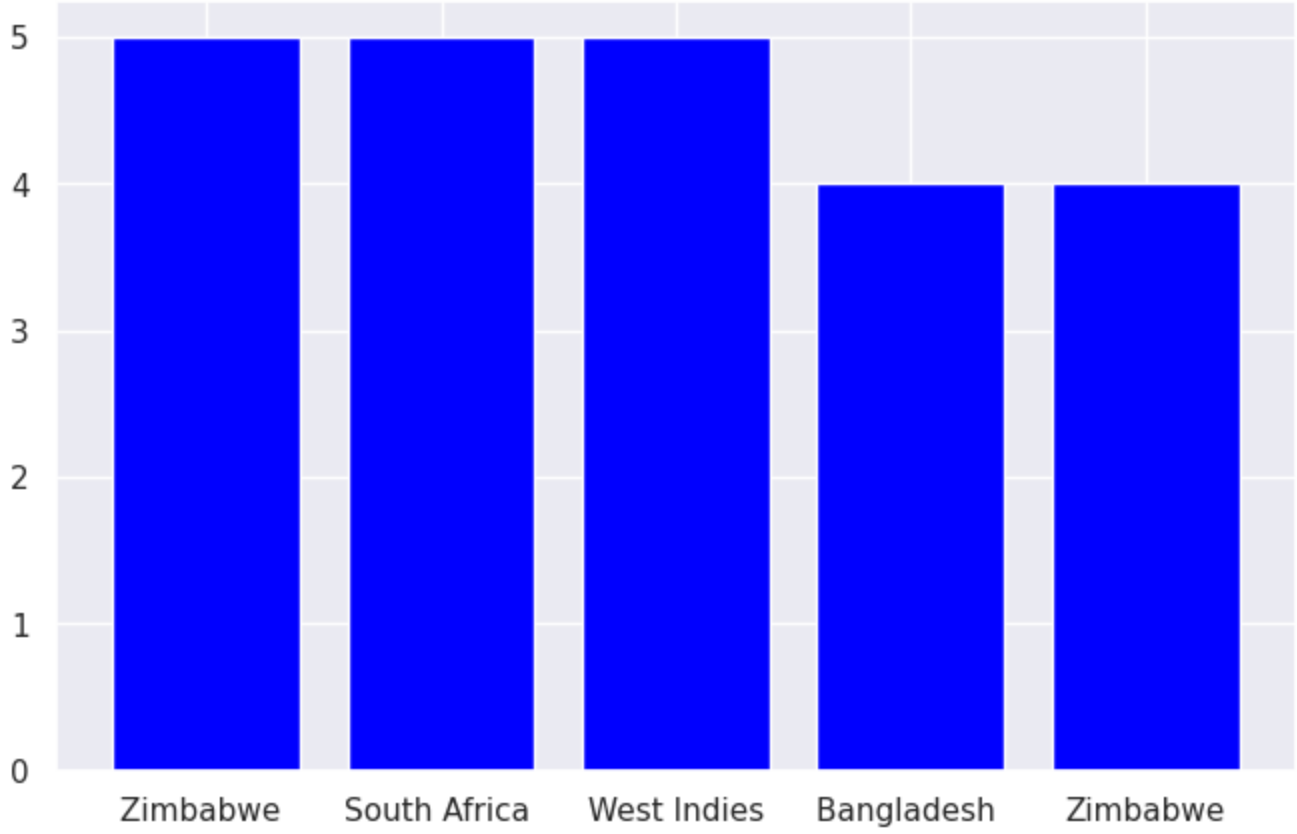
```
Zimbabwe        5
South Africa    5
West Indies     5
Bangladesh      4
Zimbabwe        4
Australia       2
Sri Lanka       2
```

```
England          2
England          1
Hong Kong        1
New Zealand      1
Afghanistan      1
Australia        1
Bangladesh       1
Name: Team_1, dtype: int64
```

In [13]:
```
exclude = 'India'

# Filter out the opponent to exclude from the data
filtered_data = india_wins[india_wins['Team_2'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by India.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_2'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

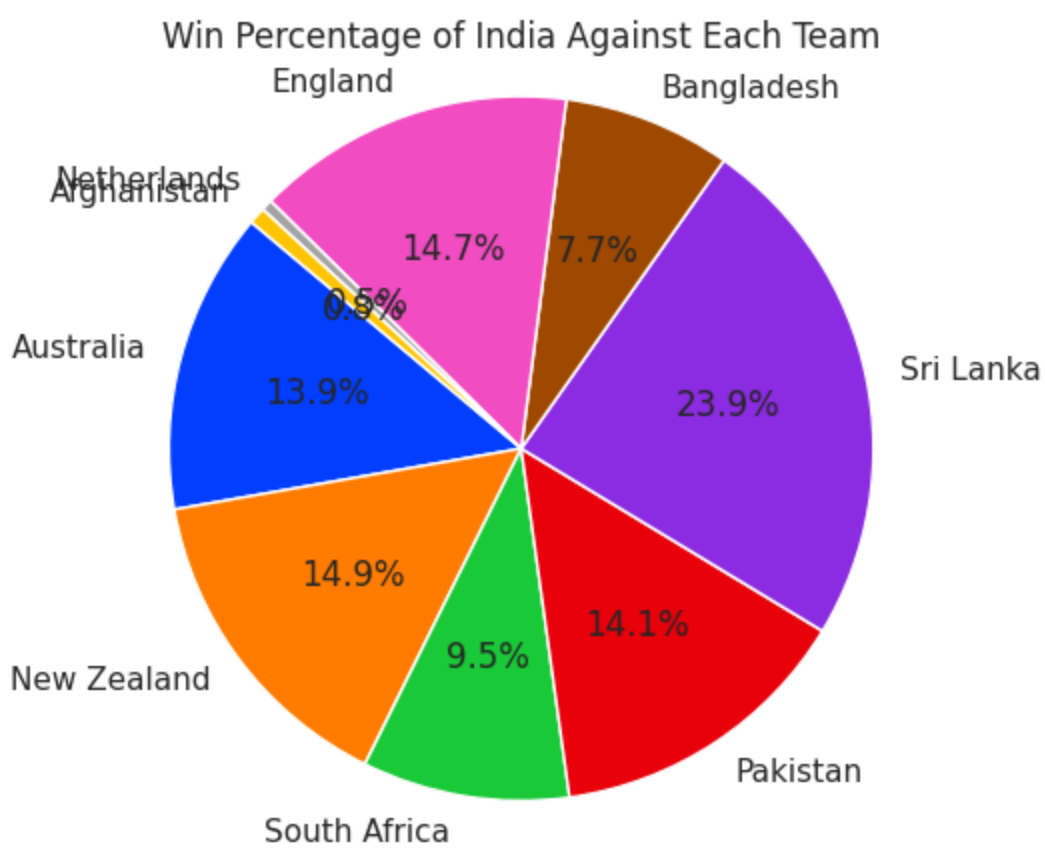


In [14]:
```
exclude = 'India'

# Filter out the opponent to exclude from the data
filtered_data = india_wins[india_wins['Team_1'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by India.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_1'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```



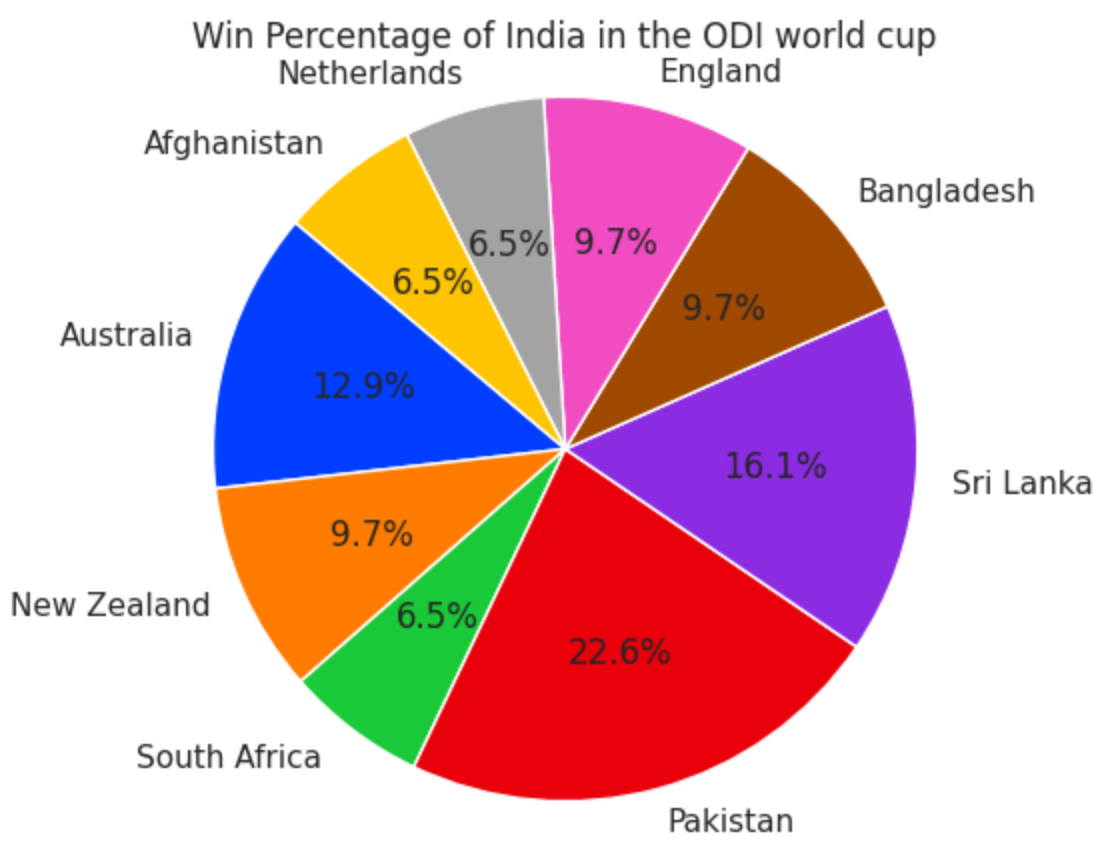
In [15]:

```
# Number of wins against each team


# Out of the 1032 ODI matches played by India, number of matches won against the followi
team_win_counts = {
    'Australia': 54,
    'New Zealand': 58,
    'South Africa ': 37,
    'Pakistan': 55,
    'Sri Lanka': 93,
    'Bangladesh': 30,
    'England': 57,
    'Netherlands': 2,
    'Afghanistan': 3
}

# Total matches played is calculated
total_matches = sum(team_win_counts.values())

# India's win percentages against each team is calculated
win_percentages = {team: (wins / total_matches) * 100 for team, wins in team_win_counts.

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages.values(), labels=win_percentages.keys(), autopct='%1.1f%%', star

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of India Against Each Team')

# Display the pie chart
plt.show()
```



