Project 1 : FIFA 21 Players Data Analysis and Visualization

Project Description

Welcome to this data analysis and visualization project! In this project, we will be exploring the 'FIFA 21 Players' dataset which comprises a rich variety of information about soccer players from around the world. The data extracted are in 'csv' file format.

Your task is to clean and prepare the data for analysis, and then leverage your data visualization skills to uncovers insights about FIFA 21 players, teams, and overall value and wage dynamics.

Here are your tasks outlined in detail:

1. **Data Cleaning**: The initial dataset contains some unnecessary and redundant information. Your first task is to clean and prepare it for analysis. In doing so:

   - Remove the 'Unnamed: 0' column from the dataset.
   - Removing the Newline Characters.
   - Look for columns which contain star ('★') characters. Remove these characters from all such columns.
   - Fill in the missing values using an appropriate method.
   - In the 'Value', 'Wage', and 'Release Clause' columns, remove the '€', 'K', and 'M' characters and convert the currency value to 'int'. For eg, "M" in value column is Million, so multiply the row values by 1,000,000, etc.

2. **Data Visualization**: After the data has been cleaned and prepared, use appropriate data visualization methods to represent the data as follows:

   - Create a Pie Chart to display the preferred foot ('Left' or 'Right') among the FIFA 21 players.
   - Use a Bar Plot to represent the top 3 FIFA 21 players.
   - Visualize the best FIFA teams from 100 players based on the 'OVA' score using a Bar Plot.
   - Use a Bar Plot to display the top 10 most valuable FIFA teams.
   - Create a Scatter Plot to show players who are highly valuable but still underpaid.

Ensure all plots are fully labeled with titles, x and y variables, and a legend if necessary.

Remember, the goal of this project is not just about getting the right answer but also about presenting your findings in a clear, logical, and visually appealing manner. Good luck and enjoy the analysis!

Read File

```python
In [39]:  import pandas as pd

          fifa_df = pd.read_csv('fifa21_raw_data.csv', low_memory=False)
          fifa_df.head()
```

	Unnamed: 0	ID	Name	LongName	Nationality	Age	↓OVA	POT	Club	Contract	...	A/W	D/W	II
0	0	158023	L. Messi	Lionel Messi	Argentina	33	93	93	\n\n\n\nFC Barcelona	2004 ~ 2021	...	Medium	Low	★
1	1	20801	Cristiano Ronaldo	C. Ronaldo dos Santos Aveiro	Portugal	35	92	92	\n\n\n\nJuventus	2018 ~ 2022	...	High	Low	★
2	2	200389	J. Oblak	Jan Oblak	Slovenia	27	91	93	\n\n\n\nAtlético Madrid	2014 ~ 2023	...	Medium	Medium	★
3	3	192985	K. De Bruyne	Kevin De Bruyne	Belgium	29	91	91	\n\n\n\nManchester City	2015 ~ 2023	...	High	High	★
4	4	190871	Neymar Jr	Neymar da Silva Santos Jr.	Brazil	28	91	91	\n\n\n\nParis Saint-Germain	2017 ~ 2022	...	High	Medium	★

5 rows × 35 columns

Data Cleaning

Task 1: Removing Unuseful Columns

```
In [40]: fifa_df = fifa_df.drop(columns='Unnamed: 0')
fifa_df.head()
```

	ID	Name	LongName	Nationality	Age	↓OVA	POT	Club	Contract	Positions	...	A/W	D/W	IR
0	158023	L. Messi	Lionel Messi	Argentina	33	93	93	\n\n\n\nFC Barcelona	2004 ~ 2021	RW, ST, CF	...	Medium	Low	5 ★
1	20801	Cristiano Ronaldo	C. Ronaldo dos Santos Aveiro	Portugal	35	92	92	\n\n\n\nJuventus	2018 ~ 2022	ST, LW	...	High	Low	5 ★
2	200389	J. Oblak	Jan Oblak	Slovenia	27	91	93	\n\n\n\nAtlético Madrid	2014 ~ 2023	GK	...	Medium	Medium	3 ★
3	192985	K. De Bruyne	Kevin De Bruyne	Belgium	29	91	91	\n\n\n\nManchester City	2015 ~ 2023	CAM, CM	...	High	High	4 ★
4	190871	Neymar Jr	Neymar da Silva Santos Jr.	Brazil	28	91	91	\n\n\n\nParis Saint-Germain	2017 ~ 2022	LW, CAM	...	High	Medium	5 ★

5 rows × 34 columns

Task 2: Removing Newline Character

```
In [41]: fifa_df.replace(to_replace=r'(\n)+', value='', regex=True, inplace=True)
fifa_df.T
```

