In [48]:
```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [49]:
```python
data1=pd.read_csv(r"C:\Users\Debanshu\Desktop\fifa project\WorldCupMatches.csv")
data2=pd.read_csv(r"C:\Users\Debanshu\Desktop\fifa project\WorldCupPlayers.csv")
data3=pd.read_csv(r"C:\Users\Debanshu\Desktop\fifa project\WorldCups.csv")
```

In [50]:
```python
data1.head()
```

Out[50]:

	Year	Datetime	Stage	Stadium	City	Home Team Name	Home Team Goals	Away Team Goals	Away Team Name	Win conditions	Attendance	Half-time Home Goals	Half-time Away Goals	Referee	Assistant 1	Assistant 2	RoundID	MatchID	Home Team Initials	Away Team Initials
0	1930.0	13 Jul 1930 - 15:00	Group 1	Pocitos	Montevideo	France	4.0	1.0	Mexico		4444.0	3.0	0.0	LOMBARDI Domingo (URU)	CRISTOPHE Henry (BEL)	REGO Gilberto (BRA)	201.0	1096.0	FRA	MEX
1	1930.0	13 Jul 1930 - 15:00	Group 4	Parque Central	Montevideo	USA	3.0	0.0	Belgium		18346.0	2.0	0.0	MACIAS Jose (ARG)	MATEUCCI Francisco (URU)	WARNKEN Alberto (CHI)	201.0	1090.0	USA	BEL
2	1930.0	14 Jul 1930 - 12:45	Group 2	Parque Central	Montevideo	Yugoslavia	2.0	1.0	Brazil		24059.0	2.0	0.0	TEJADA Anibal (URU)	VALLARINO Ricardo (URU)	BALWAY Thomas (FRA)	201.0	1093.0	YUG	BRA
3	1930.0	14 Jul 1930 - 14:50	Group 3	Pocitos	Montevideo	Romania	3.0	1.0	Peru		2549.0	1.0	0.0	WARNKEN Alberto (CHI)	LANGENUS Jean (BEL)	MATEUCCI Francisco (URU)	201.0	1098.0	ROU	PER
4	1930.0	15 Jul 1930 - 16:00	Group 1	Parque Central	Montevideo	Argentina	1.0	0.0	France		23409.0	0.0	0.0	REGO Gilberto (BRA)	SAUCEDO Ulises (BOL)	RADULESCU Constantin (ROU)	201.0	1085.0	ARG	FRA

In [51]:
```python
data2.head()
```

Out[51]:

	RoundID	MatchID	Team Initials	Coach Name	Line-up	Shirt Number	Player Name	Position	Event
0	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Alex THEPOT	GK	NaN
1	201	1096	MEX	LUQUE Juan (MEX)	S	0	Oscar BONFIGLIO	GK	NaN
2	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Marcel LANGILLER	NaN	G40'
3	201	1096	MEX	LUQUE Juan (MEX)	S	0	Juan CARRENO	NaN	G70'
4	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Ernest LIBERATI	NaN	NaN

In [52]:
```python
data3.head()
```

Out[52]:

	Year	Country	Winner	Runners-Up	Third	Fourth	GoalsScored	QualifiedTeams	MatchesPlayed	Attendance
0	1930	Uruguay	Uruguay	Argentina	USA	Yugoslavia	70	13	18	590.549
1	1934	Italy	Italy	Czechoslovakia	Germany	Austria	70	16	17	363.000
2	1938	France	Italy	Hungary	Brazil	Sweden	84	15	18	375.700
3	1950	Brazil	Uruguay	Brazil	Sweden	Spain	88	13	22	1.045.246
4	1954	Switzerland	Germany FR	Hungary	Austria	Uruguay	140	16	26	768.607

In [53]:
```python
import plotly as py
import cufflinks as cf
from plotly.offline import iplot
py.offline.init_notebook_mode(connected=True)
cf.go_offline()
```

In [54]:
```python
#-----DATASET LOADED NOW WE WILL GET SOME INSIGHTS ABOUT THE DATA------------
```

In [55]:
```python
# COUNTRY WISE ANALYSIS
```

In [56]:
```python
data_countries = pd.DataFrame(data3['Winner'].value_counts())
data_countries
```

Out[56]:

	Winner
Brazil	5
Italy	4
Germany FR	3
Uruguay	2