In [16]:

```
# Number of wins against each team in the ODI world cup

# Out of the 84 ODI matches played by India in the ODI world cup, number of matches won
team_win_counts_wc_ind = {
    'Australia': 4,
    'New Zealand': 3,
    'South Africa ': 2,
    'Pakistan': 7,
    'Sri Lanka': 5,
    'Bangladesh': 3,
    'England': 3,
    'Netherlands': 2,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches_wc_ind = sum(team_win_counts_wc_ind.values())

# India's win percentages against each team is calculated
win_percentages_wc_ind = {team: (wins / total_matches_wc_ind) * 100 for team, wins in te

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages_wc_ind.values(), labels=win_percentages_wc_ind.keys(), autopct='

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of India in the ODI world cup')

# Display the pie chart
plt.show()
```



Stats of Team Australia:

In [17]:
```
australia = odi_results[(odi_results['Team_1'] == 'Australia') | (odi_results['Team_2'] 
australia.head()
```

Out[17]:

	Date	Team_1	Team_2	Winner	Margin	Ground
32	27/08/2015	Ireland	Australia	Australia	won by 23 runs	Civil Service Cricket Club
33	03/09/2015	England	Australia	Australia	won by 59 runs	The Rose Bowl
34	05/09/2015	England	Australia	Australia	won by 64 runs	Lord's
35	08/09/2015	England	Australia	England	won by 93 runs	Old Trafford
36	11/09/2015	England	Australia	England	won by 3 wickets	Headingley

In [18]:
```
aus_wins = australia[australia['Winner'] == 'Australia']
```

In [19]:
```
# Exclude Team Australia's name
excluded_value = 'Australia'

# Filtering out rows with the excluded value
filtered_df = aus_wins[aus_wins['Team_2'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_2'].value_counts()

# Print the value counts
print(value_counts)
```

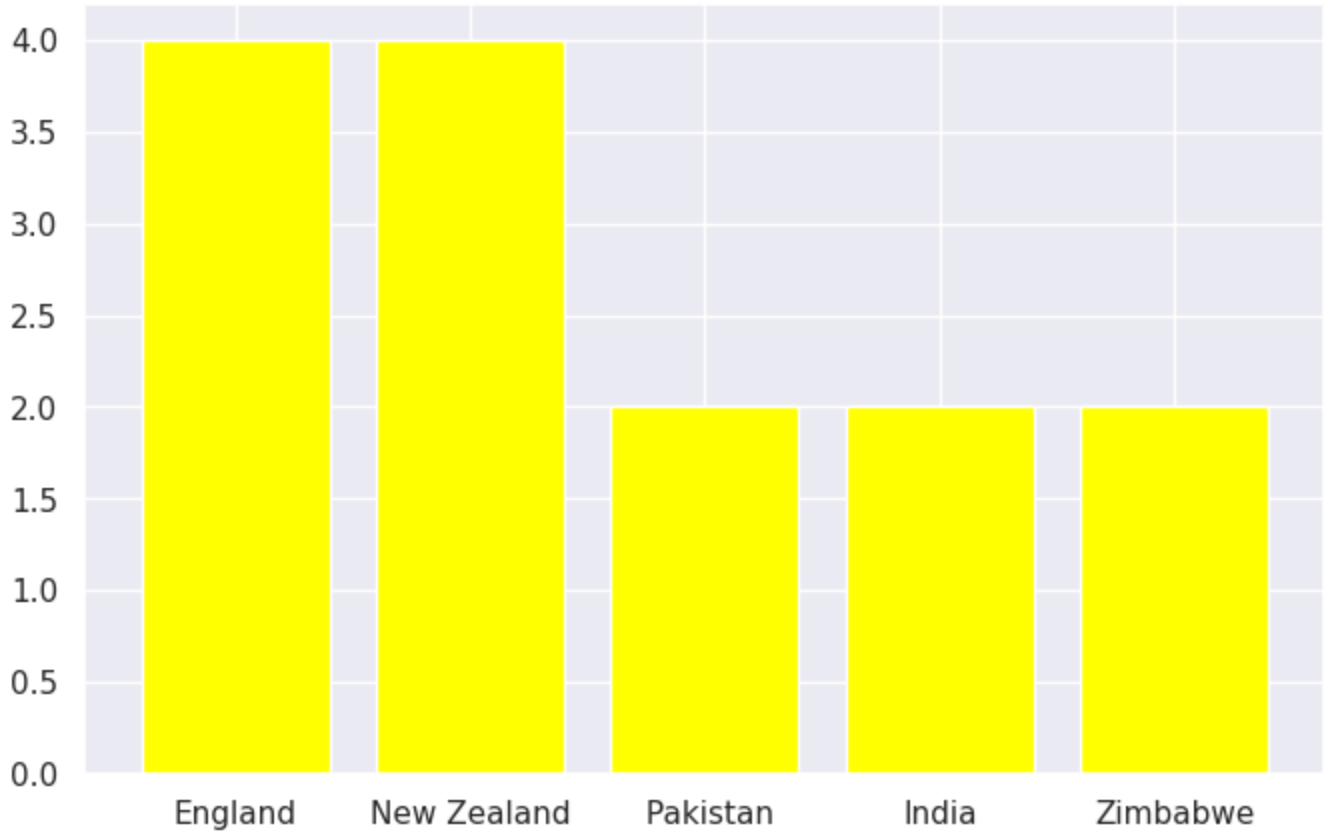
```
England          4
New Zealand      4
 Pakistan        2
India            2
```

```
Zimbabwe        2
South Africa    1
Pakistan        1
Name: Team_2, dtype: int64
```

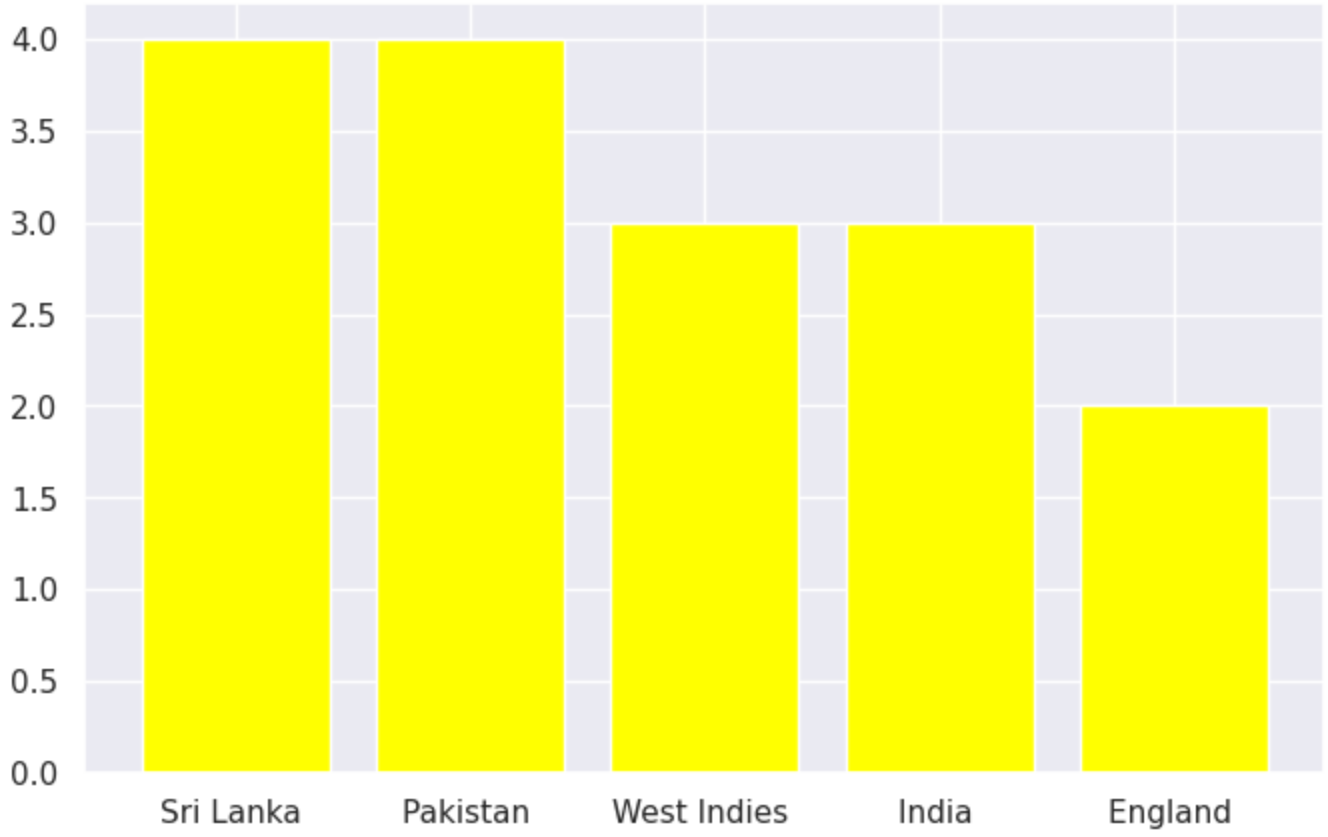
In [20]:
```python
# Exclude Team Australia's name
excluded_value = 'Australia'

# Filtering out rows with the excluded value
filtered_df = aus_wins[aus_wins['Team_1'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_1'].value_counts()

# Print the value counts
print(value_counts)
```

```
Sri Lanka       4
Pakistan        4
West Indies     3
India           3
England         2
Pakistan        2
England         2
West Indies     2
Sri Lanka       2
India           2
New Zealand     1
Afghanistan     1
Name: Team_1, dtype: int64
```

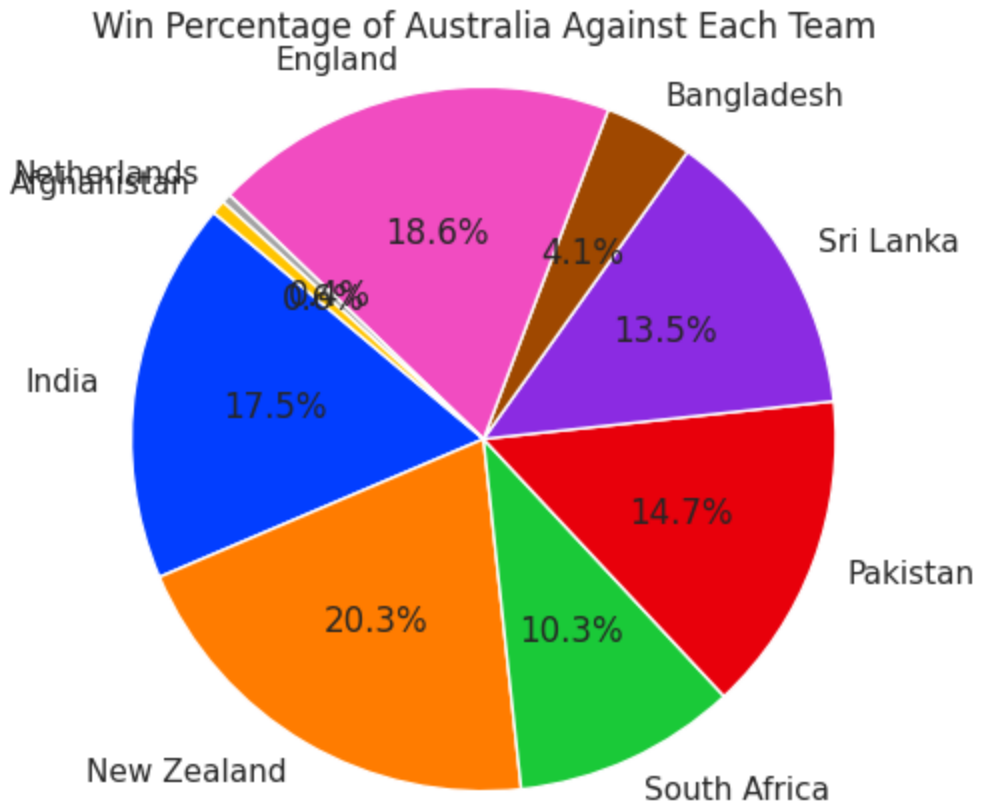
In [21]:
```python
exclude = 'Australia'

# Filter out the opponent to exclude from the data
filtered_data = aus_wins[aus_wins['Team_2'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by Australia.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_2'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```



In [22]:
```
exclude = 'Australia'

