گزارش تمرین شماره ۱

واحد درسی داده کاوی

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جناب آقای دکتر فراهانی

جناب آقای دکتر خردپیشه

هدیه آشوری ۹۹۴۲۲۰۲۲

۱۴۰۰/۰۱/۱۶

- **بررسی داده ها**

در ابتدا پکیج های مورد نیاز را Import

می کنیم :

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from scipy import stats
import urllib
import os
import datetime
```

سپس data مورد نظر را با دستور ذیل فراخوانی

می کنیم

و

با دستور df.shape ابعاد DataFrame را به

دست می آوریم (۱۸ ستون و ۴۸۸۹۵ ردیف)

```
# csv file read/load
df = pd.read_csv('D:\\results.csv')
df.shape
```

```
(42082, 9)
```

با دستور df.info() خلاصه مختصری از داده ها را به شرح ذیل دریافت می کنیم .

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 42082 entries, 0 to 42081
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   date        42082 non-null  object
 1   home_team   42082 non-null  object
 2   away_team   42082 non-null  object
 3   home_score  42082 non-null  int64
 4   away_score  42082 non-null  int64
 5   tournament  42082 non-null  object
 6   city        42082 non-null  object
 7   country     42082 non-null  object
 8   neutral     42082 non-null  bool
dtypes: bool(1), int64(2), object(6)
memory usage: 2.6+ MB
```

با دستور print(' the field name of data:',df.columns) نام ستون ها را دریافت کردم

```
print(' the field name of data:',df.columns)
```

```
the field name of data: Index(['date', 'home_team', 'away_team', 'home_score', 'away_score',
       'tournament', 'city', 'country', 'neutral'],
      dtype='object')
```

با دستور df جدولی از داده دریافت کردم

```
# data output
df
```

	date	home_team	away_team	home_score	away_score	tournament	city	country	neutral
0	1872-11-30	Scotland	England	0	0	Friendly	Glasgow	Scotland	False
1	1873-03-08	England	Scotland	4	2	Friendly	London	England	False
2	1874-03-07	Scotland	England	2	1	Friendly	Glasgow	Scotland	False
3	1875-03-06	England	Scotland	2	2	Friendly	London	England	False
4	1876-03-04	Scotland	England	3	0	Friendly	Glasgow	Scotland	False
...	...	...	...	...	...	...	...	...	...
42077	2021-03-31	Andorra	Hungary	1	4	FIFA World Cup qualification	Andorra la Vella	Andorra	False
42078	2021-03-31	San Marino	Albania	0	2	FIFA World Cup qualification	Serravalle	San Marino	False
42079	2021-03-31	Armenia	Romania	3	2	FIFA World Cup qualification	Yerevan	Armenia	False
42080	2021-03-31	Germany	North Macedonia	1	2	FIFA World Cup qualification	Duisburg	Germany	False
42081	2021-03-31	Liechtenstein	Iceland	1	4	FIFA World Cup qualification	Vaduz	Liechtenstein	False

42082 rows × 9 columns

با دستور df.dtypes ، نوع دیتا ها را بررسی کردم

```
df.dtypes
```

```
date          object
home_team     object
away_team     object
home_score     int64
away_score     int64
tournament    object
city          object
country       object
neutral         bool
dtype: object
```

با دستور df.head()، پنج خط اول داده ها را دریافت کردم

```
df.head()
```

	date	home_team	away_team	home_score	away_score	tournament	city	country	neutral
0	1872-11-30	Scotland	England	0	0	Friendly	Glasgow	Scotland	False
1	1873-03-08	England	Scotland	4	2	Friendly	London	England	False
2	1874-03-07	Scotland	England	2	1	Friendly	Glasgow	Scotland	False
3	1875-03-06	England	Scotland	2	2	Friendly	London	England	False
4	1876-03-04	Scotland	England	3	0	Friendly	Glasgow	Scotland	False

```
df.describe()
```

	home_score	away_score
count	42082.000000	42082.000000
mean	1.743691	1.186541
std	1.752459	1.403957
min	0.000000	0.000000
25%	1.000000	0.000000
50%	1.000000	1.000000
75%	2.000000	2.000000
max	31.000000	21.000000

با دستور df.describe () خلاصه ای از اطلاعات عددی data را به دست آوردم

با دستور df.isnull().sum() داده های null را بررسی کردم

```
df.isnull().sum()
```

```
date          0
home_team     0
away_team     0
home_score    0
away_score    0
tournament    0
city          0
country       0
neutral       0
dtype: int64
```

برای محاسبه ماه و سال بازی هر تیم از دستور ذیل استفاده کردم ودو ستون به ستون های جدول اضافه کردم

```
df["Year"]=pd.to_datetime(df['date']).dt.year
df["Month"]=pd.to_datetime(df['date']).dt.month
df=df.drop(columns=['date'], axis=1)
df.head()
```

	home_team	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month
0	Scotland	England	0	0	Friendly	Glasgow	Scotland	False	1872	11
1	England	Scotland	4	2	Friendly	London	England	False	1873	3
2	Scotland	England	2	1	Friendly	Glasgow	Scotland	False	1874	3
3	England	Scotland	2	2	Friendly	London	England	False	1875	3
4	Scotland	England	3	0	Friendly	Glasgow	Scotland	False	1876	3

برای محاسبه نمره کلی هر تیم، از رتبه کسب شده در خانه و همچنین رتبه کسب شده در زمین حریف استفاده کردم و ستون Total score به جدول اضافه گردید

```
df['total_score']=df['home_score']+df['away_score']
df.head()
```

	home_team	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month	total_score
0	Scotland	England	0	0	Friendly	Glasgow	Scotland	False	1872	11	0
1	England	Scotland	4	2	Friendly	London	England	False	1873	3	6
2	Scotland	England	2	1	Friendly	Glasgow	Scotland	False	1874	3	3
3	England	Scotland	2	2	Friendly	London	England	False	1875	3	4
4	Scotland	England	3	0	Friendly	Glasgow	Scotland	False	1876	3	3