Argentina	2
England	1
France	1
Spain	1
Germany	1

In [57]:
```python
# Insight 1 : Brazil has won the tournament most number of times
```

In [58]:
```python
# Tabular Representation of above mentioned data

data_countries.iplot(kind='bar',y='Winner',title='Countries who have won worldcups',colors='blue')
```

In [59]:
```python
# Now collaborating for first three positions we are having
data_winner=pd.DataFrame(data3['Winner'].value_counts())
data_runner_up=pd.DataFrame(data3['Runners-Up'].value_counts())
data_third=pd.DataFrame(data3['Third'].value_counts())
```

In [60]:
```python
data_winner.head()
```

Out[60]:

	Winner
Brazil	5
Italy	4
Germany FR	3
Uruguay	2
Argentina	2

In [61]:
```python
data_runner_up.head()
```

Out[61]:

	Runners-Up
Argentina	3
Germany FR	3
Netherlands	3
Czechoslovakia	2
Hungary	2

In [62]:
```python
data_third.head()
```

Out[62]:

	Third
Germany	3
Brazil	2
Sweden	2
France	2
Poland	2

In [63]:
```python
teams = pd.concat([data_winner, data_runner_up, data_third], axis = 1)
teams
```

Out[63]:

	Winner	Runners-Up	Third
Brazil	5.0	2.0	2.0
Italy	4.0	2.0	1.0
Germany FR	3.0	3.0	1.0
Uruguay	2.0	NaN	NaN
Argentina	2.0	3.0	NaN
England	1.0	NaN	NaN
France	1.0	1.0	2.0
Spain	1.0	NaN	NaN
Germany	1.0	1.0	3.0
Netherlands	NaN	3.0	1.0
Czechoslovakia	NaN	2.0	NaN
Hungary	NaN	2.0	NaN
Sweden	NaN	1.0	2.0
Poland	NaN	NaN	2.0
USA	NaN	NaN	1.0
Austria	NaN	NaN	1.0
Chile	NaN	NaN	1.0
Portugal	NaN	NaN	1.0
Croatia	NaN	NaN	1.0
Turkey	NaN	NaN	1.0

In [64]:
```python
# Dealing with NaN values

teams.fillna(0,inplace=True)
```

In [65]:
```python
teams=teams.astype(int)
```

In [66]:
```python
# Insight 2 : A complete depection of number of world cups won, first runner-up, and second runner-up positions by various participating teams

teams.iplot(kind='bar',yTitle='Count',title='Country wise  analysis',xTitle='Country')
```

In [67]:
```python
# NUMBER OF GOALS PER COUNTRY
```

In [68]:
```python
data1.head()
```

Out[68]:

	Year	Datetime	Stage	Stadium	City	Home Team Name	Home Team Goals	Away Team Goals	Away Team Name	Win conditions	Attendance	Half-time Home Goals	Half-time Away Goals	Referee	Assistant 1	Assistant 2	RoundID	MatchID	Home Team Initials	Away Team Initials
0	1930.0	13 Jul 1930 - 15:00	Group 1	Pocitos	Montevideo	France	4.0	1.0	Mexico		4444.0	3.0	0.0	LOMBARDI Domingo (URU)	CRISTOPHE Henry (BEL)	REGO Gilberto (BRA)	201.0	1096.0	FRA	MEX
1	1930.0	13 Jul 1930 - 15:00	Group 4	Parque Central	Montevideo	USA	3.0	0.0	Belgium		18346.0	2.0	0.0	MACIAS Jose (ARG)	MATEUCCI Francisco (URU)	WARNKEN Alberto (CHI)	201.0	1090.0	USA	BEL
2	1930.0	14 Jul 1930 - 12:45	Group 2	Parque Central	Montevideo	Yugoslavia	2.0	1.0	Brazil		24059.0	2.0	0.0	TEJADA Anibal (URU)	VALLARINO Ricardo (URU)	BALWAY Thomas (FRA)	201.0	1093.0	YUG	BRA
3	1930.0	14 Jul 1930 - 14:50	Group 3	Pocitos	Montevideo	Romania	3.0	1.0	Peru		2549.0	1.0	0.0	WARNKEN Alberto (CHI)	LANGENUS Jean (BEL)	MATEUCCI Francisco (URU)	201.0	1098.0	ROU	PER