# Filter out the opponent to exclude from the data
filtered_data = aus_wins[aus_wins['Team_1'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by Australia.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_1'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

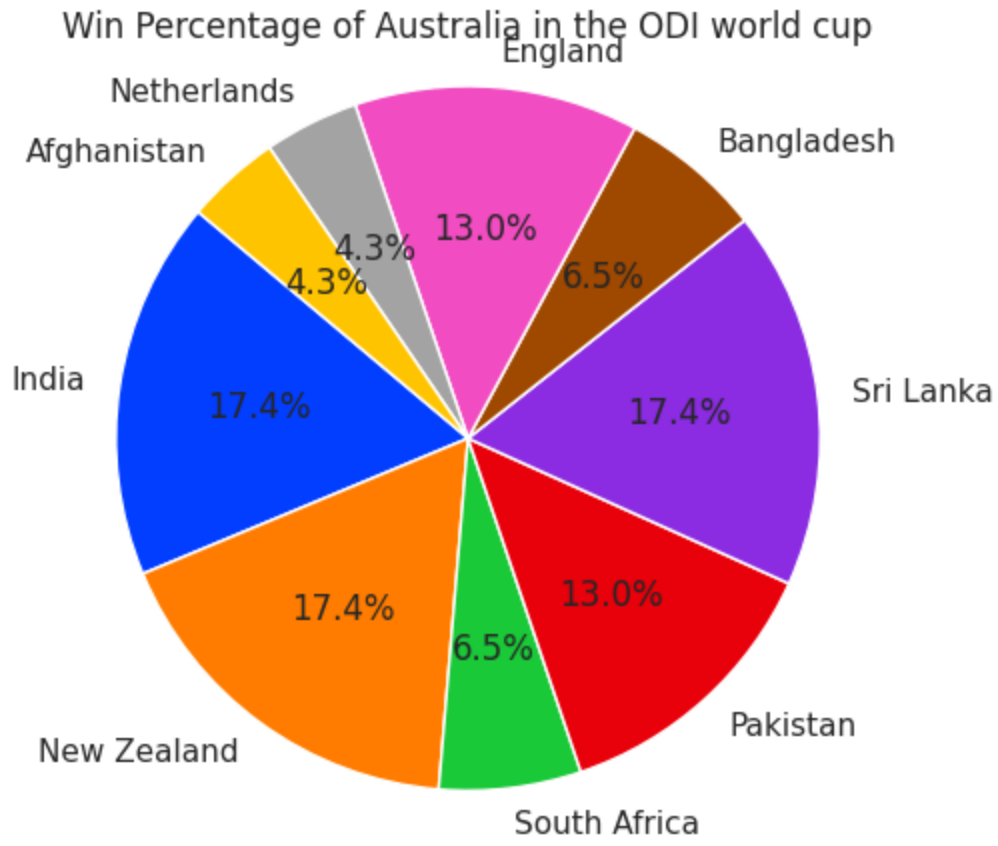


In [23]:
```
# Number of wins against each team

# Out of the 978 ODI matches played by Australia, number of matches won against the foll
team_win_counts = {
    'India': 82,
    'New Zealand': 95,
    'South Africa ': 48,
    'Pakistan': 69,
    'Sri Lanka': 63,
    'Bangladesh': 19,
    'England': 87,
    'Netherlands': 2,
    'Afghanistan': 3
}

# Total matches played is calculated
total_matches = sum(team_win_counts.values())

# Australia's win percentages against each team is calculated
win_percentages = {team: (wins / total_matches) * 100 for team, wins in team_win_counts.

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages.values(), labels=win_percentages.keys(), autopct='%1.1f%%', star

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of Australia Against Each Team')

# Display the pie chart
plt.show()
```



In [24]:
```
# Number of wins against each team in the ODI world cup

# Out of the 94 ODI matches played by Australia in the ODI world cup, number of matches
team_win_counts_wc_aus = {
```

```
    'India': 8,
    'New Zealand': 8,
    'South Africa ': 3,
    'Pakistan': 6,
    'Sri Lanka': 8,
    'Bangladesh': 3,
    'England': 6,
    'Netherlands': 2,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches_wc_aus = sum(team_win_counts_wc_aus.values())

# Australia's win percentages against each team is calculated
win_percentages_wc_aus = {team: (wins / total_matches_wc_aus) * 100 for team, wins in te

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages_wc_aus.values(), labels=win_percentages_wc_aus.keys(), autopct='

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of Australia in the ODI world cup')

# Display the pie chart
plt.show()
```



Stats of Team Pakistan:

In [25]:
```
pakistan = odi_results[(odi_results['Team_1'] == 'Pakistan') | (odi_results['Team_2'] ==
pakistan.head()
```

Out[25]:

	Date	Team_1	Team_2	Winner	Margin	Ground

0	17/04/2015	Bangladesh	Pakistan	Bangladesh	won by 79 runs	Shere Bangla National Stadium
1	19/04/2015	Bangladesh	Pakistan	Bangladesh	won by 7 wickets	Shere Bangla National Stadium
2	22/04/2015	Bangladesh	Pakistan	Bangladesh	won by 8 wickets	Shere Bangla National Stadium
17	11/07/2015	Sri Lanka	Pakistan	Pakistan	won by 6 wickets	Rangiri Dambulla International Stadium
21	15/07/2015	Sri Lanka	Pakistan	Sri Lanka	won by 2 wickets	Pallekele International Cricket Stadium

In [26]:
```
pak_wins = pakistan[pakistan['Winner'] == 'Pakistan']
```

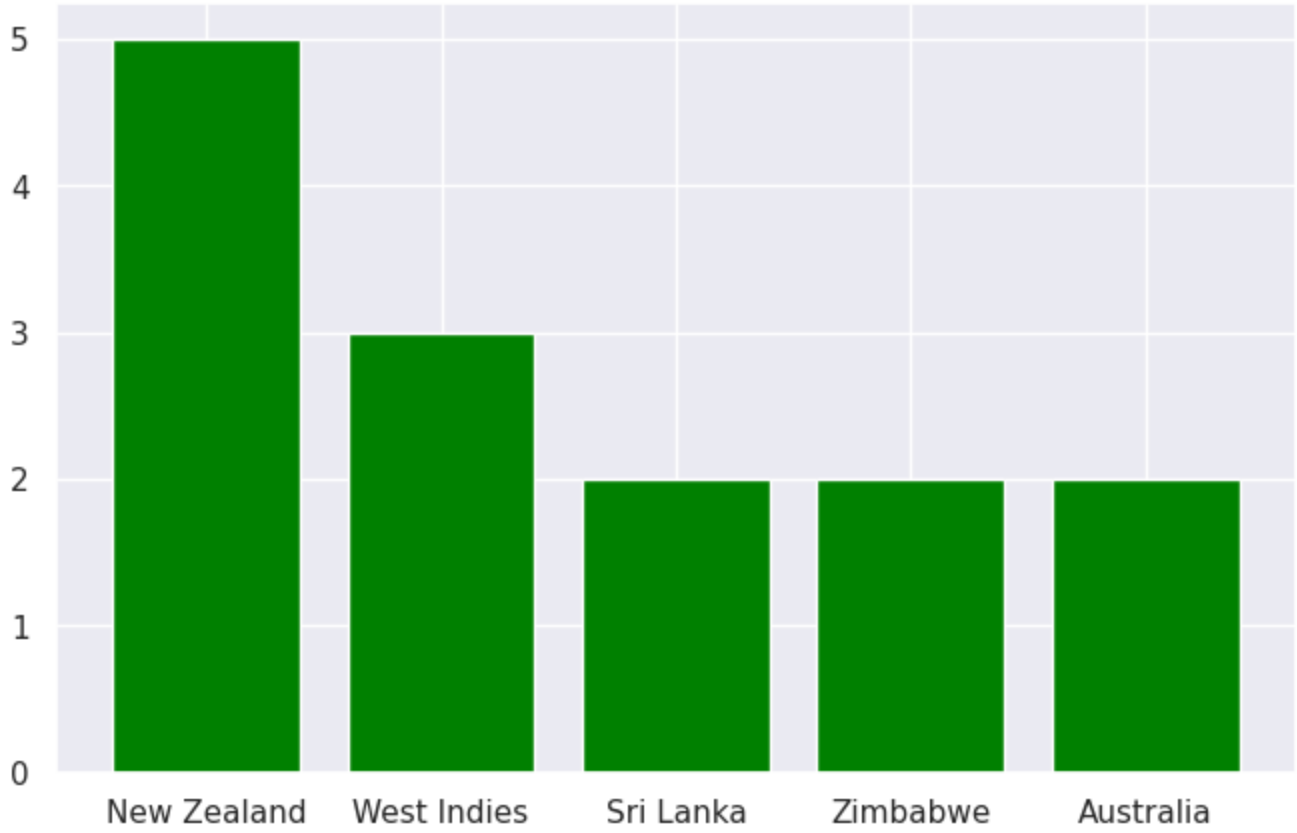
In [27]:
```
# Exclude Team Pakistan's name
excluded_value = 'Pakistan'

# Filtering out rows with the excluded value
filtered_df = pak_wins[pak_wins['Team_2'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_2'].value_counts()

# Print the value counts
print(value_counts)
```

```
New Zealand    5
West Indies    3
Sri Lanka      2
Zimbabwe       2
Australia      2
Name: Team_2, dtype: int64
```

In [28]:
```
# Exclude Team Pakistan's name
excluded_value = 'Pakistan'

# Filtering out rows with the excluded value
filtered_df = pak_wins[pak_wins['Team_1'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_1'].value_counts()

# Print the value counts
print(value_counts)
```