برای محاسبه نتیجه هربازی و اینکه چه تیمی در هربازی برنده شده است از دستور ذیل استفاده کردم و دو ستون دیگر تحت عنوان result و who-win به جدول داده ها اضافه شد

```
con=[(df['home_score']==df['away_score']),(df['home_score']>df['away_score']),(df['home_score']<df['away_score'])]
val=[0,1,2]
val2=['no_win',df['home_team'],df['away_team']]
df['result']=np.select(con,val)
df['who_win']=np.select(con,val2)
df.head()
```

	home_team	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month	total_score	result	who_win
0	Scotland	England	0	0	Friendly	Glasgow	Scotland	False	1872	11	0	0	no_win
1	England	Scotland	4	2	Friendly	London	England	False	1873	3	6	1	England
2	Scotland	England	2	1	Friendly	Glasgow	Scotland	False	1874	3	3	1	Scotland
3	England	Scotland	2	2	Friendly	London	England	False	1875	3	4	0	no_win
4	Scotland	England	3	0	Friendly	Glasgow	Scotland	False	1876	3	3	1	Scotland

Who is the best team of all time?

۱. آیا تیمی که بیشترین گل را می زند می تواند بهترین باشد !

```
# teams with the most goals
bestteam=df.groupby('who_win').sum()
bestteam=bestteam[['home_score','away_score','total_score']].sort_values(by=['total_score'],ascending=False)
bestteam=bestteam.drop(['no_win'])
bestteam.head(10)
```

who_win	home_score	away_score	total_score
Brazil	1366	836	2202
England	1163	1036	2199
Germany	1233	886	2119
Sweden	1084	806	1890
Argentina	1158	622	1780
Hungary	1030	739	1769
Netherlands	914	598	1512
Mexico	945	483	1428
France	902	524	1426
South Korea	882	512	1394

۲. آیا تیمی که بیشترین برد را داشته می تواند بهترین باشد ؟

```
# most winning teams
bestteam2=df.groupby('who_win').count()
bestteam2=bestteam2[['result']].sort_values(by=['result'],ascending=False)
bestteam2=bestteam2.drop(['no_win'])

bestteam2.head(10)
```

who_win	result
Brazil	629
England	580
Germany	560
Argentina	529
Sweden	506
South Korea	455
Mexico	443
Hungary	442
Italy	431
France	425

برای کنار هم قرار دادن نتیجه دو سوال بالا و تحلیل بهتر از این دستور استفاده کردم

```
# merge most winning teams and gols
bestteam3=pd.merge(bestteam,bestteam2, how='inner', on='who_win')
bestteam3['teams']=bestteam3.index
bestteam3.head()
```

who_win	home_score	away_score	total_score	result	teams
Brazil	1366	836	2202	629	Brazil
England	1163	1036	2199	580	England
Germany	1233	886	2119	560	Germany
Sweden	1084	806	1890	506	Sweden
Argentina	1158	622	1780	529	Argentina

برای بدست آوردن میزان بازی هر تیم از کد دستوری ذیل استفاده شد

```
#the number of matches they played
match=df.groupby('home_team').count()+df.groupby('away_team').count()
match=match[['city']].sort_values(by=['city'],ascending=False)
match=match.rename(columns = {'city':'play_count'})
match['teams']=match.index
match.head()
```

	play_count	teams
Sweden	1030.0	Sweden
England	1020.0	England
Brazil	985.0	Brazil
Argentina	984.0	Argentina
Germany	961.0	Germany

مجددا ستون play_count را در جدول کنار داده بیشترین گل، بیشترین برد و .... با کد دستوری زیر گذاشته شد

```
#merge the number of matches they played and winner
bestteam4=pd.merge(match,bestteam3,how='inner', on='teams')
bestteam4['win_per_game']=bestteam4['result']/bestteam4['play_count']
bestteam4['goal_per_game']=bestteam4['total_score']/bestteam4['play_count']
bestteam4=bestteam4[['teams', 'play_count', 'total_score', 'result', 'win_per_game', 'goal_per_game']]
bestteam4.head()
```

	teams	play_count	total_score	result	win_per_game	goal_per_game
0	Sweden	1030.0	1890	506	0.491262	1.834951
1	England	1020.0	2199	580	0.568627	2.155882
2	Brazil	985.0	2202	629	0.638579	2.235533
3	Argentina	984.0	1780	529	0.537602	1.808943
4	Germany	961.0	2119	560	0.582726	2.204995

برای بدست آوردن بهترین تیم از نظر بردن در بازی داده ها را sort می کنیم .

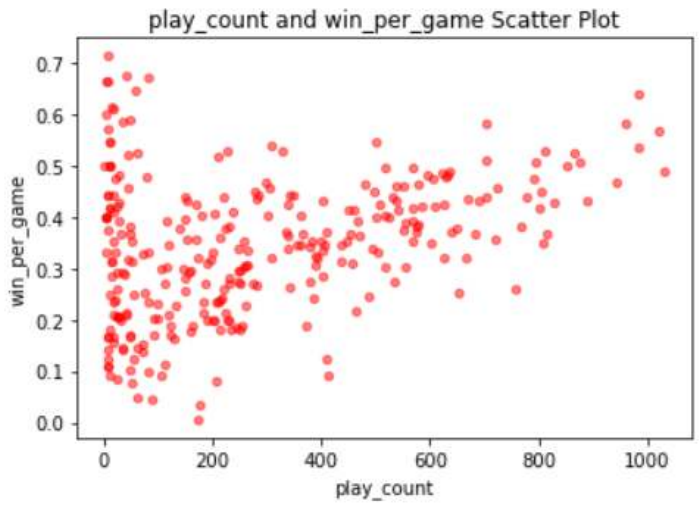
```
bestteam=bestteam.sort_values(by=['win_per_game'],ascending=False)
bestteam.head(10)
```

	teams	play_count	total_score	result	win_per_game	goal_per_game
282	Yorkshire	7.0	33	5	0.714286	4.714286
228	Padania	43.0	115	29	0.674419	2.674419
200	Jersey	82.0	186	55	0.670732	2.268293
290	Parishes of Jersey	3.0	14	2	0.666667	4.666667
273	County of Nice	9.0	21	6	0.666667	2.333333
212	Basque Country	57.0	170	37	0.649123	2.982456
2	Brazil	985.0	2202	629	0.638579	2.235533
262	Andalusia	13.0	26	8	0.615385	2.000000
253	Rhodes	18.0	32	11	0.611111	1.777778
289	Crimea	5.0	9	3	0.600000	1.800000