4	1930.0	15 Jul 1930 - 16:00	Group 1	Parque Central	Montevideo	Argentina	1.0	0.0	France		23409.0	0.0	0.0	REGO Gilberto (BRA)	SAUCEDO Ulises (BOL)	RADULESCU Constantin (ROU)	201.0	1085.0	ARG	FRA

In [69]:
```python
# Seperating data based on goals scored by teams
data_home=data1[['Home Team Name','Home Team Goals']].dropna()
data_away=data1[['Away Team Name','Away Team Goals']].dropna()
```

In [70]:
```python
data_home.head()
```

Out[70]:

	Home Team Name	Home Team Goals
0	France	4.0
1	USA	3.0
2	Yugoslavia	2.0
3	Romania	3.0
4	Argentina	1.0

In [71]:
```python
data_away.head()
```

Out[71]:

	Away Team Name	Away Team Goals
0	Mexico	1.0
1	Belgium	0.0
2	Brazil	1.0
3	Peru	1.0
4	France	0.0

In [72]:
```python
# Setting up the columns in both the tables
data_home.columns= ['Countries','Goals']
data_away.columns= ['Countries','Goals']
```

In [73]:
```python
data_country_goals = pd.concat([data_home, data_away], ignore_index=True)
```

In [74]:
```python
data_country_goals
```

Out[74]:

	Countries	Goals
0	France	4.0
1	USA	3.0
2	Yugoslavia	2.0
3	Romania	3.0
4	Argentina	1.0
...	...	...
1699	Costa Rica	0.0
1700	Germany	7.0
1701	Argentina	0.0
1702	Netherlands	3.0
1703	Argentina	0.0

1704 rows × 2 columns

In [75]:
```python
# The above table do contain all the goals both home and away but con have different values for same countries, so...

data_final_country_goal=data_country_goals.groupby('Countries').sum()
```

In [76]:
```python
# Arranging by number of goals
final_data=data_final_country_goal.sort_values(by='Goals',ascending=False)
```

In [77]:
```python
final_data=final_data[:10]
final_data
```

Out[77]:

Countries	Goals
Brazil	225.0
Argentina	133.0
Germany FR	131.0
Italy	128.0
France	108.0
Germany	104.0
Spain	92.0
Netherlands	91.0
Hungary	87.0
Uruguay	80.0

In [78]:
```python
# Insight 3 : Brazil scored the most number of goals throughout the history of worldcup followed by Argentina and Germany.
final_data.iplot(kind='bar',yTitle='No of Goals',title='Countries with maximum number of goals',colors='red',xTitle='Country')
```

In [79]:
```python
# Comparing half time home goals scored and half time away goals scored

half_team_home=pd.DataFrame(data1[['Home Team Name','Half-time Home Goals']])
half_team_away=pd.DataFrame(data1[['Away Team Name','Half-time Away Goals']])
```

In [80]:
```python
half_team_home = half_team_home.groupby('Home Team Name').sum()
half_team_home = half_team_home.sort_values(by='Half-time Home Goals',ascending=False)
half_team_home
```

Out[80]:

Home Team Name	Half-time Home Goals
Brazil	66.0
Argentina	48.0
Germany FR	38.0
Italy	36.0
Hungary	33.0
...	...
Norway	0.0
Iran	0.0
New Zealand	0.0
Iraq	0.0
rn">United Arab Emirates	0.0

78 rows × 1 columns

In [81]:
```python
half_team_away = half_team_away.groupby('Away Team Name').sum()
half_team_away = half_team_away.sort_values(by='Half-time Away Goals',ascending=False)
half_team_away
```

Out[81]:

Away Team Name	Half-time Away Goals
Spain	20.0
Germany	18.0
Netherlands	18.0
France	17.0
Brazil	17.0
...	...