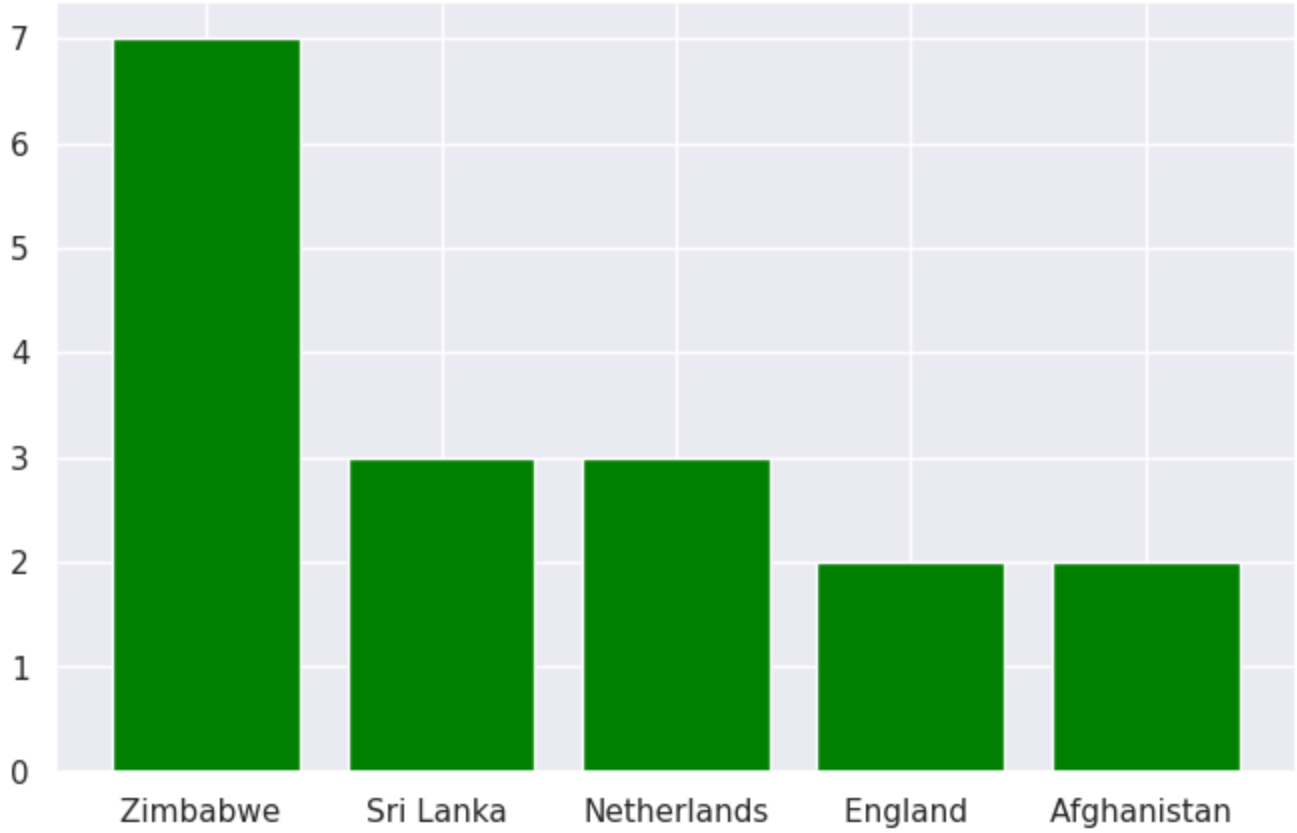
```
Zimbabwe         7
Sri Lanka        3
Netherlands      3
England          2
Afghanistan      2
South Africa     2
Ireland          1
Australia        1
Hong Kong        1
South Africa     1
New Zealand      1
Name: Team_1, dtype: int64
```

In [29]:
```
exclude = 'Pakistan'

# Filter out the opponent to exclude from the data
filtered_data = pak_wins[pak_wins['Team_2'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by Pakistan.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_2'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

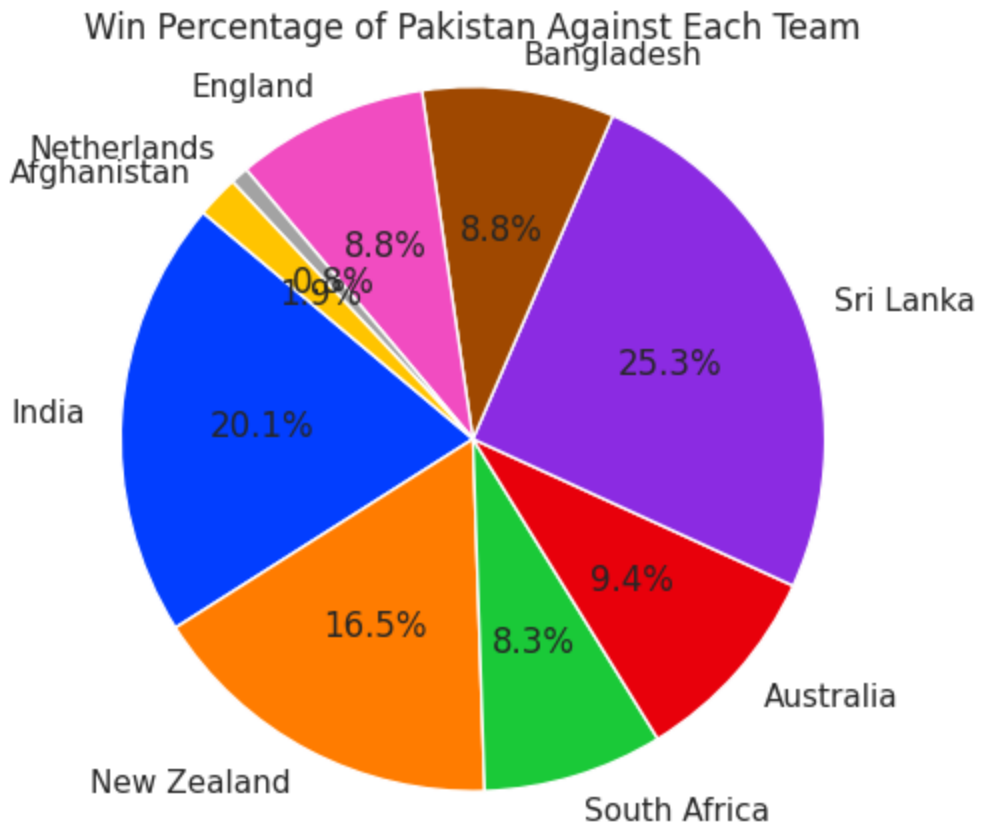


In [30]:

```
exclude = 'Pakistan'

# Filter out the opponent to exclude from the data
filtered_data = pak_wins[pak_wins['Team_1'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by Pakistan.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_1'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

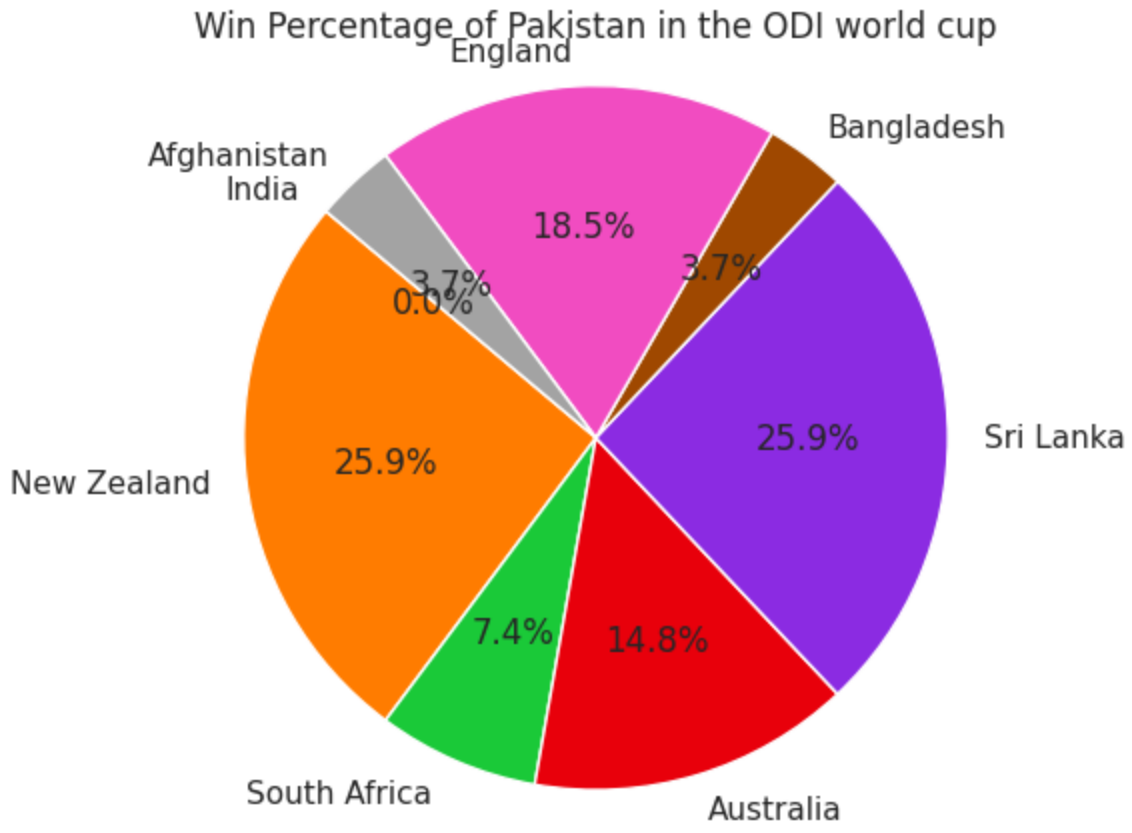


In [31]:
```
# Number of wins against each team

# Out of the 945 ODI matches played by Pakistan, number of matches won against the follo
team_win_counts = {
    'India': 73,
    'New Zealand': 60,
    'South Africa ': 30,
    'Australia': 34,
    'Sri Lanka': 92,
    'Bangladesh': 32,
    'England': 32,
    'Netherlands': 3,
    'Afghanistan': 7
}

# Total matches played is calculated
total_matches = sum(team_win_counts.values())

# Pakistan's win percentages against each team is calculated
win_percentages = {team: (wins / total_matches) * 100 for team, wins in team_win_counts.

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages.values(), labels=win_percentages.keys(), autopct='%1.1f%%', star

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of Pakistan Against Each Team')

# Display the pie chart
plt.show()
```



In [32]:
```
# Number of wins against each team in the ODI world cup

# Out of the 79 ODI matches played by Pakistan in the ODI world cup, number of matches w
```

```
team_win_counts_wc_pak = {
    'India': 0,
    'New Zealand': 7,
    'South Africa ': 2,
    'Australia': 4,
    'Sri Lanka': 7,
    'Bangladesh': 1,
    'England': 5,
    'Afghanistan': 1
}


# Total matches played is calculated
total_matches_wc_pak = sum(team_win_counts_wc_pak.values())

# Pakistan's win percentages against each team is calculated
win_percentages_wc_pak = {team: (wins / total_matches_wc_pak) * 100 for team, wins in te

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages_wc_pak.values(), labels=win_percentages_wc_pak.keys(), autopct='

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of Pakistan in the ODI world cup')

# Display the pie chart
plt.show()
```



Stats of Team New Zealand:

In [33]:
```
nz = odi_results[(odi_results['Team_1'] == 'New Zealand') | (odi_results['Team_2'] == 'N
nz.head()
```