	0	1	2	3	4	5	6	7	8	9	...	1896
ID	158023	20801	200389	192985	190871	188545	209331	212831	231747	192448	...	25793
Name	L. Messi	Cristiano Ronaldo	J. Oblak	K. De Bruyne	Neymar Jr	R. Lewandowski	M. Salah	Alisson	K. Mbappé	M. ter Stegen	...	Son Yu
LongName	Lionel Messi	C. Ronaldo dos Santos Aveiro	Jan Oblak	Kevin De Bruyne	Neymar da Silva Santos Jr.	Robert Lewandowski	Mohamed Salah	Alisson Ramses Becker	Kylian Mbappé	Marc-André ter Stegen	...	Yu Son
Nationality	Argentina	Portugal	Slovenia	Belgium	Brazil	Poland	Egypt	Brazil	France	Germany	...	Chin P
Age	33	35	27	29	28	31	28	27	21	28	...	2
↓OVA	93	92	91	91	91	91	90	90	90	90	...	4
POT	93	92	93	91	91	91	90	91	95	93	...	4
Club	FC Barcelona	Juventus	Atlético Madrid	Manchester City	Paris Saint-Germain	FC Bayern München	Liverpool	Liverpool	Paris Saint-Germain	FC Barcelona	...	Tianji TED F
Contract	2004 ~ 2021	2018 ~ 2022	2014 ~ 2023	2015 ~ 2023	2017 ~ 2022	2014 ~ 2023	2017 ~ 2023	2018 ~ 2024	2018 ~ 2022	2014 ~ 2022	...	2020 202
Positions	RW, ST, CF	ST, LW	GK	CAM, CM	LW, CAM	ST	RW	GK	ST, LW, RW	GK	...	CN
Height	170cm	187cm	188cm	181cm	175cm	184cm	175cm	191cm	178cm	187cm	...	185cr
Weight	72kg	83kg	87kg	70kg	68kg	80kg	71kg	91kg	73kg	85kg	...	79k
Preferred Foot	Left	Right	Right	Right	Right	Right	Left	Right	Right	Right	...	Righ
BOV	93	92	91	91	91	91	90	90	91	90	...	4
Best Position	RW	ST	GK	CAM	LW	ST	RW	GK	ST	GK	...	RN
Joined	Jul 1, 2004	Jul 10, 2018	Jul 16, 2014	Aug 30, 2015	Aug 3, 2017	Jul 1, 2014	Jul 1, 2017	Jul 19, 2018	Jul 1, 2018	Jul 1, 2014	...	Aug 202
Loan Date End	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	Nal
Value	€103.5M	€63M	€120M	€129M	€132M	€111M	€120.5M	€102M	€185.5M	€110M	...	€45
Wage	€560K	€220K	€125K	€370K	€270K	€240K	€250K	€160K	€160K	€260K	...	€2
Release Clause	€138.4M	€75.9M	€159.4M	€161M	€166.5M	€132M	€144.3M	€120.3M	€203.1M	€147.7M	...	€47
Total Stats	2231	2221	1413	2304	2175	2195	2211	1389	2147	1442	...	135
Base Stats	466	464	489	485	451	457	470	490	466	484	...	29
W/F	4 ★	4 ★	3 ★	5 ★	5 ★	4 ★	3 ★	3 ★	4 ★	4 ★	...	2 ★
SM	4★	5★	1★	4★	5★	4★	4★	1★	5★	1★	...	2★
A/W	Medium	High	Medium	High	High	High	High	Medium	High	Medium	...	Lov
D/W	Low	Low	Medium	High	Medium	Medium	Medium	Medium	Low	Medium	...	Lov
IR	5 ★	5 ★	3 ★	4 ★	5 ★	4 ★	3 ★	3 ★	3 ★	3 ★	...	1 ★
PAC	85	89	87	76	91	78	93	86	96	88	...	6
SHO	92	93	92	86	85	91	86	88	86	85	...	3
PAS	91	81	78	93	86	78	81	85	78	88	...	4
DRI	95	89	90	88	94	85	90	89	91	90	...	4
DEF	38	35	52	64	36	43	45	51	39	45	...	4
PHY	65	77	90	78	59	82	75	91	76	88	...	5
Hits	771	562	150	207	595	248	246	120	1.6K	130	...	Nal

34 rows × 18979 columns

Task 3: Removing Star Characters

```python
for col in ['IR', 'W/F', 'SM']:
    fifa_df[col] = fifa_df[col].str.replace('★', '')

fifa_df.T
```

In [42]:

	0	1	2	3	4	5	6	7	8	9	...	1896
ID	158023	20801	200389	192985	190871	188545	209331	212831	231747	192448	...	25793
Name	L. Messi	Cristiano Ronaldo	J. Oblak	K. De Bruyne	Neymar Jr	R. Lewandowski	M. Salah	Alisson	K. Mbappé	M. ter Stegen	...	Son Yu
LongName	Lionel Messi	C. Ronaldo dos Santos Aveiro	Jan Oblak	Kevin De Bruyne	Neymar da Silva Santos Jr.	Robert Lewandowski	Mohamed Salah	Alisson Ramses Becker	Kylian Mbappé	Marc-André ter Stegen	...	Yu Son
Nationality	Argentina	Portugal	Slovenia	Belgium	Brazil	Poland	Egypt	Brazil	France	Germany	...	Chin P
Age	33	35	27	29	28	31	28	27	21	28	...	2
↓OVA	93	92	91	91	91	91	90	90	90	90	...	4
POT	93	92	93	91	91	91	90	91	95	93	...	4
Club	FC Barcelona	Juventus	Atlético Madrid	Manchester City	Paris Saint-Germain	FC Bayern München	Liverpool	Liverpool	Paris Saint-Germain	FC Barcelona	...	Tianji TED F
Contract	2004 ~ 2021	2018 ~ 2022	2014 ~ 2023	2015 ~ 2023	2017 ~ 2022	2014 ~ 2023	2017 ~ 2023	2018 ~ 2024	2018 ~ 2022	2014 ~ 2022	...	2020 202
Positions	RW, ST, CF	ST, LW	GK	CAM, CM	LW, CAM	ST	RW	GK	ST, LW, RW	GK	...	CM
Height	170cm	187cm	188cm	181cm	175cm	184cm	175cm	191cm	178cm	187cm	...	185cm
Weight	72kg	83kg	87kg	70kg	68kg	80kg	71kg	91kg	73kg	85kg	...	79k
Preferred Foot	Left	Right	Right	Right	Right	Right	Left	Right	Right	Right	...	Righ
BOV	93	92	91	91	91	91	90	90	91	90	...	4
Best Position	RW	ST	GK	CAM	LW	ST	RW	GK	ST	GK	...	RM
Joined	Jul 1, 2004	Jul 10, 2018	Jul 16, 2014	Aug 30, 2015	Aug 3, 2017	Jul 1, 2014	Jul 1, 2017	Jul 19, 2018	Jul 1, 2018	Jul 1, 2014	...	Aug 202
Loan Date End	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	Nal
Value	€103.5M	€63M	€120M	€129M	€132M	€111M	€120.5M	€102M	€185.5M	€110M	...	€45
Wage	€560K	€220K	€125K	€370K	€270K	€240K	€250K	€160K	€160K	€260K	...	€2
Release Clause	€138.4M	€75.9M	€159.4M	€161M	€166.5M	€132M	€144.3M	€120.3M	€203.1M	€147.7M	...	€47
Total Stats	2231	2221	1413	2304	2175	2195	2211	1389	2147	1442	...	135
Base Stats	466	464	489	485	451	457	470	490	466	484	...	29
W/F	4	4	3	5	5	4	3	3	4	4	...	
SM	4	5	1	4	5	4	4	1	5	1	...	
A/W	Medium	High	Medium	High	High	High	High	Medium	High	Medium	...	Lov
D/W	Low	Low	Medium	High	Medium	Medium	Medium	Medium	Low	Medium	...	Lov
IR	5	5	3	4	5	4	3	3	3	3	...	
PAC	85	89	87	76	91	78	93	86	96	88	...	6
SHO	92	93	92	86	85	91	86	88	86	85	...	3
PAS	91	81	78	93	86	78	81	85	78	88	...	4
DRI	95	89	90	88	94	85	90	89	91	90	...	4
DEF	38	35	52	64	36	43	45	51	39	45	...	4
PHY	65	77	90	78	59	82	75	91	76	88	...	5
Hits	771	562	150	207	595	248	246	120	1.6K	130	...	Nal

34 rows × 18979 columns

Task 4: Filling Missing Values

```python
fifa_df.fillna({'Loan Date End': 'Not on Loan', 'Hits': 'Unknown'}, inplace=True)
fifa_df.T
```