نمودار جدول فوق را باScatter Plot رسم می کنیم.

```
bestteam.plot(kind='scatter',x='play_count',y='win_per_game',color='r',alpha=0.5)
plt.xlabel('play_count')
plt.ylabel('win_per_game')
plt.title('play_count and win_per_game Scatter Plot')
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



برای تشخیص بهترین تیم، میزان برد هر تیم و میزان بازی هر تیم را با هم لحاظ کردم با کد دستوری ذیل

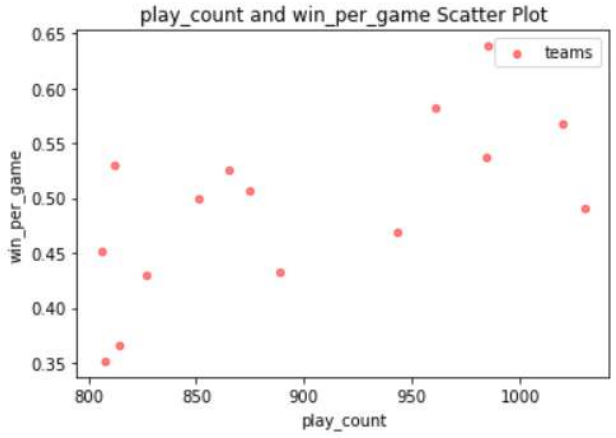
```
bestteam1=bestteam[(bestteam['win_per_game']>0,4) and (bestteam4['play_count']>800)]
bestteam1.head()
```

و جدول داده ها نیز به صورت ذیل است

	teams	play_count	total_score	result	win_per_game	goal_per_game
2	Brazil	985.0	2202	629	0.638579	2.235533
4	Germany	961.0	2119	560	0.582726	2.204995
1	England	1020.0	2199	580	0.568627	2.155882
3	Argentina	984.0	1780	529	0.537602	1.808943
12	Italy	812.0	1321	431	0.530788	1.626847

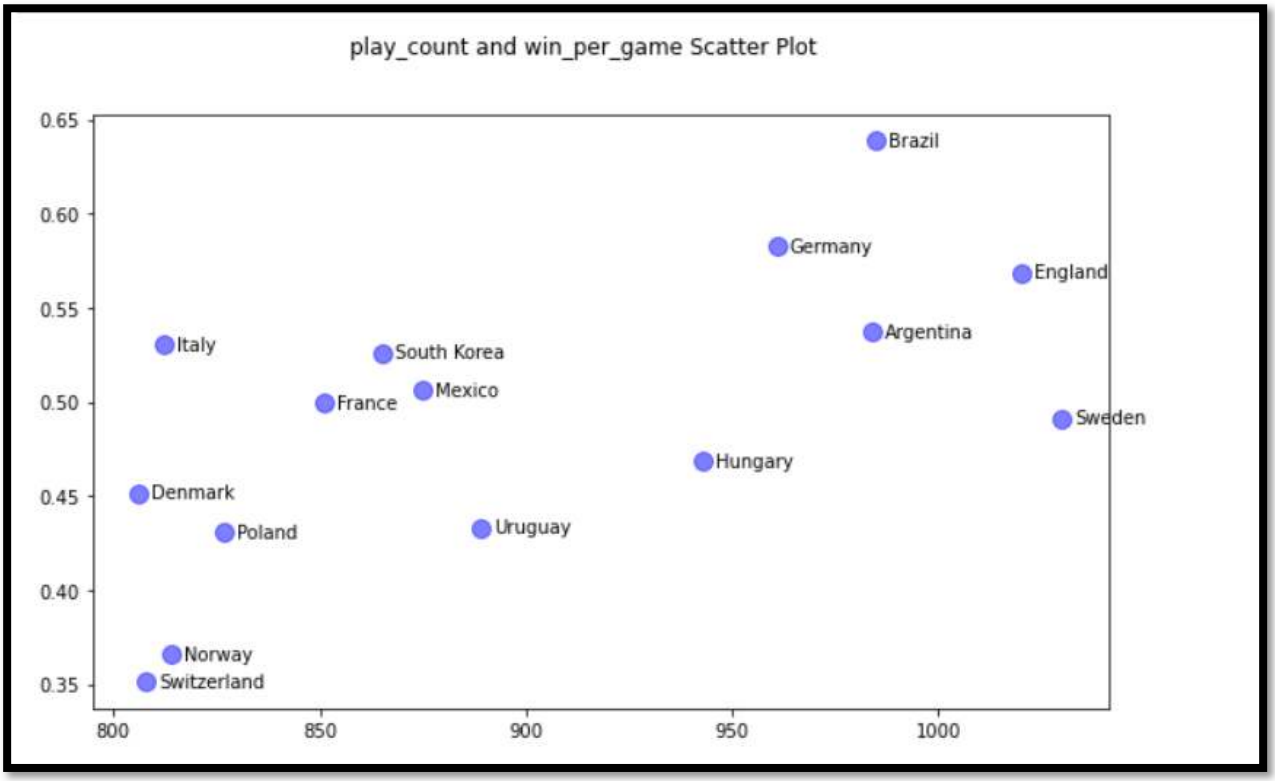
```
bestteam1.plot(kind='scatter',x='play_count',y='win_per_game',color='r',alpha=0.5,label='teams')
plt.xlabel('play_count')
plt.ylabel('win_per_game')
plt.title('play_count and win_per_game Scatter Plot')
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



برای نمایش بهتر نموداری با میزان برد هر تیم، نام هرتیم و میزان بازی آن با توجه به جدول رسم کردم

```
fig, ax = plt.subplots(1, figsize=(10, 6))
fig.suptitle('play_count and win_per_game Scatter Plot')

# Plot the scatter points
x=bestteam1['play_count']
y=bestteam1['win_per_game']
labels=bestteam1['teams']
ax.scatter(x,y,
           color="blue",  # Color of the dots
           s=100,         # Size of the dots
           alpha=0.5,     # Alpha of the dots
           linewidths=1)  # Size of edge around the dots

# Add the participant names as text labels for each point
for x_pos, y_pos, label in zip(x, y, labels):
    ax.annotate(label,             # The label for this point
                xy=(x_pos, y_pos), # Position of the corresponding point
                xytext=(7, 0),     # Offset text by 7 points to the right
                textcoords='offset points', # tell it to use offset points
                ha='left',         # Horizontally aligned to the left
                va='center')       # Vertical alignment is centered

plt.show()
```