Out[33]:

	Date	Team_1	Team_2	Winner	Margin	Ground
7	09/06/2015	England	New Zealand	England	won by 210 runs	Edgbaston
8	12/06/2015	England	New Zealand	New Zealand	won by 13 runs	Kennington Oval
9	14/06/2015	England	New Zealand	New Zealand	won by 3 wickets	The Rose Bowl
10	17/06/2015	England	New Zealand	England	won by 7 wickets	Trent Bridge
12	20/06/2015	England	New Zealand	England	won by 3 wickets	Riverside Ground

In [34]:
```
nz_wins = nz[nz['Winner'] == 'New Zealand']
```

In [35]:
```
# Exclude Team New Zealand's name
excluded_value = 'New Zealand'

# Filtering out rows with the excluded value
filtered_df = nz_wins[nz_wins['Team_2'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_2'].value_counts()

# Print the value counts
print(value_counts)
```

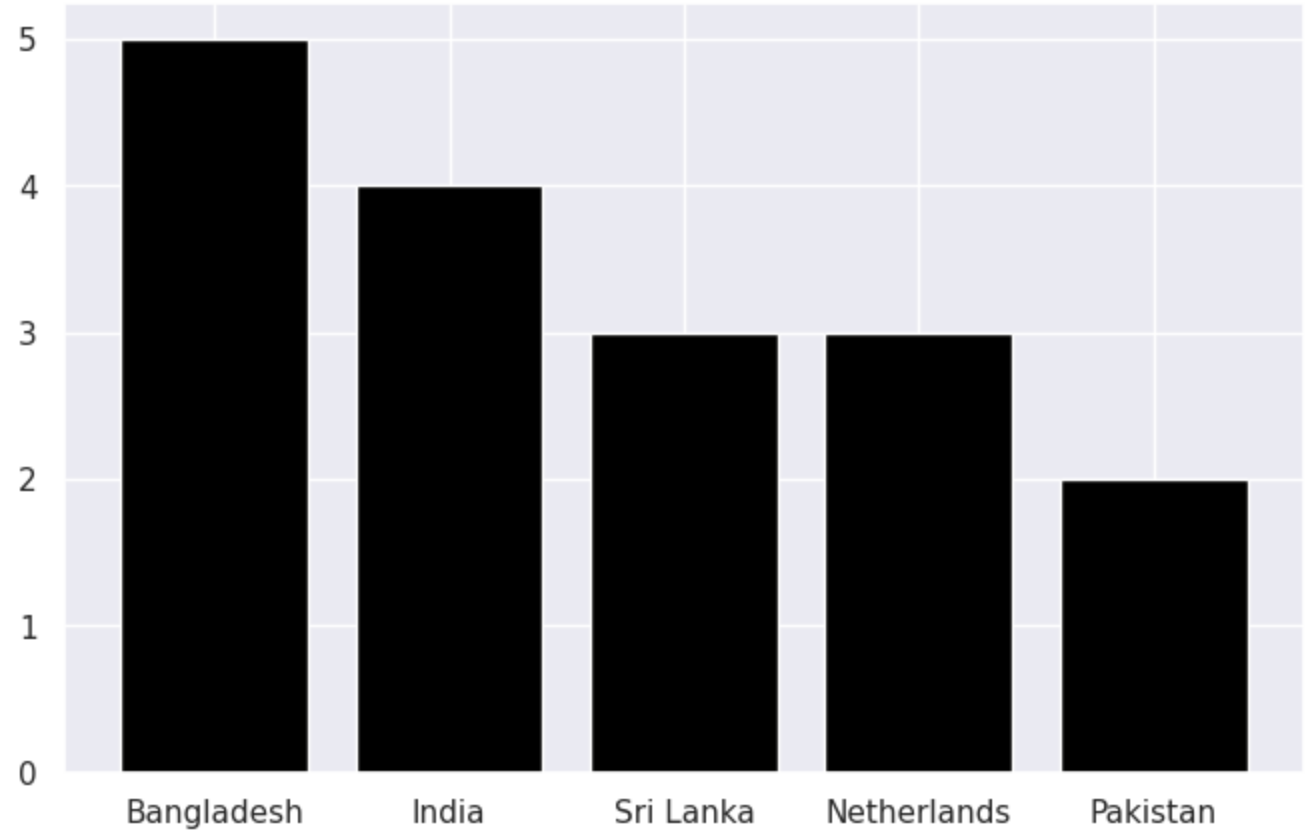
```
Bangladesh      5
India           4
Sri Lanka       3
Netherlands     3
Pakistan        2
Australia       1
South Africa    1
Name: Team_2, dtype: int64
```

In [36]:
```
# Exclude Team New Zealand's name
excluded_value = 'New Zealand'

# Filtering out rows with the excluded value
filtered_df = nz_wins[nz_wins['Team_1'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_1'].value_counts()

# Print the value counts
print(value_counts)
```

```
India           3
Pakistan        3
Ireland         3
Zimbabwe        2
West Indies     2
Ireland         1
Bangladesh      1
Afghanistan     1
Scotland        1
Name: Team_1, dtype: int64
```

In [37]:
```
exclude = 'New Zealand'

# Filter out the opponent to exclude from the data
filtered_data = nz_wins[nz_wins['Team_2'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by New Zealand.
plt.figure(figsize=(8, 5))
```

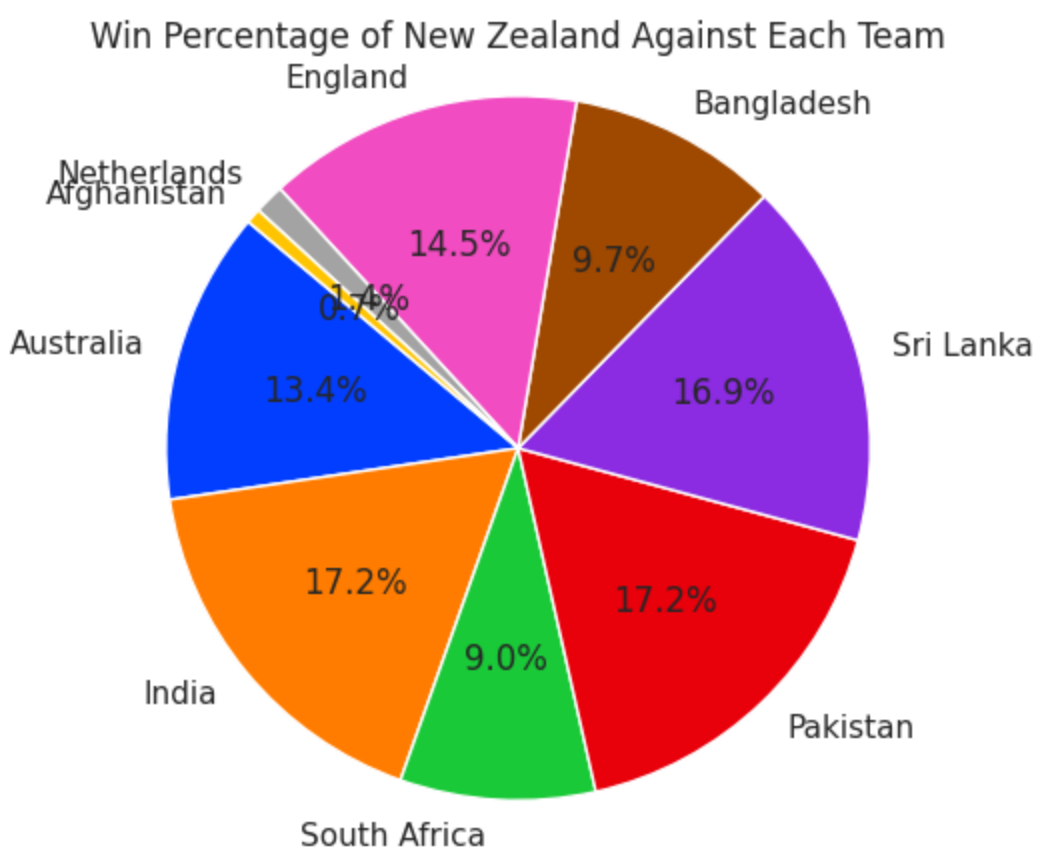
```
plt.bar(list(filtered_data['Team_2'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```



In [38]:
```
exclude = 'New Zealand'

# Filter out the opponent to exclude from the data
filtered_data = nz_wins[nz_wins['Team_1'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by New Zealand.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_1'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

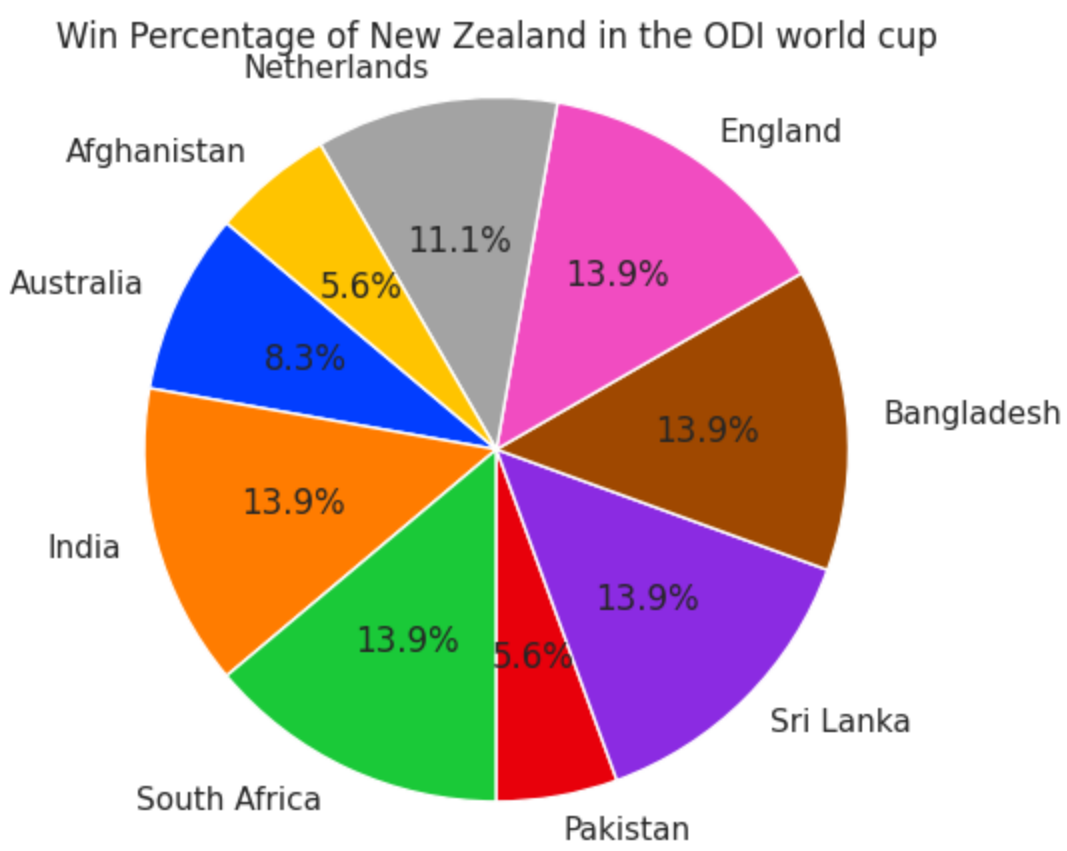
In [39]:

```
# Number of wins against each team

# Out of the 794 ODI matches played by New Zealand, number of matches won against the fo
team_win_counts = {
    'Australia': 39,
    'India': 50,
    'South Africa ': 26,
    'Pakistan': 50,
    'Sri Lanka': 49,
    'Bangladesh':28,
    'England': 42,
    'Netherlands': 4,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches = sum(team_win_counts.values())

# New Zealand's win percentages against each team is calculated
win_percentages = {team: (wins / total_matches) * 100 for team, wins in team_win_counts.

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages.values(), labels=win_percentages.keys(), autopct='%1.1f%%', star

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of New Zealand Against Each Team')

# Display the pie chart
plt.show()
```