	0	1	2	3	4	5	6	7	8	9	...	189
ID	158023	20801	200389	192985	190871	188545	209331	212831	231747	192448	...	2579
Name	L. Messi	Cristiano Ronaldo	J. Oblak	K. De Bruyne	Neymar Jr	R. Lewandowski	M. Salah	Alisson	K. Mbappé	M. ter Stegen	...	So Y
LongName	Lionel Messi	C. Ronaldo dos Santos Aveiro	Jan Oblak	Kevin De Bruyne	Neymar da Silva Santos Jr.	Robert Lewandowski	Mohamed Salah	Alisson Ramses Becker	Kylian Mbappé	Marc-André ter Stegen	...	Y So
Nationality	Argentina	Portugal	Slovenia	Belgium	Brazil	Poland	Egypt	Brazil	France	Germany	...	China
Age	33	35	27	29	28	31	28	27	21	28	...	
↓OVA	93	92	91	91	91	91	90	90	90	90	...	
POT	93	92	93	91	91	91	90	91	95	93	...	
Club	FC Barcelona	Juventus	Atlético Madrid	Manchester City	Paris Saint-Germain	FC Bayern München	Liverpool	Liverpool	Paris Saint-Germain	FC Barcelona	...	Tiar TEDA
Contract	2004 ~ 2021	2018 ~ 2022	2014 ~ 2023	2015 ~ 2023	2017 ~ 2022	2014 ~ 2023	2017 ~ 2023	2018 ~ 2024	2018 ~ 2022	2014 ~ 2022	...	2020 20
Positions	RW, ST, CF	ST, LW	GK	CAM, CM	LW, CAM	ST	RW	GK	ST, LW, RW	GK	...	C
Height	170cm	187cm	188cm	181cm	175cm	184cm	175cm	191cm	178cm	187cm	...	185
Weight	72kg	83kg	87kg	70kg	68kg	80kg	71kg	91kg	73kg	85kg	...	79
Preferred Foot	Left	Right	Right	Right	Right	Right	Left	Right	Right	Right	...	Rig
BOV	93	92	91	91	91	91	90	90	91	90	...	
Best Position	RW	ST	GK	CAM	LW	ST	RW	GK	ST	GK	...	F
Joined	Jul 1, 2004	Jul 10, 2018	Jul 16, 2014	Aug 30, 2015	Aug 3, 2017	Jul 1, 2014	Jul 1, 2017	Jul 19, 2018	Jul 1, 2018	Jul 1, 2014	...	Aug 20
Loan Date End	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	...	Not Lc
Value	€103.5M	€63M	€120M	€129M	€132M	€111M	€120.5M	€102M	€185.5M	€110M	...	€4
Wage	€560K	€220K	€125K	€370K	€270K	€240K	€250K	€160K	€160K	€260K	...	€
Release Clause	€138.4M	€75.9M	€159.4M	€161M	€166.5M	€132M	€144.3M	€120.3M	€203.1M	€147.7M	...	€4
Total Stats	2231	2221	1413	2304	2175	2195	2211	1389	2147	1442	...	13
Base Stats	466	464	489	485	451	457	470	490	466	484	...	2
W/F	4	4	3	5	5	4	3	3	4	4	...	
SM	4	5	1	4	5	4	4	1	5	1	...	
A/W	Medium	High	Medium	High	High	High	High	Medium	High	Medium	...	L
D/W	Low	Low	Medium	High	Medium	Medium	Medium	Medium	Low	Medium	...	L
IR	5	5	3	4	5	4	3	3	3	3	...	
PAC	85	89	87	76	91	78	93	86	96	88	...	
SHO	92	93	92	86	85	91	86	88	86	85	...	
PAS	91	81	78	93	86	78	81	85	78	88	...	
DRI	95	89	90	88	94	85	90	89	91	90	...	
DEF	38	35	52	64	36	43	45	51	39	45	...	
PHY	65	77	90	78	59	82	75	91	76	88	...	
Hits	771	562	150	207	595	248	246	120	1.6K	130	...	Unkno

34 rows × 18979 columns

Task 5: Cleaning and Converting Financial Data

In [44]:
```python
def convert_value(value):
    value = value.replace('€', '').replace('.', '').replace('K', '000').replace('M', '000000')
    return int(value)

for column in ['Value', 'Wage', 'Release Clause']:
    fifa_df[column] = fifa_df[column].apply(convert_value)
```
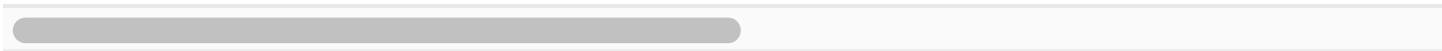
```
display(fifa_df.info())
display(fifa_df.T)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 18979 entries, 0 to 18978
Data columns (total 34 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   ID             18979 non-null  int64
 1   Name           18979 non-null  object
 2   LongName       18979 non-null  object
 3   Nationality    18979 non-null  object
 4   Age            18979 non-null  int64
 5   ↓OVA           18979 non-null  int64
 6   POT            18979 non-null  int64
 7   Club           18979 non-null  object
 8   Contract       18979 non-null  object
 9   Positions      18979 non-null  object
 10  Height         18979 non-null  object
 11  Weight         18979 non-null  object
 12  Preferred Foot 18979 non-null  object
 13  BOV            18979 non-null  int64
 14  Best Position  18979 non-null  object
 15  Joined         18979 non-null  object
 16  Loan Date End  18979 non-null  object
 17  Value          18979 non-null  int64
 18  Wage           18979 non-null  int64
 19  Release Clause 18979 non-null  int64
 20  Total Stats    18979 non-null  int64
 21  Base Stats     18979 non-null  int64
 22  W/F            18979 non-null  object
 23  SM             18979 non-null  object
 24  A/W            18979 non-null  object
 25  D/W            18979 non-null  object
 26  IR             18979 non-null  object
 27  PAC            18979 non-null  int64
 28  SHO            18979 non-null  int64
 29  PAS            18979 non-null  int64
 30  DRI            18979 non-null  int64
 31  DEF            18979 non-null  int64
 32  PHY            18979 non-null  int64
 33  Hits           18979 non-null  object
dtypes: int64(16), object(18)
memory usage: 4.9+ MB
None
```

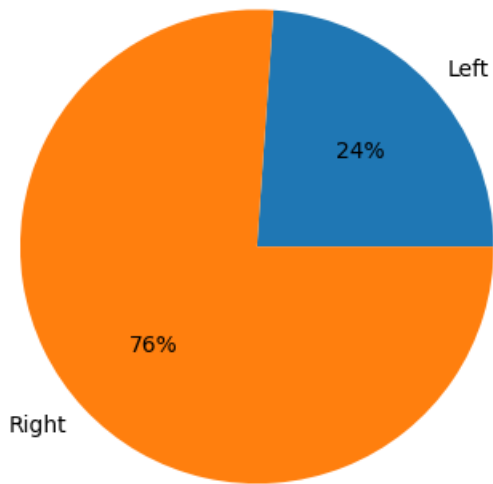|	0	1	2	3	4	5	6	7	8
ID	158023	20801	200389	192985	190871	188545	209331	212831	231747
Name	L. Messi	Cristiano Ronaldo	J. Oblak	K. De Bruyne	Neymar Jr	R. Lewandowski	M. Salah	Alisson	K. Mbappé
LongName	Lionel Messi	C. Ronaldo dos Santos Aveiro	Jan Oblak	Kevin De Bruyne	Neymar da Silva Santos Jr.	Robert Lewandowski	Mohamed Salah	Alisson Ramses Becker	Kylian Mbappé
Nationality	Argentina	Portugal	Slovenia	Belgium	Brazil	Poland	Egypt	Brazil	France
Age	33	35	27	29	28	31	28	27	21
↓OVA	93	92	91	91	91	91	90	90	90
POT	93	92	93	91	91	91	90	91	95
Club	FC Barcelona	Juventus	Atlético Madrid	Manchester City	Paris Saint-Germain	FC Bayern München	Liverpool	Liverpool	Paris Saint-Germain
Contract	2004 ~ 2021	2018 ~ 2022	2014 ~ 2023	2015 ~ 2023	2017 ~ 2022	2014 ~ 2023	2017 ~ 2023	2018 ~ 2024	2018 ~ 2022
Positions	RW, ST, CF	ST, LW	GK	CAM, CM	LW, CAM	ST	RW	GK	ST, LW, RW
Height	170cm	187cm	188cm	181cm	175cm	184cm	175cm	191cm	178cm
Weight	72kg	83kg	87kg	70kg	68kg	80kg	71kg	91kg	73kg
Preferred Foot	Left	Right	Right	Right	Right	Right	Left	Right	Right
BOV	93	92	91	91	91	91	90	90	91
Best Position	RW	ST	GK	CAM	LW	ST	RW	GK	ST
Joined	Jul 1, 2004	Jul 10, 2018	Jul 16, 2014	Aug 30, 2015	Aug 3, 2017	Jul 1, 2014	Jul 1, 2017	Jul 19, 2018	Jul 1, 2018
Loan Date End	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan	Not on Loan
Value	1035000000	63000000	120000000	129000000	132000000	111000000	1205000000	102000000	1855000000
Wage	560000	220000	125000	370000	270000	240000	250000	160000	160000
Release Clause	1384000000	759000000	1594000000	161000000	1665000000	132000000	1443000000	1203000000	2031000000
Total Stats	2231	2221	1413	2304	2175	2195	2211	1389	2147
Base Stats	466	464	489	485	451	457	470	490	466
W/F	4	4	3	5	5	4	3	3	4
SM	4	5	1	4	5	4	4	1	5
A/W	Medium	High	Medium	High	High	High	High	Medium	High
D/W	Low	Low	Medium	High	Medium	Medium	Medium	Medium	Low
IR	5	5	3	4	5	4	3	3	3
PAC	85	89	87	76	91	78	93	86	96
SHO	92	93	92	86	85	91	86	88	86
PAS	91	81	78	93	86	78	81	85	78
DRI	95	89	90	88	94	85	90	89	91
DEF	38	35	52	64	36	43	45	51	39
PHY	65	77	90	78	59	82	75	91	76
Hits	771	562	150	207	595	248	246	120	1.6K

34 rows × 18979 columns

Data Visualization

Task 6: Pie Chart Creation - Preferred Foot

In [45]:
```python
import matplotlib.pyplot as plt

fifa_df_pref_foot = fifa_df.groupby('Preferred Foot').agg({'Name':'count'}).reset_index()
plt.pie(fifa_df_pref_foot.Name, labels=fifa_df_pref_foot['Preferred Foot'], autopct='%.0f%%')
plt.title("Player's Preferred Foot")
plt.show()
```
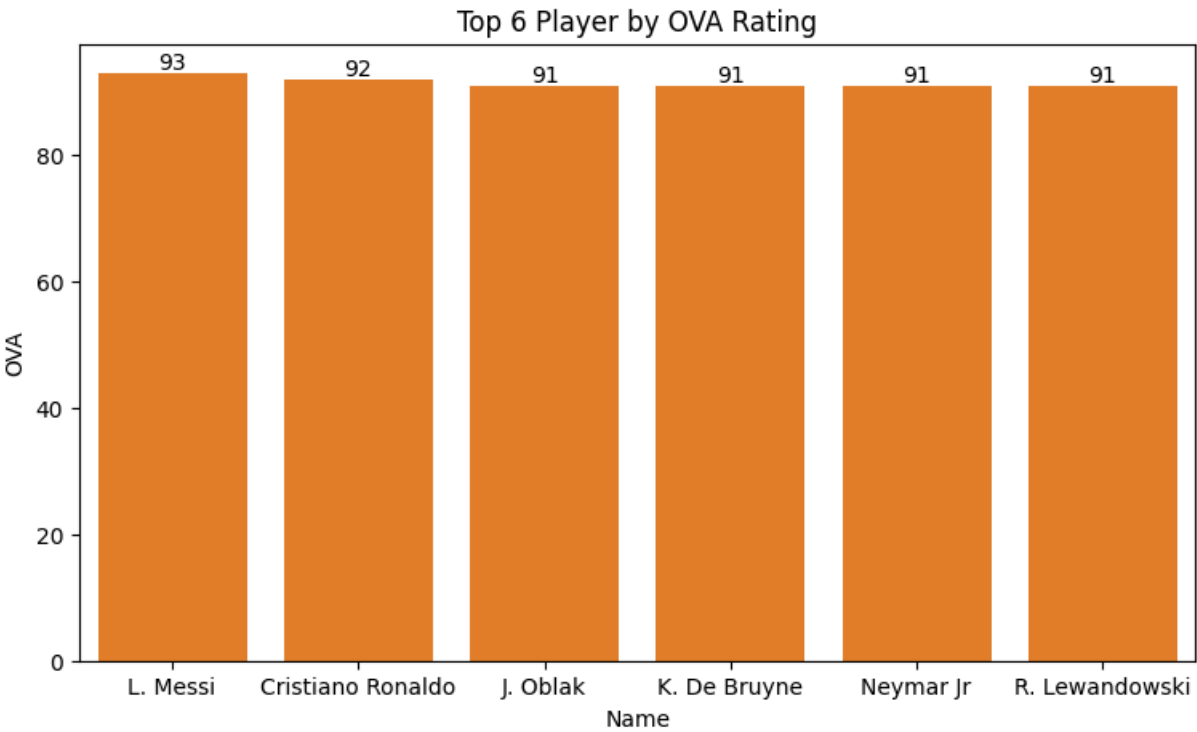
Player's Preferred Foot

Task 7: Barplot Creation - Top 6 Players

```
In [46]: fifa_df.rename(columns = {'↓OVA':'OVA'}, inplace=True)
         top_6_by_OVA = fifa_df.sort_values(by = 'OVA', ascending=False).head(6)[['Name', 'OVA']]
         top_6_by_OVA

         import seaborn as sns

         plt.figure(figsize=(9,5))
         sns.barplot(top_6_by_OVA, x='Name', y='OVA').bar_label(sns.barplot(top_6_by_OVA, x='Name', y='OVA').containers[0]
         plt.title('Top 6 Player by OVA Rating')
         plt.show()
```
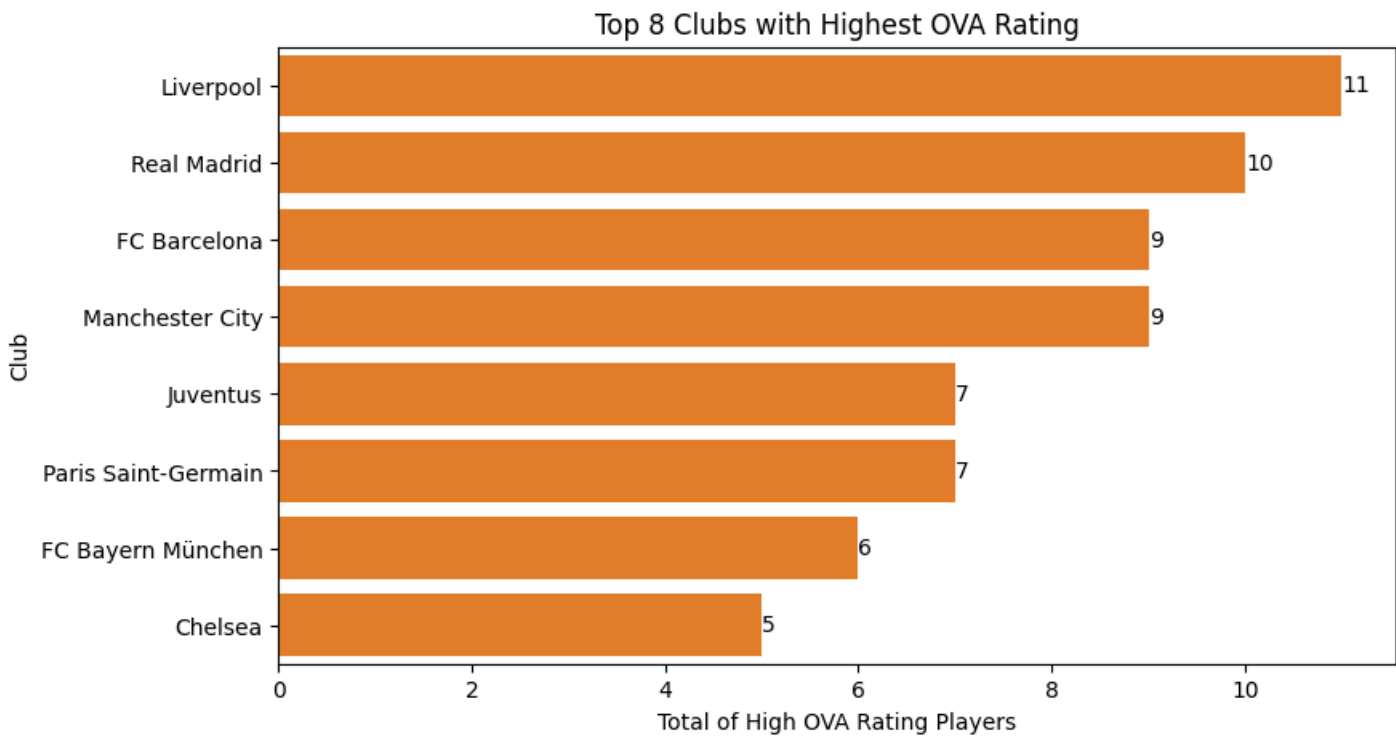

Task 8: Bar Plot Creation - Top 8 Clubs with Best Players

```
In [47]: top_100_by_OVA = fifa_df.sort_values(by = 'OVA', ascending=False).head(100)[['Name', 'OVA', 'Club']]
         top_8_club = top_100_by_OVA.groupby('Club').agg({'Name':'count'}).reset_index().sort_values(by = 'Name', ascendin
         top_8_club

         plt.figure(figsize=(9,5))
         sns.barplot(top_8_club, x='Name', y='Club').bar_label(sns.barplot(top_8_club, x='Name', y='Club').containers[0],
         plt.title('Top 8 Clubs with Highest OVA Rating')
         plt.xlabel('Total of High OVA Rating Players')
         plt.show()
```