China PR	0.0
Dutch East Indies	0.0
Slovenia	0.0
Slovakia	0.0
Haiti	0.0

83 rows × 1 columns

In [82]:
```python
# Concatinating both the tables on team name
total = pd.concat([half_team_home, half_team_away], axis = 1)
total
```

Out[82]:

	Half-time Home Goals	Half-time Away Goals
Brazil	66.0	17.0
Argentina	48.0	8.0
Germany FR	38.0	12.0
Italy	36.0	13.0
Hungary	33.0	7.0
...	...	...
Egypt	NaN	2.0
Israel	NaN	0.0
Kuwait	NaN	0.0
El Salvador	NaN	0.0
Dutch East Indies	NaN	0.0

83 rows × 2 columns

In [83]:
```python
# Creating total goals columns to order the table based on total number of goals scored by a team
total['total_goals'] = total['Half-time Home Goals'] + total['Half-time Away Goals']
total = total.sort_values(by= 'total_goals',ascending=False)
total=total[:10]
total
```

Out[83]:

	Half-time Home Goals	Half-time Away Goals	total_goals
Brazil	66.0	17.0	83.0
Argentina	48.0	8.0	56.0
Germany FR	38.0	12.0	50.0
Italy	36.0	13.0	49.0
Germany	28.0	18.0	46.0
France	25.0	17.0	42.0
Hungary	33.0	7.0	40.0
Netherlands	19.0	18.0	37.0
Spain	16.0	20.0	36.0
Uruguay	27.0	6.0	33.0

In [84]:
```python
# We don't require total_goals anymore, so...
total.pop('total_goals')
total
```

Out[84]:

	Half-time Home Goals	Half-time Away Goals
Brazil	66.0	17.0
Argentina	48.0	8.0
Germany FR	38.0	12.0
Italy	36.0	13.0
Germany	28.0	18.0
France	25.0	17.0
Hungary	33.0	7.0
Netherlands	19.0	18.0
Spain	16.0	20.0
Uruguay	27.0	6.0

In [85]:
```python
# Insight 4 : Brazil has again scored a majority of total goals playing as home team whereas spain scored more goals playing as away country rather than home country
total.iplot(kind='bar',yTitle='Count',title='Country wise analysis',xTitle='Country')
```

In [86]:
```python
# Match outcomes by home and away teams
```

In [87]:
```python
data1.head(10)
```

Out[87]:

	Year	Datetime	Stage	Stadium	City	Home Team Name	Home Team Goals	Away Team Goals	Away Team Name	Win conditions	Attendance	Half-time Home Goals	Half-time Away Goals	Referee	Assistant 1	Assistant 2	RoundID	MatchID	Home Team Initials	Away Team Initials