In [40]:

```
# Number of wins against each team in the ODI world cup

# Out of the 89 ODI matches played by New Zealand in the ODI world cup, number of matche
team_win_counts_wc_nz = {
    'Australia': 3,
    'India': 5,
    'South Africa ': 5,
    'Pakistan': 2,
    'Sri Lanka': 5,
    'Bangladesh': 5,
    'England': 5,
    'Netherlands': 4,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches_wc_nz = sum(team_win_counts_wc_nz.values())

# New Zealand's win percentages against each team is calculated
win_percentages_wc_nz = {team: (wins / total_matches_wc_nz) * 100 for team, wins in team

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages_wc_nz.values(), labels=win_percentages_wc_nz.keys(), autopct='%1

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of New Zealand in the ODI world cup')

# Display the pie chart
plt.show()
```



Stats of Team England:

In [41]:
```
england = odi_results[(odi_results['Team_1'] == 'England') | (odi_results['Team_2'] == '
england.head()
```

Out[41]:

	Date	Team_1	Team_2	Winner	Margin	Ground
8	12/06/2015	England	New Zealand	New Zealand	won by 13 runs	Kennington Oval
35	08/09/2015	England	Australia	England	won by 93 runs	Old Trafford
55	11/11/2015	Pakistan	England	Pakistan	Pakistan won by 6 wickets	Sheikh Zayed Stadium
57	13/11/2015	Pakistan	England	England	England won by 95 runs	Sheikh Zayed Stadium
58	17/11/2015	Pakistan	England	England	England won by 6 wickets	Sharjah Cricket Stadium

In [42]:
```
eng_wins = england[england['Winner'] == 'England']
```

In [43]:
```
# Exclude Team India's name
excluded_value = 'England'

# Filtering out rows with the excluded value
filtered_df = eng_wins[eng_wins['Team_2'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_2'].value_counts()

# Print the value counts
print(value_counts)
```

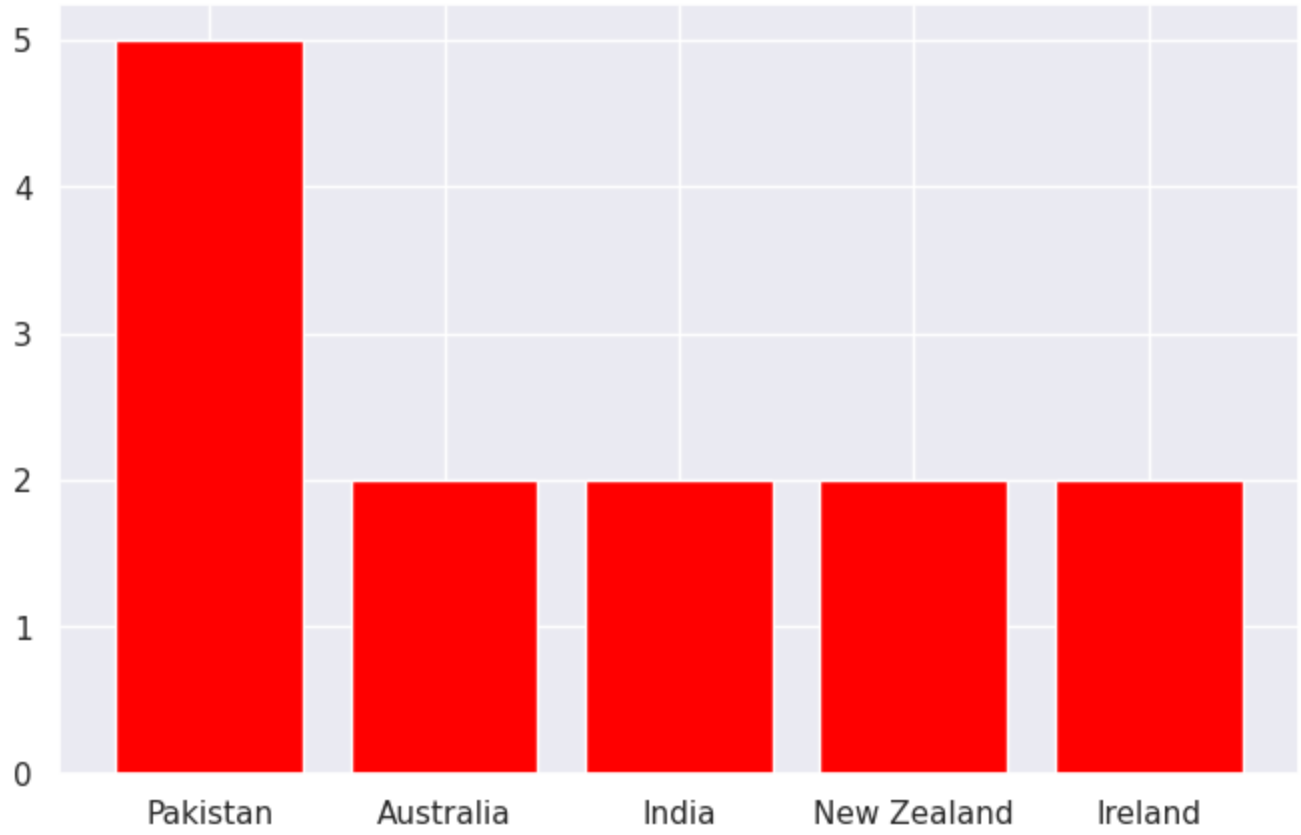
```
Pakistan        5
Australia       2
India           2
New Zealand     2
```

```
Ireland          2
Sri Lanka        2
West Indies      1
South Africa     1
Name: Team_2, dtype: int64
```

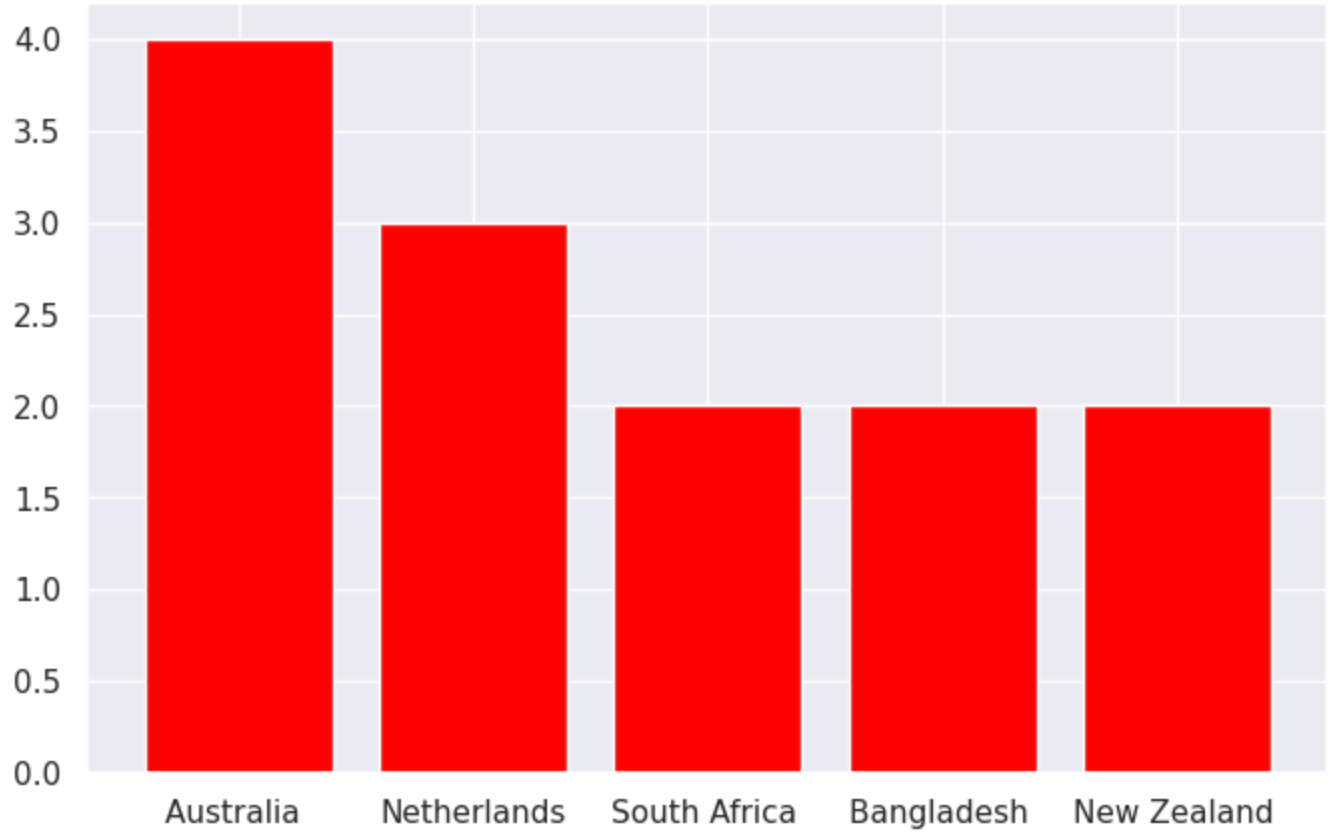
In [44]:
```
# Exclude Team India's name
excluded_value = 'England'

# Filtering out rows with the excluded value
filtered_df = eng_wins[eng_wins['Team_1'] != excluded_value]

# Counting the occurrences of each value in the filtered DataFrame's 'Team_2' column.
value_counts = filtered_df['Team_1'].value_counts()

# Print the value counts
print(value_counts)
```

```
Australia        4
Netherlands      3
South Africa     2
Bangladesh       2
New Zealand      2
Sri Lanka        2
South Africa     2
Bangladesh       2
Pakistan         1
West Indies      1
New Zealand      1
Sri Lanka        1
Ireland          1
India            1
Name: Team_1, dtype: int64
```