Top 8 Clubs with Highest OVA Rating

```
In [48]: top_100_by_value = fifa_df.sort_values(by='Value', ascending=False)[['Name', 'Value', 'Club']].head(100)
         top_10_club = top_100_by_value.groupby('Club').agg({'Name':'count'}).reset_index().sort_values(by='Name', ascendi
         top_10_club
```
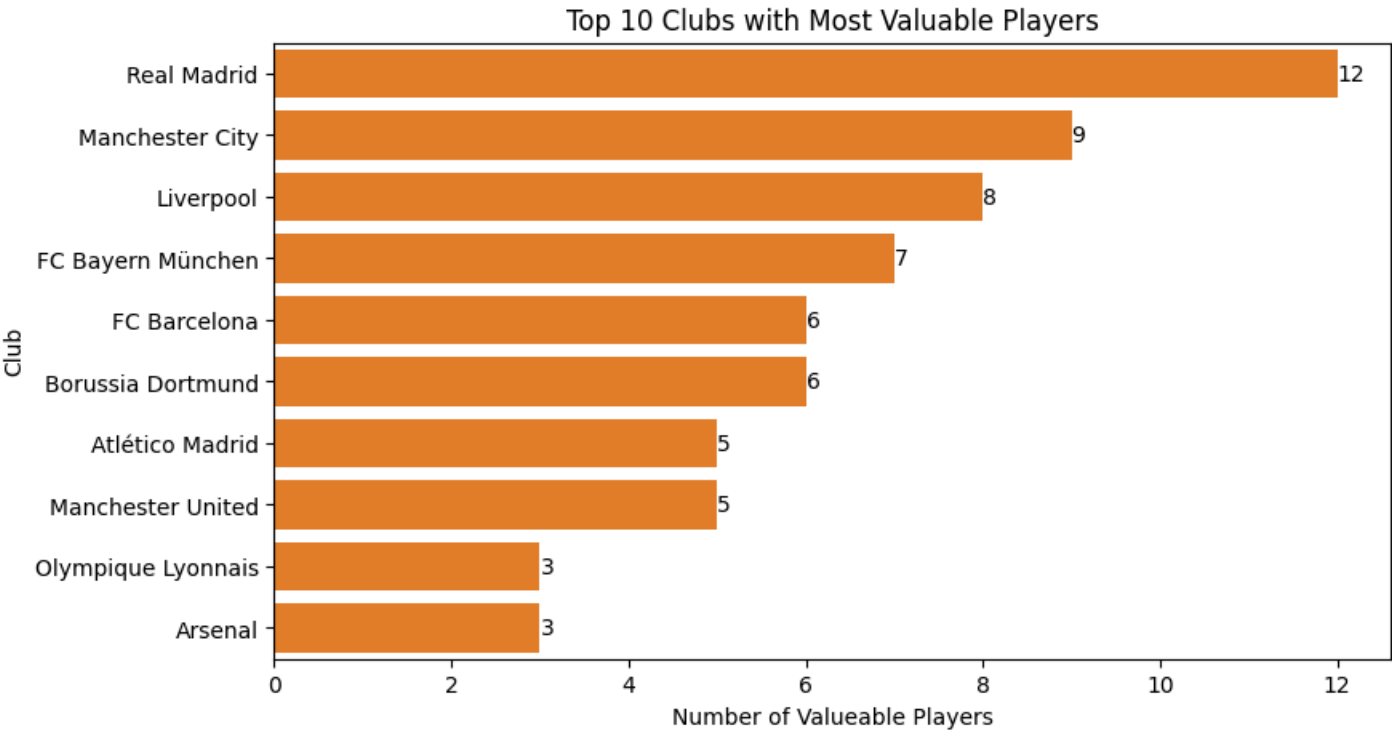
Out[48]:

	Club	Name
25	Real Madrid	12
18	Manchester City	9
17	Liverpool	8
12	FC Bayern München	7
11	FC Barcelona	6
5	Borussia Dortmund	6
4	Atlético Madrid	5
19	Manchester United	5
22	Olympique Lyonnais	3
1	Arsenal	3

Task 9: Bar Plot Creation - Top 10 Teams with Most Valuable Player

```
In [49]: top_100_by_value = fifa_df.sort_values(by='Value', ascending=False)[['Name', 'Value', 'Club']].head(100)
         top_10_club = top_100_by_value.groupby('Club').agg({'Name':'count'}).reset_index().sort_values(by='Name', ascendi
         top_10_club

         plt.figure(figsize=(9,5))
         sns.barplot(top_10_club, x='Name', y='Club').bar_label(sns.barplot(top_10_club, x='Name', y='Club').containers[0]
         plt.title('Top 10 Clubs with Most Valuable Players')
         plt.xlabel('Number of Valueable Players')
         plt.show()
```

Top 10 Clubs with Most Valuable Players

Task 10: Scatter Plot Creation - High Value, Underpaid Players

```
In [50]:  underpaid_players = fifa_df[((
              fifa_df['Value'] >= fifa_df['Value'].quantile(q=0.75)) & (
                  fifa_df['Wage'] <= fifa_df['Wage'].quantile(q=0.25)))]

          other_players = fifa_df[~((
              fifa_df['Value'] >= fifa_df['Value'].quantile(q=0.75)) & (
                  fifa_df['Wage'] <= fifa_df['Wage'].quantile(q=0.25)))]

          plt.figure(figsize=(8,8))
          sns.scatterplot(other_players, x='Wage', y='Value', color='red', label='Other Players')
          sns.scatterplot(underpaid_players, x='Wage', y='Value', color='blue', label='Underpaid Players')
          plt.legend()
          plt.show()
```