Which teams dominated different eras of football

مجددا با دستور df.head() پنج سطر جدول را مشاهده می کنیم

```
df.head()
```

	home_team	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month	total_score	result	who_win
0	Scotland	England	0	0	Friendly	Glasgow	Scotland	False	1872	11	0	0	no_win
1	England	Scotland	4	2	Friendly	London	England	False	1873	3	6	1	England
2	Scotland	England	2	1	Friendly	Glasgow	Scotland	False	1874	3	3	1	Scotland
3	England	Scotland	2	2	Friendly	London	England	False	1875	3	4	0	no_win
4	Scotland	England	3	0	Friendly	Glasgow	Scotland	False	1876	3	3	1	Scotland

فراخوانی ستون های تیم برنده و سال

```
teams=df[['Year','who_win']]
teams.head()
```

	Year	who_win
0	1872	no_win
1	1873	England
2	1874	Scotland
3	1875	no_win
4	1876	Scotland

در این قسمت تابعی نوشتم برای اینکه no-win را در سطح پایینی جدول دیده شود

```
def re_find(who_win):
    if "no_win" not in who_win.lower():
        return True
    return False

teams2=teams[teams['who_win'].apply(re_find)]

teams2.head()
```

	Year	who_win
1	1873	England
2	1874	Scotland
4	1876	Scotland
5	1876	Scotland
6	1877	Scotland

در این قسمت برای دریافت نتیجه سال برد هرتیم را کنار اسم آن قید کردم و ستون جدیدی ایجاد شد

```
list1=[]
list2=[]
list3=[]
b=teams2['Year'].count()
for i in range(0,b):
    list1.append(teams2['Year'].iloc[i])
    list2.append(teams2['who_win'].iloc[i])
    a=str(teams2['Year'].iloc[i])+teams2['who_win'].iloc[i]
    list3.append(a)

list_label = ["Year","who_win","Year_who_win"]
list_col = [list1,list2,list3]
zipped = zip(list_label,list_col)
data_dict = dict(zipped)

teams3 = pd.DataFrame(data_dict)
teams3.head()
```

	Year	who_win	Year_who_win
0	1873	England	1873England
1	1874	Scotland	1874Scotland
2	1876	Scotland	1876Scotland
3	1876	Scotland	1876Scotland
4	1877	Scotland	1877Scotland

و در نهایت sort داده

```
teams4=teams3.groupby('Year_who_win').count()
teams4=teams4[['who_win']].sort_values(by=['who_win'], ascending=False)
teams4.head()
```

	who_win
Year_who_win	
1997Brazil	20
2008Trinidad and Tobago	17
1997China PR	17
2001Saudi Arabia	17
1993Mexico	17

What trends have there been in international football throughout the ages - home advantage, total goals scored, distribution of teams' strength etc

```
df.head()
```

	home_team	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month	total_score	result	who_win
0	Scotland	England	0	0	Friendly	Glasgow	Scotland	False	1872	11	0	0	no_win
1	England	Scotland	4	2	Friendly	London	England	False	1873	3	6	1	England
2	Scotland	England	2	1	Friendly	Glasgow	Scotland	False	1874	3	3	1	Scotland
3	England	Scotland	2	2	Friendly	London	England	False	1875	3	4	0	no_win
4	Scotland	England	3	0	Friendly	Glasgow	Scotland	False	1876	3	3	1	Scotland

تعریف تابعی برای محاسبه برد در خانه و برد در خانه حریف

```
con=[(df['home_team']==df['who_win']),(df['away_team']==df['who_win'])]
val=['home_win','away_win']
val2=[1,1]
df['home_away_win']=np.select(con,val)
df['home_away_win2']=np.select(con,val2)
df.head()
```

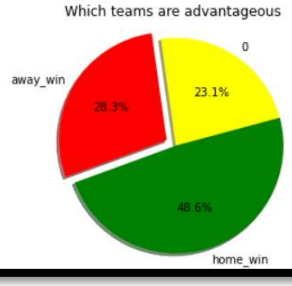
m	away_team	home_score	away_score	tournament	city	country	neutral	Year	Month	total_score	result	who_win	home_away_win	home_away_win2
nd	England	0	0	Friendly	Glasgow	Scotland	False	1872	11	0	0	no_win	0	0
nd	Scotland	4	2	Friendly	London	England	False	1873	3	6	1	England	home_win	1
nd	England	2	1	Friendly	Glasgow	Scotland	False	1874	3	3	1	Scotland	home_win	1
nd	Scotland	2	2	Friendly	London	England	False	1875	3	4	0	no_win	0	0
nd	England	3	0	Friendly	Glasgow	Scotland	False	1876	3	3	1	Scotland	home_win	1

نتیجه نهایی با نمودار Pie

```
#home advantage?
data1=df.groupby('home_away_win').count()
data1[['who_win']]
```

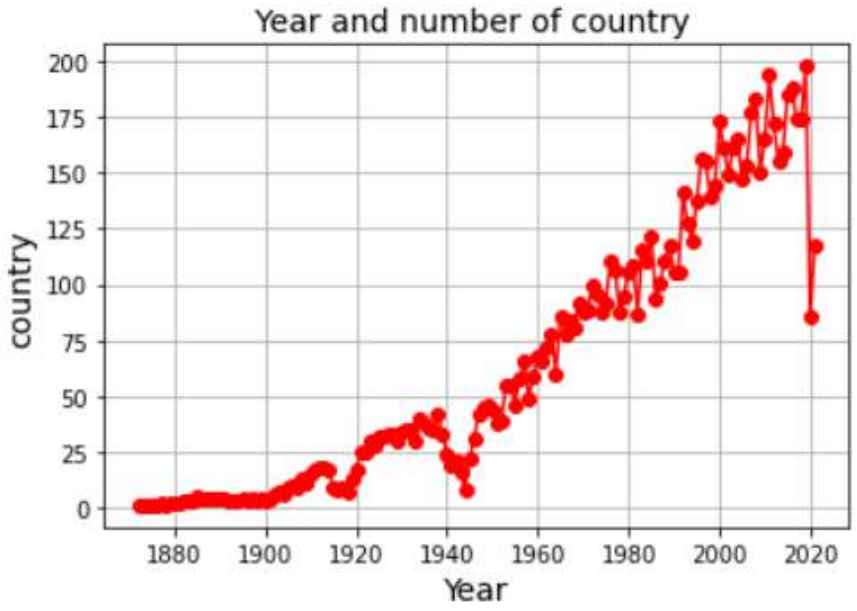
	who_win
home_away_win	
0	9700
away_win	11924
home_win	20458

```
my_colors = ['yellow','red','green']
my_explode = (0, 0.1, 0)
plt.pie(data1['who_win'], labels=data1.index, autopct='%1.1f%%', startangle=15, shadow = True, colors=my_colors, explode=my_explo
plt.title('Which teams are advantageous')
plt.axis('equal')
plt.show()
```



how has the number of countries changed

```
df_c=df[['Year','country']]
df_c = df_c.drop_duplicates()
df_c1=df_c.groupby('Year').count()

plt.plot(df_c1.index, df_c1['country'], color='red', marker='o')
plt.title('Year and number of country ', fontsize=14)
plt.xlabel('Year', fontsize=14)
plt.ylabel('country', fontsize=14)
plt.grid(True)
plt.show()
```



Which countries host the most matches where they themselves are not participating in

```
data_c = df.drop(df[df.country == df.home_team].index)
list1=[]
list2=[]
b=len(data_c.index)
for i in range(0,b):
    list1.append(data_c['country'].iloc[i])
    list2.append(1)

list_label = ["Country","Num"]
list_col = [list1,list2]
zipped = zip(list_label,list_col)
data_dict = dict(zipped)

data_c3 = pd.DataFrame(data_dict)
data_c4=data_c3.groupby('Country').count()
data_c5=data_c4[['Num']]
data_c6=data_c5.sort_values(by=['Num'], ascending=False)
data_c6.head()
```

Country	Num
United States	772
Malaysia	428
France	375
South Africa	284
United Arab Emirates	276

How much, if at all, does hosting a major tournament help a country's chances in the Tournament

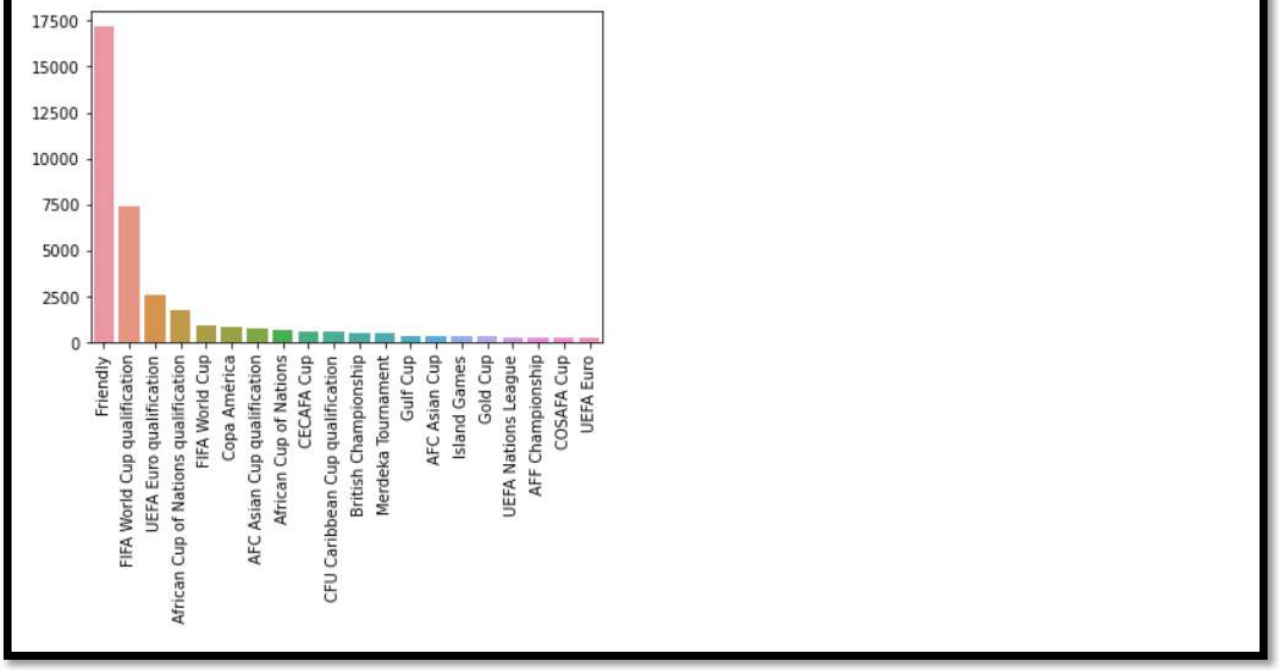
شمارش تعداد هر مسابقه

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

```
Friendly                                17189
FIFA World Cup qualification             7363
UEFA Euro qualification                  2582
African Cup of Nations qualification     1719
FIFA World Cup                            900
                                          ...
World Unity Cup                             4
Dragon Cup                                  4
AFF Championship qualification              2
Atlantic Heritage Cup                       2
Copa América qualification                  2
Name: tournament, Length: 112, dtype: int64
```

نمودار تعداد مسابقات

```
sns.barplot(x=df['tournament'].value_counts().index[:20],y=df['tournament'].value_counts().values[:20])
plt.xticks(rotation=90)
plt.show()
```