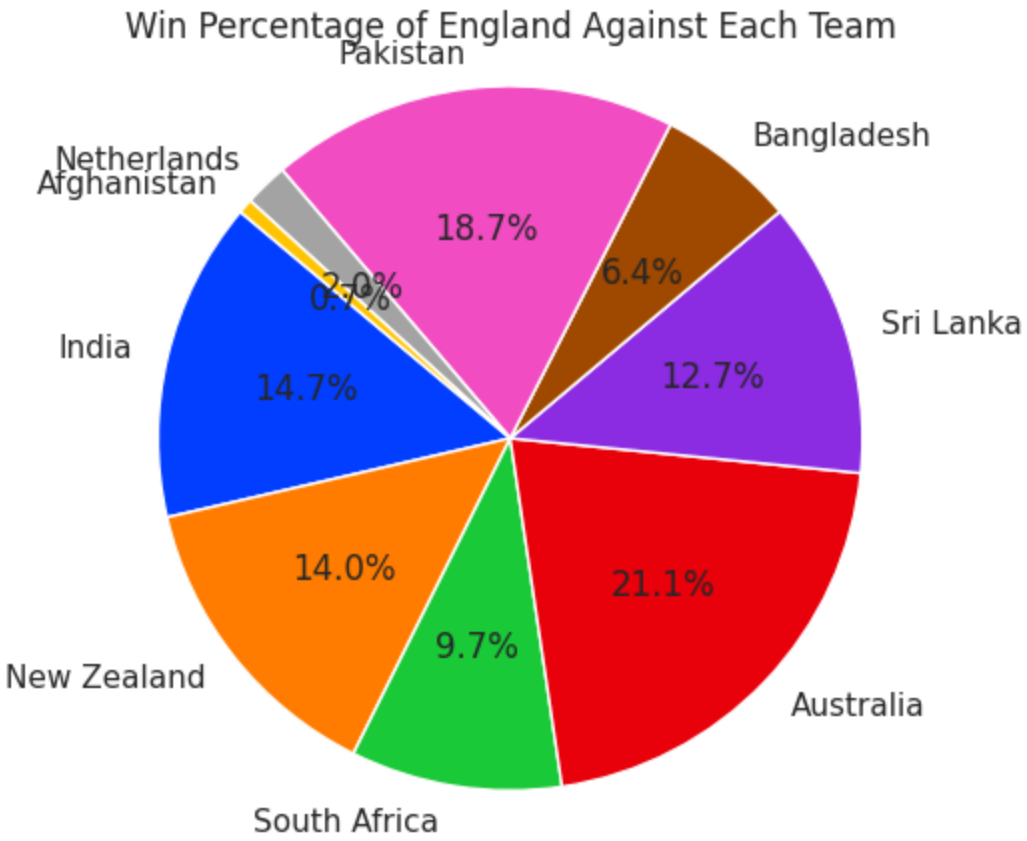
In [45]:
```
exclude = 'England'

# Filter out the opponent to exclude from the data
filtered_data = eng_wins[eng_wins['Team_2'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by England.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_2'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```



In [46]:
```
exclude = 'England'

# Filter out the opponent to exclude from the data
filtered_data = eng_wins[eng_wins['Team_1'] != exclude]

# Plotting a bar chart to show the top 5 opponents faced by England.
plt.figure(figsize=(8, 5))
plt.bar(list(filtered_data['Team_1'].value_counts()[0:5].keys()), list(filtered_data['Te
plt.show()
```

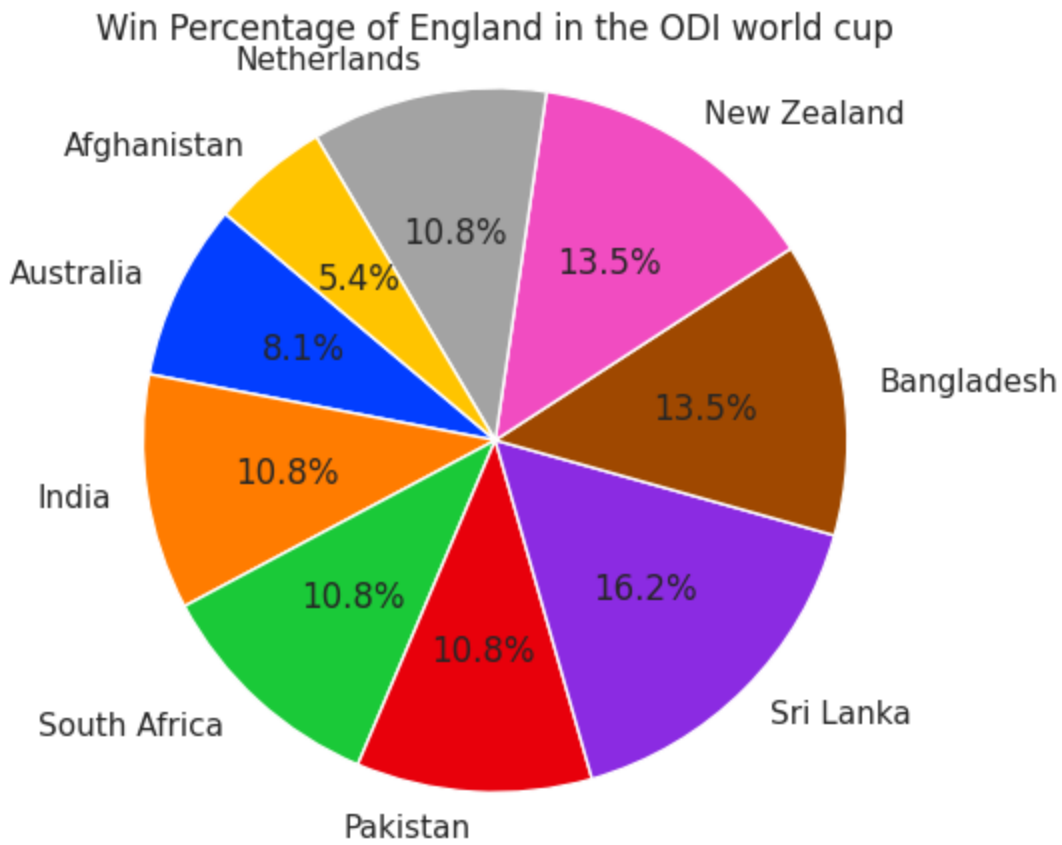


In [47]:
```
# Number of wins against each team

# Out of the 775 ODI matches played by England, number of matches won against the follow
team_win_counts = {
    'India': 44,
    'New Zealand': 42,
    'South Africa ': 29,
    'Australia': 63,
    'Sri Lanka': 38,
    'Bangladesh': 19,
    'Pakistan': 56,
    'Netherlands': 6,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches = sum(team_win_counts.values())

# England's win percentages against each team is calculated
win_percentages = {team: (wins / total_matches) * 100 for team, wins in team_win_counts.

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages.values(), labels=win_percentages.keys(), autopct='%1.1f%%', star

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of England Against Each Team')

# Display the pie chart
plt.show()
```



In [48]:
```
# Number of wins against each team in the ODI world cup

# Out of the 83 ODI matches played by England in the ODI world cup, number of matches wo
```

```
team_win_counts_wc_eng = {
    'Australia': 3,
    'India': 4,
    'South Africa ': 4,
    'Pakistan': 4,
    'Sri Lanka': 6,
    'Bangladesh': 5,
    'New Zealand': 5,
    'Netherlands': 4,
    'Afghanistan': 2
}

# Total matches played is calculated
total_matches_wc_eng = sum(team_win_counts_wc_eng.values())

# England's win percentages against each team is calculated
win_percentages_wc_eng = {team: (wins / total_matches_wc_eng) * 100 for team, wins in te

# Pie chart
plt.figure(figsize=(5, 5))
plt.pie(win_percentages_wc_eng.values(), labels=win_percentages_wc_eng.keys(), autopct='

# Equal aspect ratio ensures that pie is drawn as a circle.
plt.axis('equal')

# Title for the pie chart
plt.title('Win Percentage of England in the ODI world cup')

# Display the pie chart
plt.show()
```



Exploratory Data Analysis

In [49]:
```
# Nations participating in the world cup
worldcup_teams = ['England', ' South Africa', 'West Indies', 'Pakistan', 'New Zealand',
```

```
# Filtering matches involving only teams in the 'worldcup_teams' list
df_teams_1 = odi_results[odi_results['Team_1'].isin(worldcup_teams)]  # Extracts matches
df_teams_2 = odi_results[odi_results['Team_2'].isin(worldcup_teams)]  # Extracts matches

df_teams = pd.concat((df_teams_1, df_teams_2))  # Concatenates the two dataframes vertic

df_teams.drop_duplicates()  # Removes duplicate rows if any

df_teams.count()  # Counts the number of rows in the final dataframe
```

Out[49]:
```
Date       748
Team_1     748
Team_2     748
Winner     748
Margin     748
Ground     748
dtype: int64
```

In [50]:
```
df_teams.head()
```

Out[50]:

	Date	Team_1	Team_2	Winner	Margin	Ground
8	12/06/2015	England	New Zealand	New Zealand	won by 13 runs	Kennington Oval
11	18/06/2015	Bangladesh	India	Bangladesh	won by 79 runs	Shere Bangla National Stadium
35	08/09/2015	England	Australia	England	won by 93 runs	Old Trafford
53	07/11/2015	Sri Lanka	West Indies	Sri Lanka	Sri Lanka won by 19 runs	Pallekele International Cricket Stadium
56	11/11/2015	Bangladesh	Zimbabwe	Bangladesh	Bangladesh won by 61 runs	Shere Bangla National Stadium

In [51]:
```
# Removing unnecessary columns from df_teams
df_teams_2019 = df_teams.drop(['Date','Margin', 'Ground'], axis=1)
df_teams_2019.head()
```

Out[51]:

	Team_1	Team_2	Winner
8	England	New Zealand	New Zealand
11	Bangladesh	India	Bangladesh
35	England	Australia	England
53	Sri Lanka	West Indies	Sri Lanka
56	Bangladesh	Zimbabwe	Bangladesh

Feature Selection

In [52]:
```
# Reset the index of df_teams_2019
df_teams_2019 = df_teams_2019.reset_index(drop=True)

# Set a value of 1 in the 'winning_team' column for rows where the 'Winner' column is th
df_teams_2019.loc[df_teams_2019.Winner == df_teams_2019.Team_1,'winning_team']=1

# Set a value of 2 in the 'winning_team' column for rows where the 'Winner' column is th
df_teams_2019.loc[df_teams_2019.Winner == df_teams_2019.Team_2, 'winning_team']=2

# Drop the 'winning_team' column from the DataFrame.
```

```
df_teams_2019 = df_teams_2019.drop(['winning_team'], axis=1)

df_teams_2019.head()
```

Out[52]:

	Team_1	Team_2	Winner
0	England	New Zealand	New Zealand
1	Bangladesh	India	Bangladesh
2	England	Australia	England
3	Sri Lanka	West Indies	Sri Lanka
4	Bangladesh	Zimbabwe	Bangladesh

Training and Testing the data

In [53]:
```
from sklearn.model_selection import train_test_split
```

In [54]:
```
# Creating dummy variables for team names
final = pd.get_dummies(df_teams_2019, prefix=['Team_1', 'Team_2'], columns=['Team_1', 'T

X = final.drop(['Winner'], axis=1)  # Extracting features by dropping the 'Winner' colum
y = final["Winner"]  # Assigning the 'Winner' column as the target variable