0	1930.0	13 Jul 1930 - 15:00	Group 1	Pocitos	Montevideo	France	4.0	1.0	Mexico		4444.0	3.0	0.0	LOMBARDI Domingo (URU)	CRISTOPHE Henry (BEL)	REGO Gilberto (BRA)	201.0	1096.0	FRA	MEX
1	1930.0	13 Jul 1930 - 15:00	Group 4	Parque Central	Montevideo	USA	3.0	0.0	Belgium		18346.0	2.0	0.0	MACIAS Jose (ARG)	MATEUCCI Francisco (URU)	WARNKEN Alberto (CHI)	201.0	1090.0	USA	BEL
2	1930.0	14 Jul 1930 - 12:45	Group 2	Parque Central	Montevideo	Yugoslavia	2.0	1.0	Brazil		24059.0	2.0	0.0	TEJADA Anibal (URU)	VALLARINO Ricardo (URU)	BALWAY Thomas (FRA)	201.0	1093.0	YUG	BRA
3	1930.0	14 Jul 1930 - 14:50	Group 3	Pocitos	Montevideo	Romania	3.0	1.0	Peru		2549.0	1.0	0.0	WARNKEN Alberto (CHI)	LANGENUS Jean (BEL)	MATEUCCI Francisco (URU)	201.0	1098.0	ROU	PER
4	1930.0	15 Jul 1930 - 16:00	Group 1	Parque Central	Montevideo	Argentina	1.0	0.0	France		23409.0	0.0	0.0	REGO Gilberto (BRA)	SAUCEDO Ulises (BOL)	RADULESCU Constantin (ROU)	201.0	1085.0	ARG	FRA
5	1930.0	16 Jul 1930 - 14:45	Group 1	Parque Central	Montevideo	Chile	3.0	0.0	Mexico		9249.0	1.0	0.0	CRISTOPHE Henry (BEL)	APHESTEGUY Martin (URU)	LANGENUS Jean (BEL)	201.0	1095.0	CHI	MEX
6	1930.0	17 Jul 1930 - 12:45	Group 2	Parque Central	Montevideo	Yugoslavia	4.0	0.0	Bolivia		18306.0	0.0	0.0	MATEUCCI Francisco (URU)	LOMBARDI Domingo (URU)	WARNKEN Alberto (CHI)	201.0	1092.0	YUG	BOL
7	1930.0	17 Jul 1930 - 14:45	Group 4	Parque Central	Montevideo	USA	3.0	0.0	Paraguay		18306.0	2.0	0.0	MACIAS Jose (ARG)	APHESTEGUY Martin (URU)	TEJADA Anibal (URU)	201.0	1097.0	USA	PAR
8	1930.0	18 Jul 1930 - 14:30	Group 3	Estadio Centenario	Montevideo	Uruguay	1.0	0.0	Peru		57735.0	0.0	0.0	LANGENUS Jean (BEL)	BALWAY Thomas (FRA)	CRISTOPHE Henry (BEL)	201.0	1099.0	URU	PER
9	1930.0	19 Jul 1930 - 12:50	Group 1	Estadio Centenario	Montevideo	Chile	1.0	0.0	France		2000.0	0.0	0.0	TEJADA Anibal (URU)	LOMBARDI Domingo (URU)	REGO Gilberto (BRA)	201.0	1094.0	CHI	FRA

In [88]:
```python
# We didn't considered draw matches here because in many cells we had NaN values given which corresponded to 0 values and could
# had made our pie chart biased.

def winner(data1):
    if data1['Home Team Goals'] > data1['Away Team Goals']:
        return 'Home team won'
    elif data1['Home Team Goals'] < data1['Away Team Goals']:
        return 'Away Team won'
```

In [89]:
```python
data1['winner']=data1.apply(lambda x:winner(x),axis=1)
```

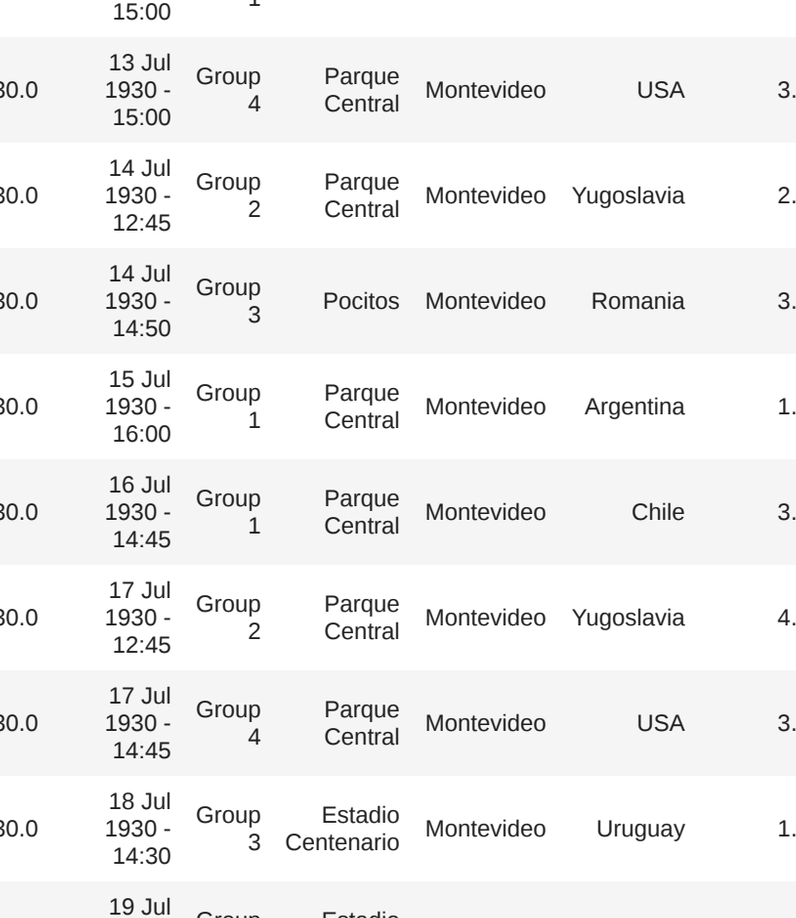
In [90]:
```python
data1['winner'].value_counts()
```

Out[90]:
```
Home team won    488
Away Team won    174
Name: winner, dtype: int64
```

In [91]:
```python
labels=['Home team won','Away Team won']
sizes=[486,174]
```

In [92]:
```python
fig, ax = plt.subplots(figsize= (4, 4), dpi = 100)
explode = (0.1, 0, 0)
ax.pie(sizes, labels = labels, autopct = '%1.1f%%', shadow = True,
      startangle = 90)

plt.show()
```



In [93]:
```python
# Insight 5 : 73.6 % of the matches were won by home team while 26.4 % were won by away team.
```

In [94]:
```python
data2.head()
```

Out[94]:

	RoundID	MatchID	Team Initials	Coach Name	Line-up	Shirt Number	Player Name	Position	Event
0	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Alex THEPOT	GK	NaN
1	201	1096	MEX	LUQUE Juan (MEX)	S	0	Oscar BONFIGLIO	GK	NaN
2	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Marcel LANGILLER	NaN	G40'
3	201	1096	MEX	LUQUE Juan (MEX)	S	0	Juan CARRENO	NaN	G70'
4	201	1096	FRA	CAUDRON Raoul (FRA)	S	0	Ernest LIBERATI	NaN	NaN

In [95]:
```python
# Team Initials and Number Of Players Played Analysis
```

In [96]:
```python
data2['Team Initials'].unique()
```

Out[96]:
```
array(['FRA', 'MEX', 'USA', 'BEL', 'YUG', 'BRA', 'ROU', 'PER', 'ARG',
       'CHI', 'BOL', 'PAR', 'URU', 'AUT', 'HUN', 'EGY', 'SUI', 'NED',
       'SWE', 'GER', 'ESP', 'ITA', 'TCH', 'INH', 'CUB', 'NOR', 'POL',
       'ENG', 'SCO', 'FRG', 'TUR', 'KOR', 'URS', 'WAL', 'NIR', 'COL',
       'BUL', 'PRK', 'POR', 'ISR', 'MAR', 'SLV', 'GDR', 'AUS', 'ZAI',
       'HAI', 'TUN', 'IRN', 'CMR', 'NZL', 'ALG', 'HON', 'KUW', 'CAN',
       'IRQ', 'DEN', 'UAE', 'CRC', 'IRL', 'KSA', 'RUS', 'GRE', 'NGA',
       'RSA', 'JPN', 'JAM', 'CRO', 'SEN', 'SVN', 'ECU', 'CHN', 'TRI',
       'CIV', 'SCG', 'ANG', 'CZE', 'GHA', 'TOG', 'UKR', 'SRB', 'SVK',
       'BIH'], dtype=object)
```

In [97]:
```python
data_nat = pd.DataFrame(data2[['Team Initials','Player Name']])
data_nat.head()
```

Out[97]:

	Team Initials	Player Name