دریافت اطلاعات مسابقات

```
df['tournament'].unique()
```

```
array(['Friendly', 'British Championship', 'Copa Lipton', 'Copa Newton',
       'Copa Premio Honor Argentino', 'Copa Premio Honor Uruguayo',
       'Copa Roca', 'Copa América', 'Copa Chevallier Boutell',
       'Nordic Championship', 'International Cup', 'Baltic Cup',
       'Balkan Cup', 'FIFA World Cup', 'Copa Rio Branco',
       'FIFA World Cup qualification', 'CCCF Championship',
       'NAFU Championship', 'Copa Oswaldo Cruz',
       'Pan American Championship', 'Copa del Pacífico',
       "Copa Bernardo O'Higgins", 'AFC Asian Cup qualification',
       'Atlantic Cup', 'AFC Asian Cup', 'African Cup of Nations',
       'Copa Paz del Chaco', 'Merdeka Tournament',
       'UEFA Euro qualification', 'UEFA Euro',
       'Windward Islands Tournament',
       'African Cup of Nations qualification', 'Vietnam Independence Cup',
       'Copa Carlos Dittborn', 'CONCACAF Championship',
       'Copa Juan Pinto Durán', 'UAFA Cup', 'South Pacific Games',
       'CONCACAF Championship qualification', 'Copa Artigas', 'GaNEFo',
       "King's Cup", 'Gulf Cup', 'Indonesia Tournament', 'Korea Cup',
       'Brazil Independence Cup', 'Copa Ramón Castilla',
       'Oceania Nations Cup', 'CECAFA Cup', 'Copa Félix Bogado',
       'Kirin Cup', 'CFU Caribbean Cup qualification',
       'CFU Caribbean Cup', 'Amílcar Cabral Cup', 'Mundialito',
       'West African Cup', 'Nehru Cup', 'Merlion Cup', 'UDEAC Cup',
       'Rous Cup', 'Lunar New Year Cup', 'Tournoi de France',
       'Malta International Tournament', 'Island Games', 'Dynasty Cup',
       'UNCAF Cup', 'Gold Cup', 'USA Cup',
       'Jordan International Tournament', 'Confederations Cup',
       'United Arab Emirates Friendship Tournament',
       'Oceania Nations Cup qualification', 'Simba Tournament',
       'SAFF Cup', 'AFF Championship', 'King Hassan II Tournament',
       'Cyprus International Tournament', 'Dunhill Cup', 'COSAFA Cup',
       'Gold Cup qualification', 'SKN Football Festival', 'UNIFFAC Cup',
       'WAFF Championship', 'Millennium Cup', "Prime Minister's Cup",
       'EAFF Championship', 'AFC Challenge Cup', 'FIFI Wild Cup',
       'ELF Cup', 'Viva World Cup', 'UAFA Cup qualification',
       'AFC Challenge Cup qualification', 'African Nations Championship',
       'VFF Cup', 'Dragon Cup', 'ABCS Tournament',
       'Nile Basin Tournament', 'Nations Cup', 'Pacific Games', 'OSN Cup',
       'CONIFA World Football Cup', 'CONIFA European Football Cup',
       'Copa América qualification', 'World Unity Cup',
       'Intercontinental Cup', 'AFF Championship qualification',
       'UEFA Nations League', 'CONCACAF Nations League qualification',
       'African Nations Championship qualification',
       'Atlantic Heritage Cup', 'Inter Games Football Tournament',
       'CONCACAF Nations League'], dtype=object)
```

محاسبه طول داده مسابقات

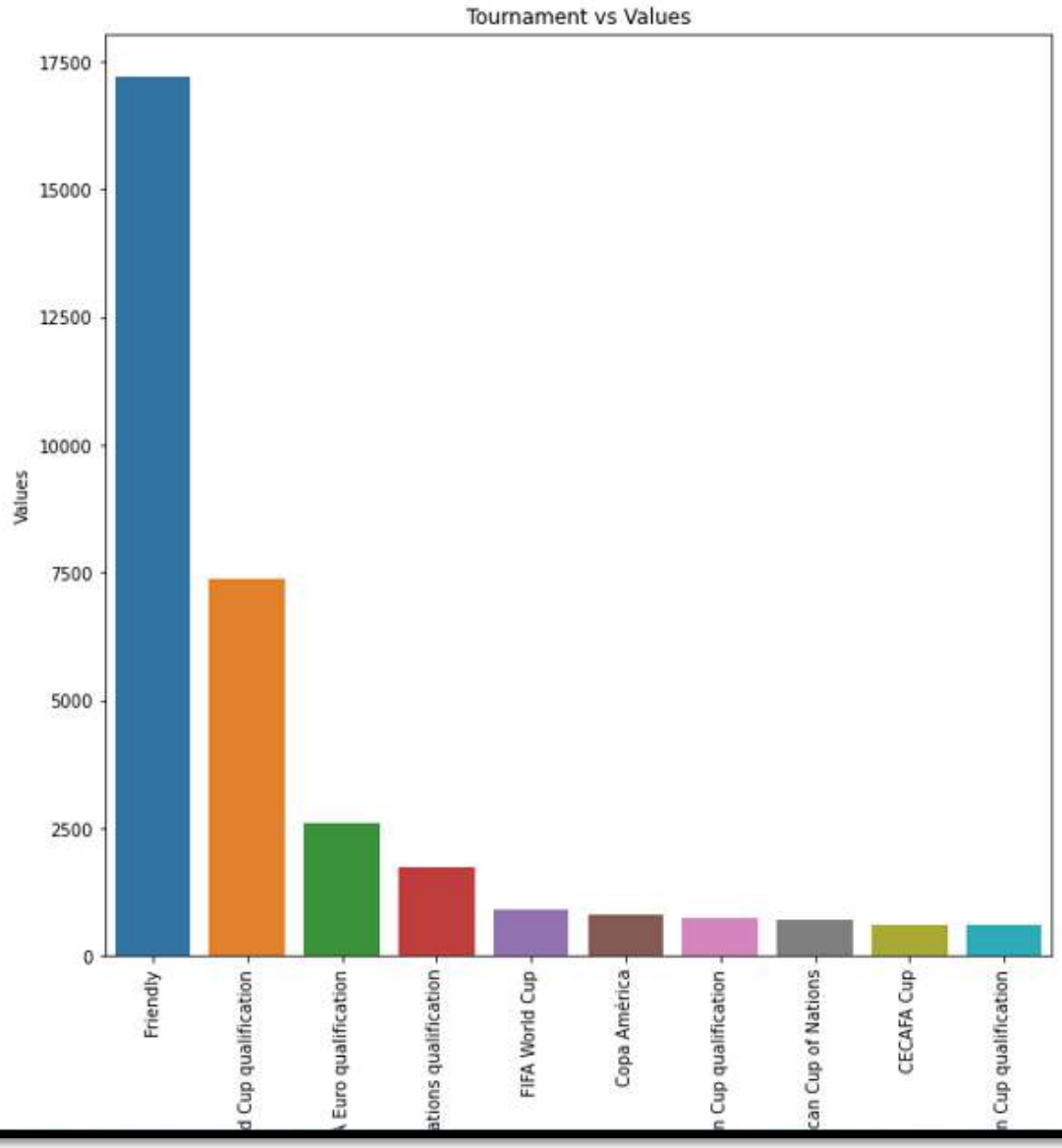
```
LT=len(df['tournament'].unique())
LT
```

```
112
```

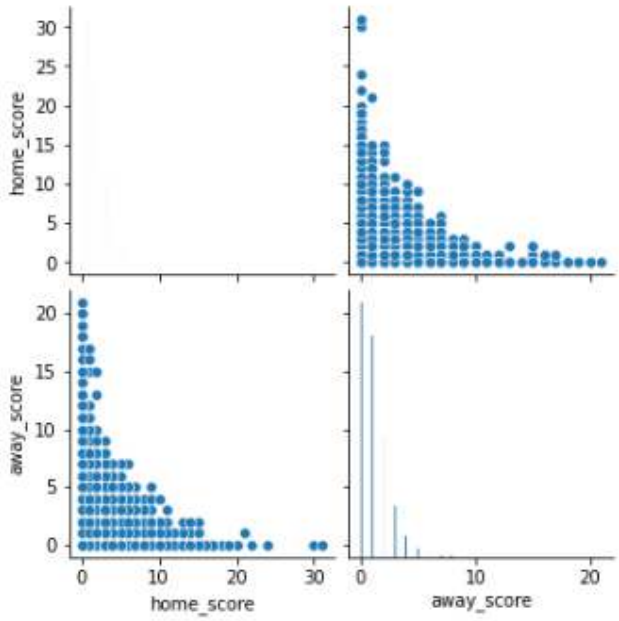
نمودار مسابقات

```
tournament=df['tournament'].value_counts()
names=tournament.index
values=tournament.values
```

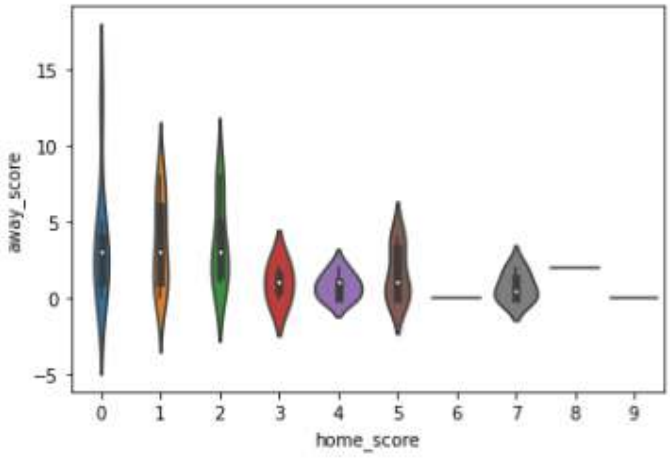
```
plt.figure(figsize=(10,10))
sns.barplot(x=names[:10],y=values[:10])
plt.xticks(rotation=90)
plt.ylabel('Values')
plt.xlabel('Tournament')
plt.title('Tournament vs Values')
plt.show()
```



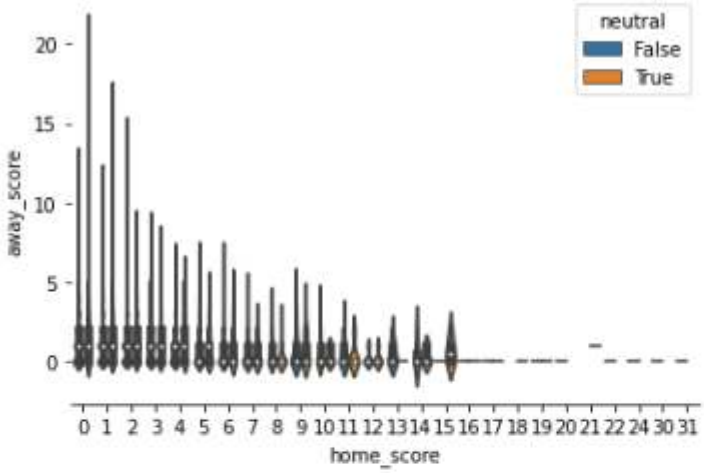
```
sns.pairplot(df.iloc[:,2:5])
plt.show()
```



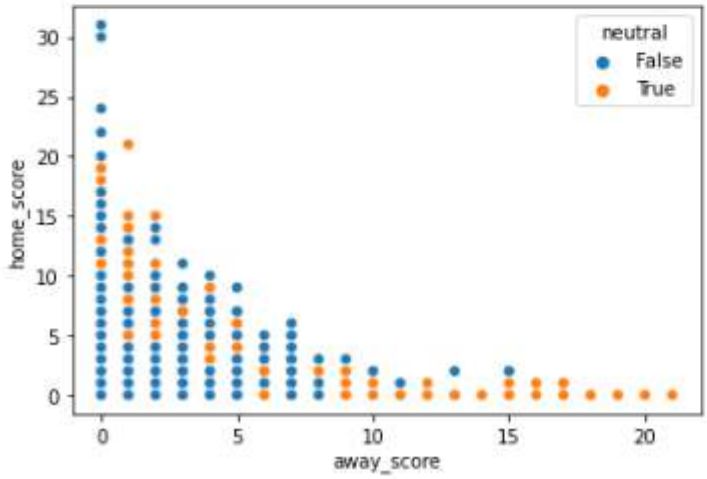

```
sns.violinplot(x=df['home_score'][:50],y=df['away_score'][:50])
plt.show()
```



```
sns.violinplot(x="home_score", y="away_score", hue="neutral",data=df)
sns.despine(left=True)
plt.show()
```




```
sns.scatterplot(y="home_score", x="away_score",
                hue="neutral",data=df)
plt.show()
```



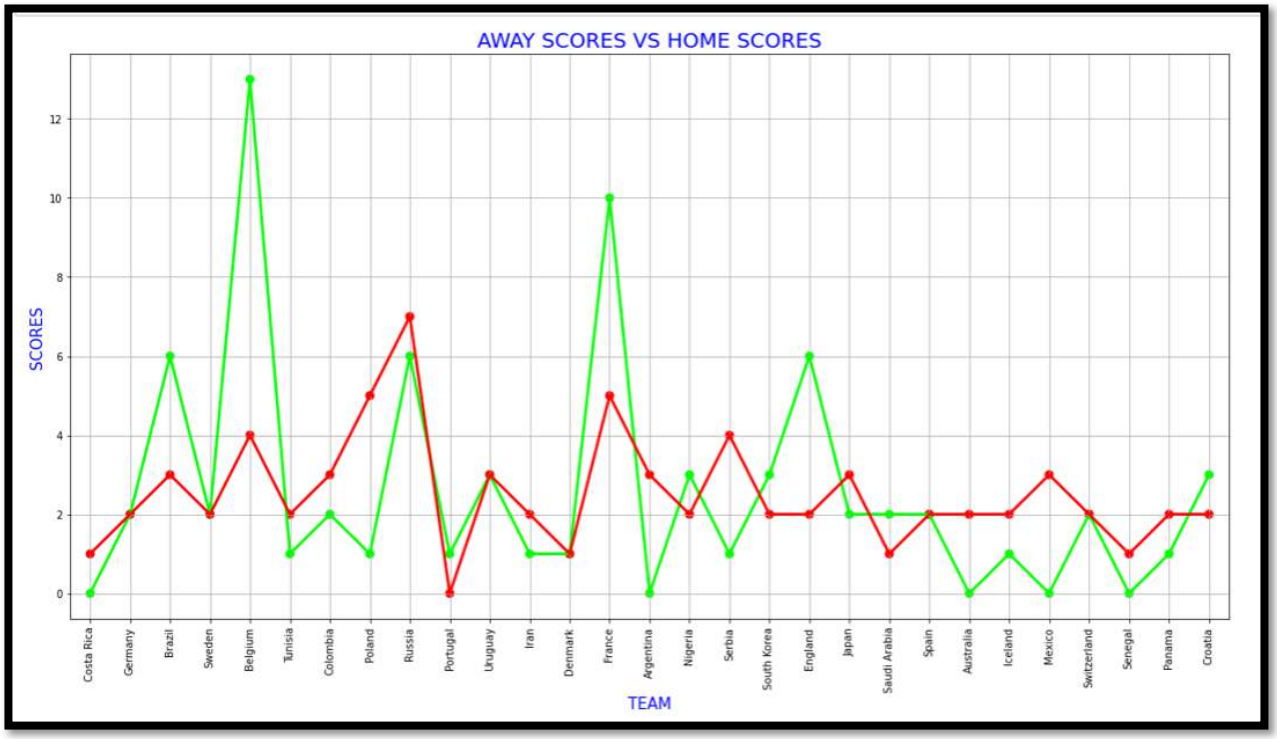
برای به دست آوردن همه مسابقات تیم ها در خانه و همه مسابقات تیم ها در خانه حریف

```
away_scores_allteam=[]
home_scores_allteam=[]
for team in allteam:
    toplam=sum(veri[veri['home_team']==team].away_score)
    away_scores_allteam.append(toplam)
    home_scores_allteam.append(sum(veri[veri['home_team']==team].home_score))
    toplam=0

away_scores_allteam
home_scores_allteam
allteam

all_team=pd.DataFrame([allteam,home_scores_allteam,away_scores_allteam])

all_team
```

	0	1	2	3	4	5	6	7	8	9	...	19	20	21	22	23	24	25	26
0	Costa Rica	Germany	Brazil	Sweden	Belgium	Tunisia	Colombia	Poland	Russia	Portugal	...	Japan	Saudi Arabia	Spain	Australia	Iceland	Mexico	Switzerland	Senegal
1	0	2	6	2	13	1	2	1	6	1	...	2	2	2	0	1	0	2	0
2	1	2	3	2	4	2	3	5	7	0	...	3	1	2	2	2	3	2	1

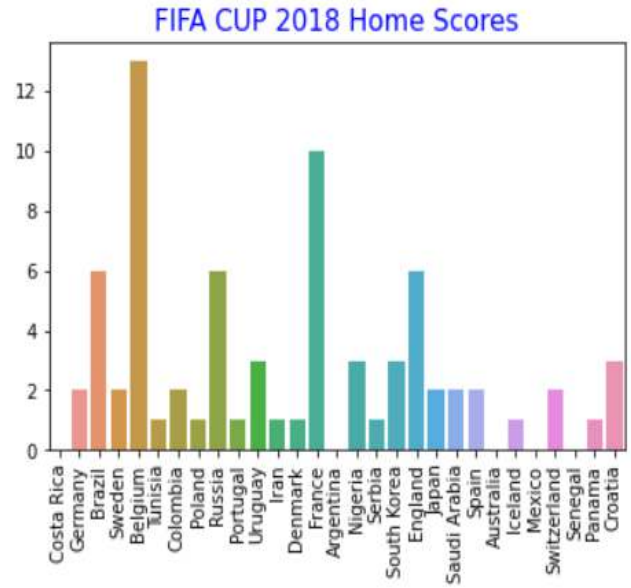
3 rows × 29 columns

نمودار pointplot از بازی تیم ها در خانه و خانه حریف



نمودار plotbar از homescore

```
sns.barplot(x=allteam,y=home_scores_allteam)
plt.title('FIFA CUP 2018 Home Scores',color='b',fontsize=15)
plt.xticks(rotation=90)
plt.show()
```



نمودار plotbar از awayscore

```
sns.barplot(x=allteam,y=away_scores_allteam)
plt.title('FIFA CUP 2018 Away Scores',color='b',fontsize=15)
plt.xticks(rotation=90)
plt.show()
```