# Split the data into training and testing sets using a test size of 30% and a random st
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42
```

In [55]:
```
final.head()
```

Out[55]:

	Winner	Team_1_Afghanistan	Team_1_Afghanistan	Team_1_Australia	Team_1_Australia	Team_1_Bangladesh
0	New Zealand	0	0	0	0	0
1	Bangladesh	0	0	0	0	1
2	England	0	0	0	0	0
3	Sri Lanka	0	0	0	0	0
4	Bangladesh	0	0	0	0	1

5 rows × 51 columns

Random Forest Classifier Algorithm

In [56]:
```
from sklearn.ensemble import RandomForestClassifier

rf = RandomForestClassifier(n_estimators=100, max_depth=15, random_state=2)


rf.fit(X_train, y_train)


pred = rf.predict(X_test)
```

```
train_score = rf.score(X_train, y_train)
test_score = rf.score(X_test, y_test)

print("Training set accuracy: ", '%.3f'%(train_score))
print("Test set accuracy: ", '%.3f'%(test_score))
```

```
Training set accuracy:  0.740
Test set accuracy:  0.671
```

In [57]:
```
ranking = pd.read_csv('/content/drive/MyDrive/data/icc_team_ranking.csv')
fixtures = pd.read_csv('/content/drive/MyDrive/data/wc2023_fixtures.csv')

pred_set = []  # Initialize an empty list to store prediction results
```

In [58]:
```
# Insert team rankings into the fixtures dataframe based on 'Team_1' and 'Team_2' column
fixtures.insert(1, 'first_position', fixtures['Team_1'].map(ranking.set_index('Team_name
fixtures.insert(2, 'second_position', fixtures['Team_2'].map(ranking.set_index('Team_nam

# Select the first 45 rows of the updated fixtures dataframe for league stage matches.
fixtures = fixtures.iloc[:45, :]
fixtures.head()
```

Out[58]:

	Round_number	first_position	second_position	Team_1	Team_2	Date	Location	Group	Resul
0	1	5.0	NaN	England	New Zealand	5/10/2023	Narendra Modi Stadium, Ahmedabad	Group A	Nal
1	1	NaN	10.0	Pakistan	Netherlands	6/10/2023	Rajiv Gandhi International Stadium, Hyderabad	Group A	Nal
2	1	7.0	8.0	Bangladesh	Afghanistan	7/10/2023	Himachal Pradesh Cricket Association Stadium, ...	Group A	Nal
3	1	6.0	9.0	South Africa	Sri Lanka	7/10/2023	Arun Jaitley Stadium, Delhi	Group A	Nal
4	1	3.0	1.0	India	Australia	8/10/2023	MA Chidambaram Stadium, Chennai	Group A	Nal

In [59]:
```
# Filling in the missing values in 'first_position' and 'second_position' columns with t
fixtures['first_position']=fixtures['first_position'].fillna(fixtures['first_position'].
fixtures['second_position']=fixtures['second_position'].fillna(fixtures['second_position

fixtures.head()
```

Out[59]:

	Round_number	first_position	second_position	Team_1	Team_2	Date	Location	Group	Resul
0	1	5.000000	7.119048	England	New Zealand	5/10/2023	Narendra Modi Stadium, Ahmedabad	Group A	Nal
1	1	4.411765	10.000000	Pakistan	Netherlands	6/10/2023	Rajiv Gandhi International	Group A	Nal

							Stadium, Hyderabad		
2	1	7.000000	8.000000	Bangladesh	Afghanistan	7/10/2023	Himachal Pradesh Cricket Association Stadium, ...	Group A	Nal
3	1	6.000000	9.000000	South Africa	Sri Lanka	7/10/2023	Arun Jaitley Stadium, Delhi	Group A	Nal
4	1	3.000000	1.000000	India	Australia	8/10/2023	MA Chidambaram Stadium, Chennai	Group A	Nal

In [60]:
```
# Predicting winning teams based on positions in fixtures.
for index, row in fixtures.iterrows():
    if row['first_position'] < row['second_position']:
        pred_set.append({'Team_1': row['Team_1'], 'Team_2': row['Team_2'], 'winning_team
    else:
        pred_set.append({'Team_1': row['Team_2'], 'Team_2': row['Team_1'], 'winning_team

pred_set = pd.DataFrame(pred_set)
backup_pred_set = pred_set

pred_set.head()
```

Out[60]:

	Team_1	Team_2	winning_team
0	England	New Zealand	None
1	Pakistan	Netherlands	None
2	Bangladesh	Afghanistan	None
3	South Africa	Sri Lanka	None
4	Australia	India	None

In [61]:
```
# Transforming the dataset using one-hot encoding for 'Team_1' and 'Team_2' columns.
pred_set = pd.get_dummies(pred_set, prefix=['Team_1', 'Team_2'], columns=['Team_1', 'Tea

# Finding missing columns in the final dataset compared to the transformed 'pred_set'.
missing_cols = set(final.columns) - set(pred_set.columns)

# Setting the missing columns in "pred_set" DataFrame to 0 and then keeps only the colum
for c in missing_cols:
    pred_set[c] = 0
pred_set = pred_set[final.columns]

# Dropping the 'Winner' column from pred_set
pred_set = pred_set.drop(['Winner'], axis=1)
pred_set.head()
```

Out[61]:

	Team_1_Afghanistan	Team_1_Afghanistan	Team_1_Australia	Team_1_Australia	Team_1_Bangladesh	Team_1_Bang
0	0	0	0	0	0	
1	0	0	0	0	0	
2	0	0	0	0	1	

3	0	0	0	0	0
4	0	0	1	0	0

5 rows × 50 columns

Interpret the model results

In [62]:
```
# Making predictions using 'rf' on 'pred_set' and printing the winners for each fixture
predictions = rf.predict(pred_set)
for i in range(fixtures.shape[0]):
    print(backup_pred_set.iloc[i, 1] + " vs " + backup_pred_set.iloc[i, 0])
    if predictions[i] == 1:
        print("Winner: " + backup_pred_set.iloc[i, 1])

    else:
        print("Winner: " + backup_pred_set.iloc[i, 0])
    print("")
```

```
New Zealand vs England
Winner: England

Netherlands vs Pakistan
Winner: Pakistan

Afghanistan vs Bangladesh
Winner: Bangladesh

Sri Lanka vs South Africa
Winner: South Africa

India vs Australia
Winner: Australia

Netherlands vs New Zealand
Winner: New Zealand

Bangladesh vs England
Winner: England

Afghanistan vs India
Winner: India

Sri Lanka vs Pakistan
Winner: Pakistan

South Africa vs Australia
Winner: Australia

Bangladesh vs New Zealand
Winner: New Zealand

Afghanistan vs England
Winner: England

India vs Pakistan
Winner: Pakistan

Sri Lanka vs Australia
Winner: Australia

Netherlands vs South Africa
Winner: South Africa
```

Afghanistan vs New Zealand
Winner: New Zealand

Bangladesh vs India
Winner: India

Pakistan vs Australia
Winner: Australia

Netherlands vs Sri Lanka
Winner: Sri Lanka

South Africa vs England
Winner: England

New Zealand vs India
Winner: India

Afghanistan vs Pakistan
Winner: Pakistan

Bangladesh vs South Africa
Winner: South Africa

Netherlands vs Australia
Winner: Australia

Sri Lanka vs England
Winner: England

South Africa vs Pakistan
Winner: Pakistan

New Zealand vs Australia
Winner: Australia

Netherlands vs Bangladesh
Winner: Bangladesh

England vs India
Winner: India

Sri Lanka vs Afghanistan
Winner: Afghanistan

Bangladesh vs Pakistan
Winner: Pakistan

South Africa vs New Zealand
Winner: New Zealand

Sri Lanka vs India
Winner: India

Netherlands vs Afghanistan
Winner: Afghanistan

New Zealand vs Pakistan
Winner: Pakistan

England vs Australia
Winner: Australia

South Africa vs India
Winner: India

```
Sri Lanka vs Bangladesh
Winner: Bangladesh

Afghanistan vs Australia
Winner: Australia

Netherlands vs England
Winner: England

Sri Lanka vs New Zealand
Winner: New Zealand

Afghanistan vs South Africa
Winner: South Africa

Netherlands vs India
Winner: India

Bangladesh vs Australia
Winner: Australia

England vs Pakistan
Winner: Pakistan
```

In [63]:
```python
# The teams qualified for semi-finals based on wins.
semis = [('Pakistan', 'Australia'), ('England', 'India')]
```

In [64]:
```python
def clean_and_predict(matches, ranking, final, rf):
    # Initialize an empty list to store the positions of teams in the ranking
    positions = []

    # Loop through the list of matches and add the rankings of the teams to the position
    for match in matches:
        positions.append(ranking.loc[ranking['Team_name'] == match[0], 'Team_ranking'].i
        positions.append(ranking.loc[ranking['Team_name'] == match[0], 'Team_ranking'].i

    pred_set = []

    i = 0
    j = 0

    # Loop through the positions list to create match predictions
    while i < len(positions):
        dict1 = {}
        # Compare the positions of the two teams in the match and add the corresponding
        if positions[i] < positions[i + 1]:
            dict1.update({'Team_1': matches[j][0], 'Team_2': matches[j][1]})
        else:
            dict1.update({'Team_1': matches[j][1], 'Team_2': matches[j][0]})

        # Add the prediction dictionary to the pred_set list
        pred_set.append(dict1)
        i += 2
        j += 1

    # Convert the pred_set list into a pandas DataFrame
    pred_set = pd.DataFrame(pred_set)

    backup_pred_set = pred_set

    # Convert categorical variables in the pred_set DataFrame into dummy variables
    pred_set = pd.get_dummies(pred_set, prefix=['Team_1', 'Team_2'], columns=['Team_1',
```

```
    # Identify missing columns in pred_set compared to the final DataFrame
    missing_cols2 = set(final.columns) - set(pred_set.columns)

    # Add the missing columns to the pred_set DataFrame and set their values to 0
    for c in missing_cols2:
        pred_set[c] = 0

    # Reorder pred_set columns to match the final DataFrame's order
    pred_set = pred_set[final.columns]

    # Drop the 'Winner' column from the pred_set DataFrame
    pred_set = pred_set.drop(['Winner'], axis=1)

    # Use the provided classifier (cls) to make predictions on the pred_set DataFrame
    predictions = rf.predict(pred_set)

    # Loop through the pred_set DataFrame and print the match predictions and winners
    for i in range(len(pred_set)):
        print(backup_pred_set.iloc[i, 1] + " vs " + backup_pred_set.iloc[i, 0])
        if predictions[i] == 1:
            print("Winner: " + backup_pred_set.iloc[i, 1])
        else:
            print("Winner: " + backup_pred_set.iloc[i, 0])
        print("")
```

In [65]:
```
clean_and_predict(semis, ranking, final, rf)
```

```
Pakistan vs Australia
Winner: Australia

England vs India
Winner: India
```

In [66]:
```
finals = [('Australia', 'India')]
```

In [67]:
```
clean_and_predict(finals, ranking, final, rf)
```

```
Australia vs India
Winner: India
```