0	FRA	Alex THEPOT
1	MEX	Oscar BONFIGLIO
2	FRA	Marcel LANGILLER
3	MEX	Juan CARRENO
4	FRA	Ernest LIBERATI

In [98]:
```python
d2 = pd.DataFrame(data_nat['Team Initials'].value_counts())
d2
```

Out[98]:

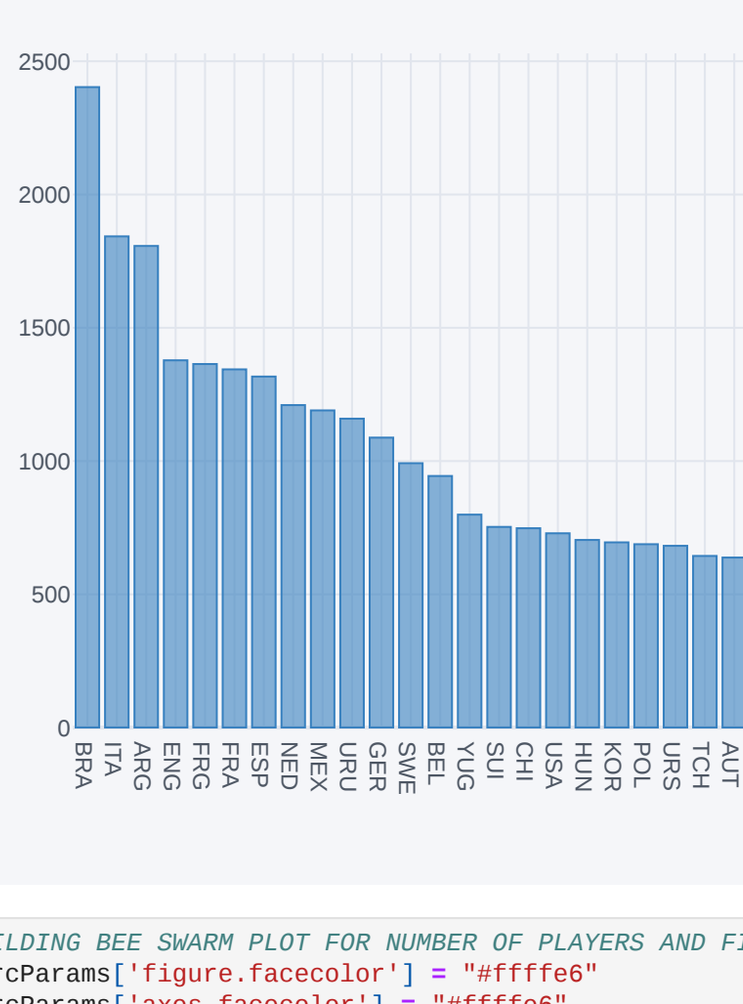
	Team Initials
BRA	2403
ITA	1843
ARG	1807
ENG	1378
FRG	1364
...	...
KUW	66
CAN	66
UAE	66
CUB	45
INH	18

82 rows × 1 columns

In [99]:
```python
d2.iplot(kind='bar',yTitle='No of players',title='Country codes vs number of players played',colors='blue',xTitle='Country code')

# Insight 6 : Brazil has played the most bnumber of players followed by Italy and Argentina
```

In [100…
```python
# BUILDING BEE SWARM PLOT FOR NUMBER OF PLAYERS AND FINDING MINIMUM AND MAXIMUM RANGE
plt.rcParams['figure.facecolor'] = "#ffffe6"
plt.rcParams['axes.facecolor'] = "#ffffe6"
p2 = sns.swarmplot( x = 'Team Initials', data = d2 , palette='inferno')
plt.title('Finding the range of players played from Minimum To Maximum')
plt.xlabel('Number Of Players')
plt.ylabel('Range of Players')
plt.show()
```



In [101…
```python
# Insight 7 : Most of the teams have played between 0  and 500 players only in the complete competition, and handful of countries have played more than 1500 players in the history o
```

In [102…
```python
# Insights,

# Insight 1 : Brazil has won the tournament most number of times
# Insight 2 : A complete depection of number of world cups won, first runner-up, and second runner-up positions by various participating teams
# Insight 3 : Brazil scored the most number of goals throughout the history of worldcup followed by Argentina and Germany.
# Insight 4 : Brazil has again scored a majority of total goals playing as home team whereas spain scored more goals playing as away country rather than home country
# Insight 5 : 73.6 % of the matches were won by home team while 26.4 % were won by away team.
# Insight 6 : Brazil has played the most bnumber of players followed by Italy and Argentina
# Insight 7 : Most of the teams have played between 0  and 500 players only in the complete competition, and handful of countries have played more than 1500 players in the history o
```

In [ ]: