Load libraries

In [3]:
```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

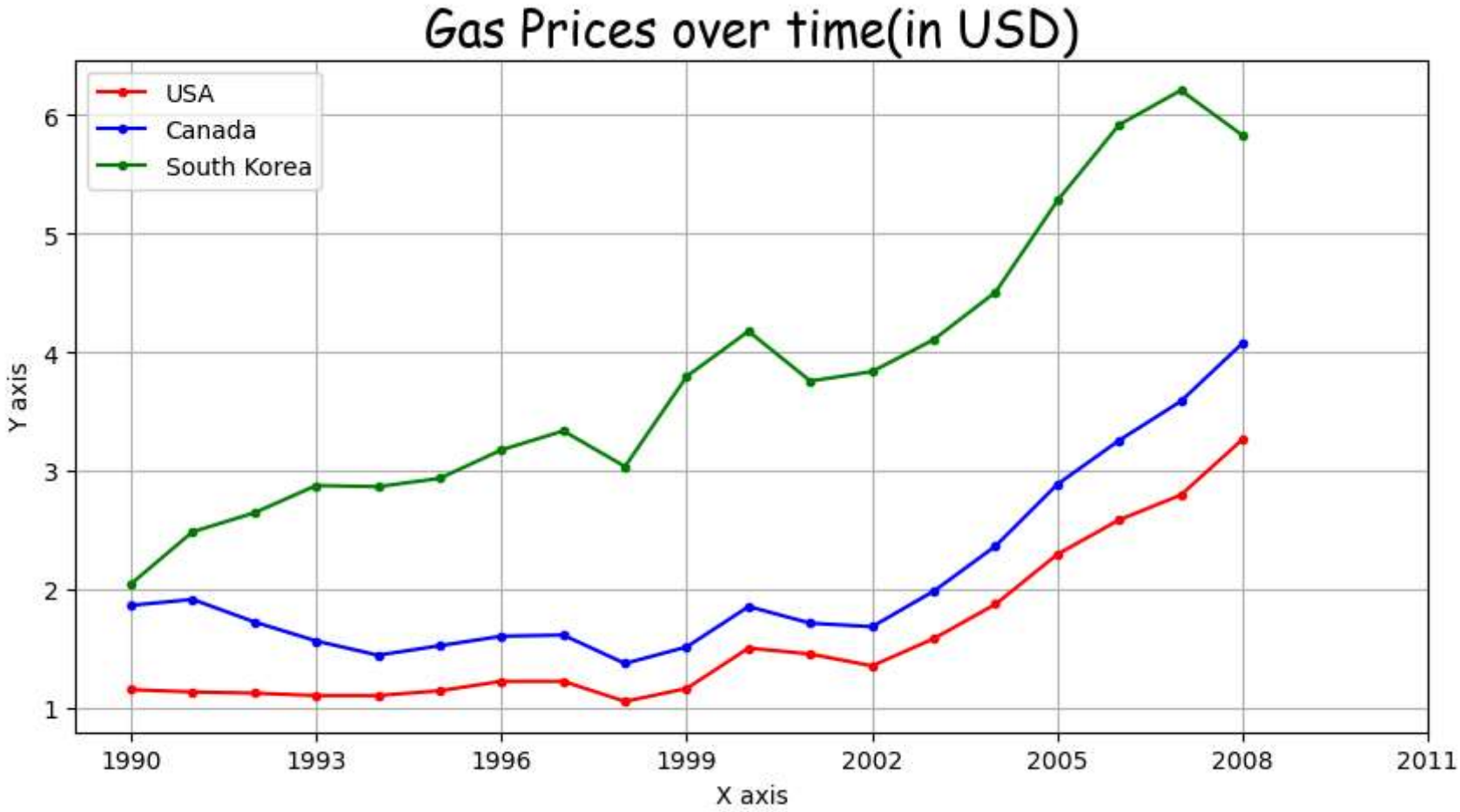
In [4]:
```
gas=pd.read_csv('gas_prices.csv')
```

In [6]:
```
gas
```

Out[6]:

	Year	Australia	Canada	France	Germany	Italy	Japan	Mexico	South Korea	UK	USA
0	1990	NaN	1.87	3.63	2.65	4.59	3.16	1.00	2.05	2.82	1.16
1	1991	1.96	1.92	3.45	2.90	4.50	3.46	1.30	2.49	3.01	1.14
2	1992	1.89	1.73	3.56	3.27	4.53	3.58	1.50	2.65	3.06	1.13
3	1993	1.73	1.57	3.41	3.07	3.68	4.16	1.56	2.88	2.84	1.11
4	1994	1.84	1.45	3.59	3.52	3.70	4.36	1.48	2.87	2.99	1.11
5	1995	1.95	1.53	4.26	3.96	4.00	4.43	1.11	2.94	3.21	1.15
6	1996	2.12	1.61	4.41	3.94	4.39	3.64	1.25	3.18	3.34	1.23
7	1997	2.05	1.62	4.00	3.53	4.07	3.26	1.47	3.34	3.83	1.23
8	1998	1.63	1.38	3.87	3.34	3.84	2.82	1.49	3.04	4.06	1.06
9	1999	1.72	1.52	3.85	3.42	3.87	3.27	1.79	3.80	4.29	1.17
10	2000	1.94	1.86	3.80	3.45	3.77	3.65	2.01	4.18	4.58	1.51
11	2001	1.71	1.72	3.51	3.40	3.57	3.27	2.20	3.76	4.13	1.46
12	2002	1.76	1.69	3.62	3.67	3.74	3.15	2.24	3.84	4.16	1.36
13	2003	2.19	1.99	4.35	4.59	4.53	3.47	2.04	4.11	4.70	1.59
14	2004	2.72	2.37	4.99	5.24	5.29	3.93	2.03	4.51	5.56	1.88
15	2005	3.23	2.89	5.46	5.66	5.74	4.28	2.22	5.28	5.97	2.30
16	2006	3.54	3.26	5.88	6.03	6.10	4.47	2.31	5.92	6.36	2.59
17	2007	3.85	3.59	6.60	6.88	6.73	4.49	2.40	6.21	7.13	2.80
18	2008	4.45	4.08	7.51	7.75	7.63	5.74	2.45	5.83	7.42	3.27

In [36]:
```
#resize figure
plt.figure(figsize=(10,5),dpi=100)

plt.plot(gas['Year'],gas['USA'],'r.-',label='USA')
plt.plot(gas['Year'],gas['Canada'],'b.-',label='Canada')
plt.plot(gas['Year'],gas['South Korea'],'g.-',label='South Korea')

#plt.title('Our first graph')
plt.title('Gas Prices over time(in USD)',fontdict={'fontname':'Comic Sans MS','fontsize':20})
plt.xlabel('X axis')
plt.ylabel('Y axis')

#plt.xticks(gas['Year'][::3])      #important: check that the xticks working every 3 years
#Add 2011 to the graph
plt.xticks(gas['Year'][::3].tolist()+[2011])


#plt.yticks([0,2,4,6,8])

plt.legend()
plt.grid()
plt.show()
```

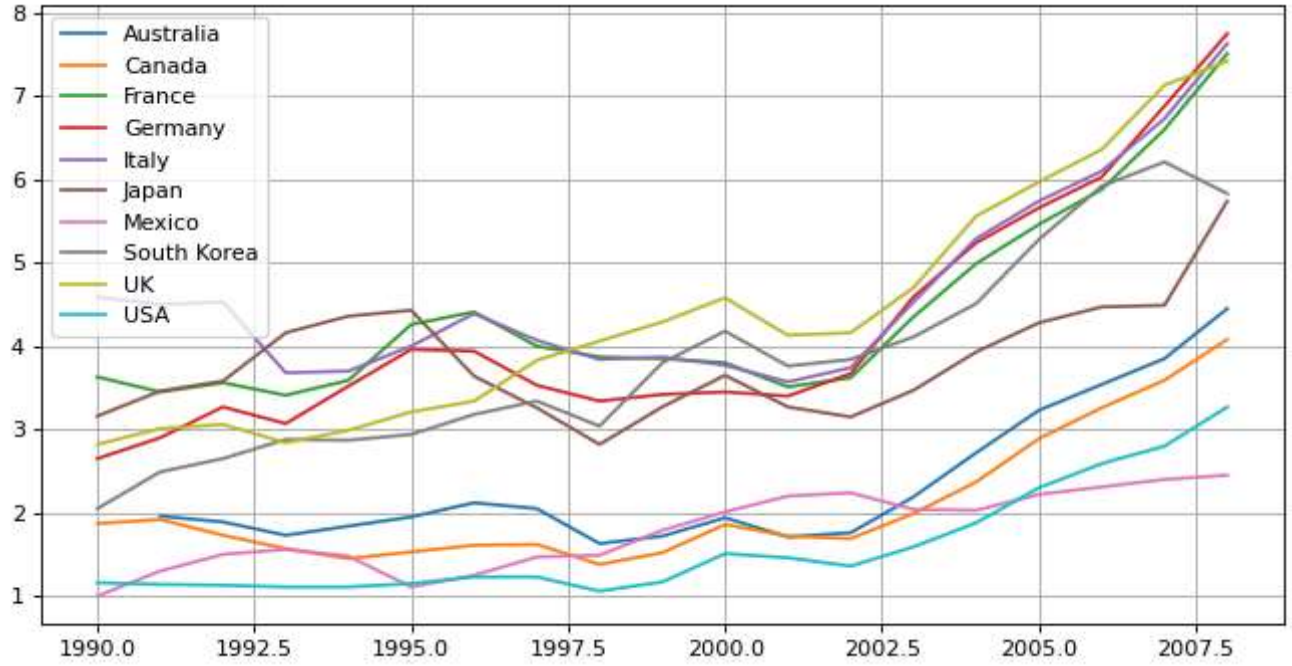


In [26]:
```
gas.columns[1:]
```

Out[26]:
```
Index(['Australia', 'Canada', 'France', 'Germany', 'Italy', 'Japan', 'Mexico',
       'South Korea', 'UK', 'USA'],
      dtype='object')
```

Very important example for multiple plots

In [82]:
```
plt.figure(figsize=(10,5),dpi=80)
for country in gas.columns[1:]:
    plt.plot(gas['Year'],gas[country])
my_legend=gas.columns[1:]
plt.legend(my_legend)
plt.grid()
plt.show()
```



In [75]:
```
my_legend
```

Out[75]:
```
Index(['Australia', 'Canada', 'France', 'Germany', 'Italy', 'Japan', 'Mexico',
       'South Korea', 'UK', 'USA'],
      dtype='object')
```

Q: how can i add multiple legends wile running in for loop for plotting

???

working with FIFA data

In [4]:
```
fifa=pd.read_csv('fifa_data.csv')
```

In [38]:
```
fifa
```

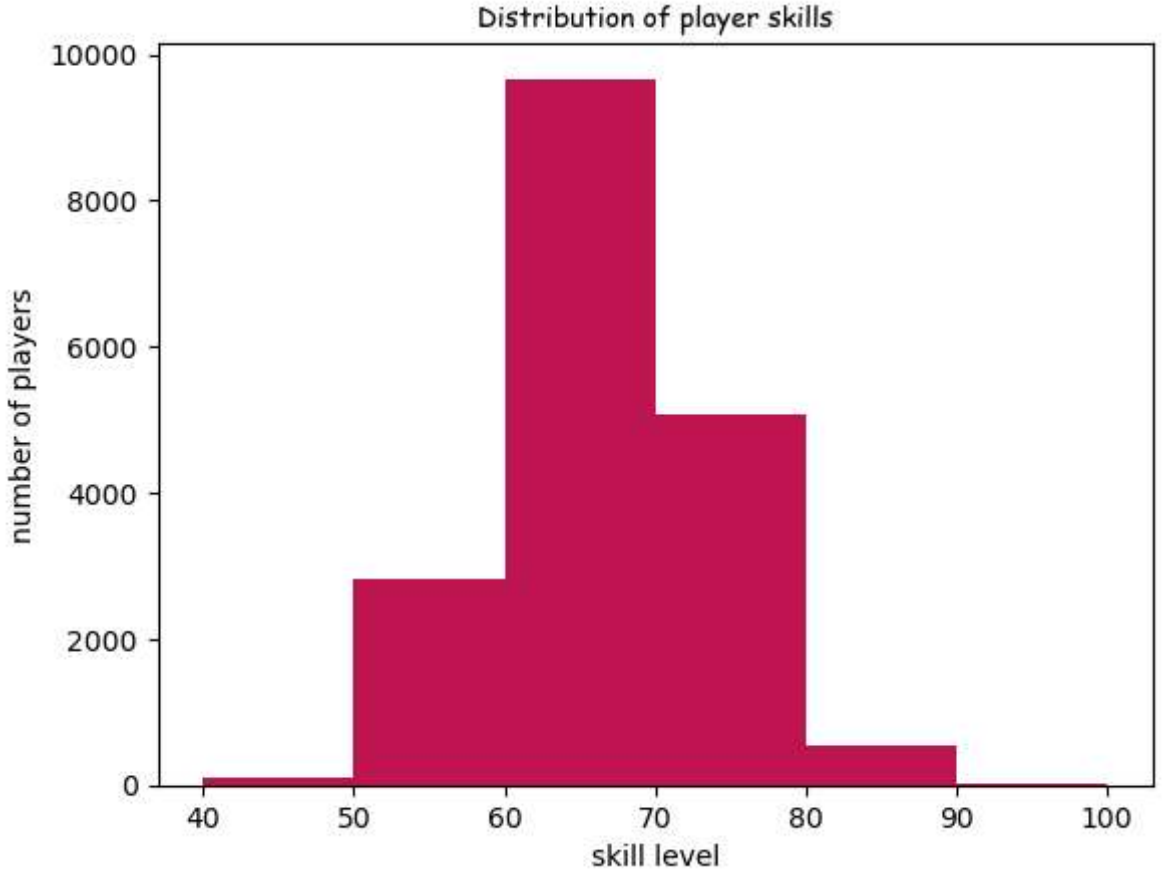
Out[38]:

	Unnamed: 0	ID	Name	Age	Photo	Nationality	Flag	Overall	Potenti
0	0	158023	L. Messi	31	https://cdn.sofifa.org/players/4/19/158023.png	Argentina	https://cdn.sofifa.org/flags/52.png	94	9
1	1	20801	Cristiano Ronaldo	33	https://cdn.sofifa.org/players/4/19/20801.png	Portugal	https://cdn.sofifa.org/flags/38.png	94	9
2	2	190871	Neymar Jr	26	https://cdn.sofifa.org/players/4/19/190871.png	Brazil	https://cdn.sofifa.org/flags/54.png	92	9
3	3	193080	De Gea	27	https://cdn.sofifa.org/players/4/19/193080.png	Spain	https://cdn.sofifa.org/flags/45.png	91	9
4	4	192985	K. De Bruyne	27	https://cdn.sofifa.org/players/4/19/192985.png	Belgium	https://cdn.sofifa.org/flags/7.png	91	9
...	...	...	...	...	...	...	...	...	
18202	18202	238813	J. Lundstram	19	https://cdn.sofifa.org/players/4/19/238813.png	England	https://cdn.sofifa.org/flags/14.png	47	6
18203	18203	243165	N. Christoffersson	19	https://cdn.sofifa.org/players/4/19/243165.png	Sweden	https://cdn.sofifa.org/flags/46.png	47	6
18204	18204	241638	B. Worman	16	https://cdn.sofifa.org/players/4/19/241638.png	England	https://cdn.sofifa.org/flags/14.png	47	6
18205	18205	246268	D. Walker-Rice	17	https://cdn.sofifa.org/players/4/19/246268.png	England	https://cdn.sofifa.org/flags/14.png	47	6
18206	18206	246269	G. Nugent	16	https://cdn.sofifa.org/players/4/19/246269.png	England	https://cdn.sofifa.org/flags/14.png	46	6

18207 rows × 89 columns

Histograms

In [6]:
```
plt.hist(fifa['Overall'],bins=np.arange(40,110,10),color='#c21552')

plt.xticks(np.arange(40,110,10))

plt.title('Distribution of player skills',fontdict={'fontname':'Comic Sans MS','fontsize':10})
plt.xlabel('skill level')
plt.ylabel('number of players')

plt.show()
```



Pie charts

In [7]:
```
fifa.columns
```

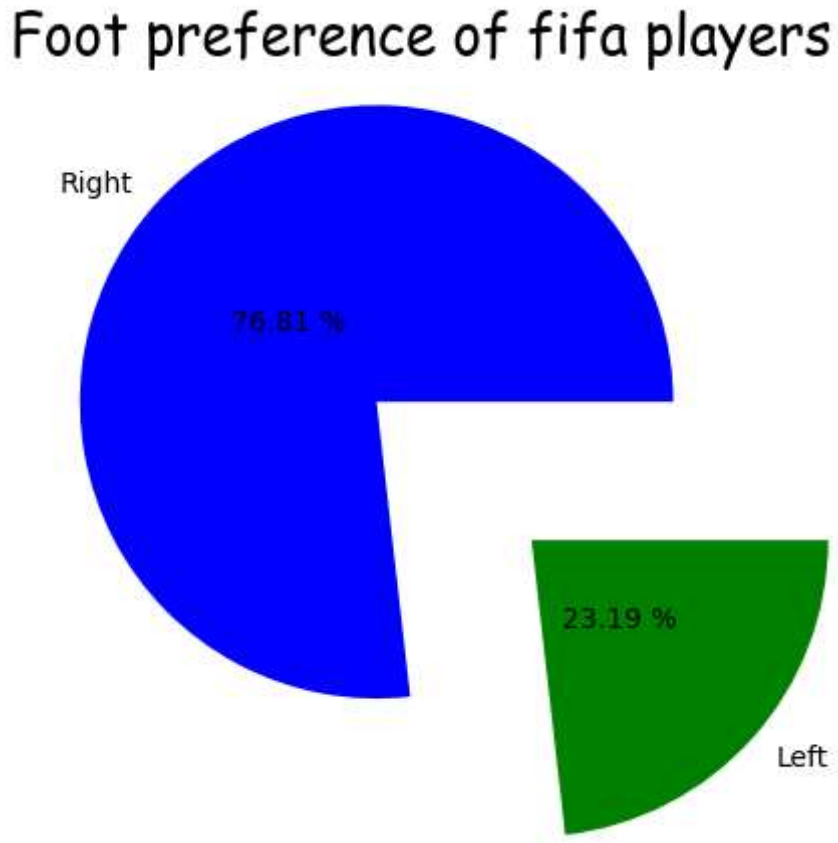
Out[7]:
```
Index(['Unnamed: 0', 'ID', 'Name', 'Age', 'Photo', 'Nationality', 'Flag',
       'Overall', 'Potential', 'Club', 'Club Logo', 'Value', 'Wage', 'Special',
       'Preferred Foot', 'International Reputation', 'Weak Foot',
       'Skill Moves', 'Work Rate', 'Body Type', 'Real Face', 'Position',
       'Jersey Number', 'Joined', 'Loaned From', 'Contract Valid Until',
       'Height', 'Weight', 'LS', 'ST', 'RS', 'LW', 'LF', 'CF', 'RF', 'RW',
       'LAM', 'CAM', 'RAM', 'LM', 'LCM', 'CM', 'RCM', 'RM', 'LWB', 'LDM',
       'CDM', 'RDM', 'RWB', 'LB', 'LCB', 'CB', 'RCB', 'RB', 'Crossing',
       'Finishing', 'HeadingAccuracy', 'ShortPassing', 'Volleys', 'Dribbling',
       'Curve', 'FKAccuracy', 'LongPassing', 'BallControl', 'Acceleration',
       'SprintSpeed', 'Agility', 'Reactions', 'Balance', 'ShotPower',
       'Jumping', 'Stamina', 'Strength', 'LongShots', 'Aggression',
       'Interceptions', 'Positioning', 'Vision', 'Penalties', 'Composure',
       'Marking', 'StandingTackle', 'SlidingTackle', 'GKDiving', 'GKHandling',
       'GKKicking', 'GKPositioning', 'GKReflexes', 'Release Clause'],
      dtype='object')
```

In [8]:
```
fifa['Preferred Foot']
```

Out[8]:
```
0         Left
1        Right
2        Right
3        Right
4        Right
         ...
18202    Right
18203    Right
18204    Right
18205    Right
18206    Right
Name: Preferred Foot, Length: 18207, dtype: object
```

In [9]:
```
Right_foot=fifa['Preferred Foot'].value_counts()['Right']
Left_foot=fifa['Preferred Foot'].value_counts()['Left']
```

In [39]:
```
my_labels=['Right','Left']
my_colors=['b','g']

#plt.style.use('ggplot')            #for different types of style apart from the default ones

my_explode=(0.2,0.5)
plt.pie([Right_foot,Left_foot],labels=my_labels,colors=my_colors,autopct='%.2f %%',pctdistance=0.4, explode=my_explode)
plt.title('Foot preference of fifa players',fontdict={'fontname':'Comic Sans MS','fontsize':20})


plt.show()
```



In [11]:
```
fifa['Weight']
```

Out[11]:
```
0        159lbs
1        183lbs
2        150lbs
3        168lbs
4        154lbs
          ...
18202    134lbs
18203    170lbs
18204    148lbs
18205    154lbs
18206    176lbs
Name: Weight, Length: 18207, dtype: object
```

In [12]:
```
fifa.Weight
```

Out[12]:
```
0        159lbs
1        183lbs
2        150lbs
3        168lbs
4        154lbs
          ...
18202    134lbs
18203    170lbs
18204    148lbs
18205    154lbs
18206    176lbs
Name: Weight, Length: 18207, dtype: object
```

convert waight to numeric and to kgs (Important)

In [22]:
```
fifa['Weight']=[int(x.strip('lbs')) if type(x)==str else x for x in fifa['Weight']]
```

In [23]:
```
fifa['Weight']
```

Out[23]:
```
0        159.0
1        183.0
2        150.0
3        168.0
4        154.0
         ...
18202    134.0
18203    170.0
18204    148.0
18205    154.0
18206    176.0
Name: Weight, Length: 18207, dtype: float64
```

In [26]:
```
len(fifa[fifa['Weight']<125.0])
```

Out[26]:
```
41
```

Box and whiskers chart

In [40]:
```
fifa.head(10)
```

Out[40]:

	Unnamed: 0	ID	Name	Age	Photo	Nationality	Flag	Overall	Potential	
0	0	158023	L. Messi	31	https://cdn.sofifa.org/players/4/19/158023.png	Argentina	https://cdn.sofifa.org/flags/52.png	94	94	Barce
1	1	20801	Cristiano Ronaldo	33	https://cdn.sofifa.org/players/4/19/20801.png	Portugal	https://cdn.sofifa.org/flags/38.png	94	94	Juve
2	2	190871	Neymar Jr	26	https://cdn.sofifa.org/players/4/19/190871.png	Brazil	https://cdn.sofifa.org/flags/54.png	92	93	Paris S Ger
3	3	193080	De Gea	27	https://cdn.sofifa.org/players/4/19/193080.png	Spain	https://cdn.sofifa.org/flags/45.png	91	93	Manche U
4	4	192985	K. De Bruyne	27	https://cdn.sofifa.org/players/4/19/192985.png	Belgium	https://cdn.sofifa.org/flags/7.png	91	92	Manche
5	5	183277	E. Hazard	27	https://cdn.sofifa.org/players/4/19/183277.png	Belgium	https://cdn.sofifa.org/flags/7.png	91	91	Che
6	6	177003	L. Modrić	32	https://cdn.sofifa.org/players/4/19/177003.png	Croatia	https://cdn.sofifa.org/flags/10.png	91	91	Ma
7	7	176580	L. Suárez	31	https://cdn.sofifa.org/players/4/19/176580.png	Uruguay	https://cdn.sofifa.org/flags/60.png	91	91	Barce
8	8	155862	Sergio Ramos	32	https://cdn.sofifa.org/players/4/19/155862.png	Spain	https://cdn.sofifa.org/flags/45.png	91	91	Ma
9	9	200389	J. Oblak	25	https://cdn.sofifa.org/players/4/19/200389.png	Slovenia	https://cdn.sofifa.org/flags/44.png	90	93	Atl Ma

10 rows × 89 columns

In [64]:
```
fifa.sort_values(by=['Overall'],ascending=False).head(10)
```

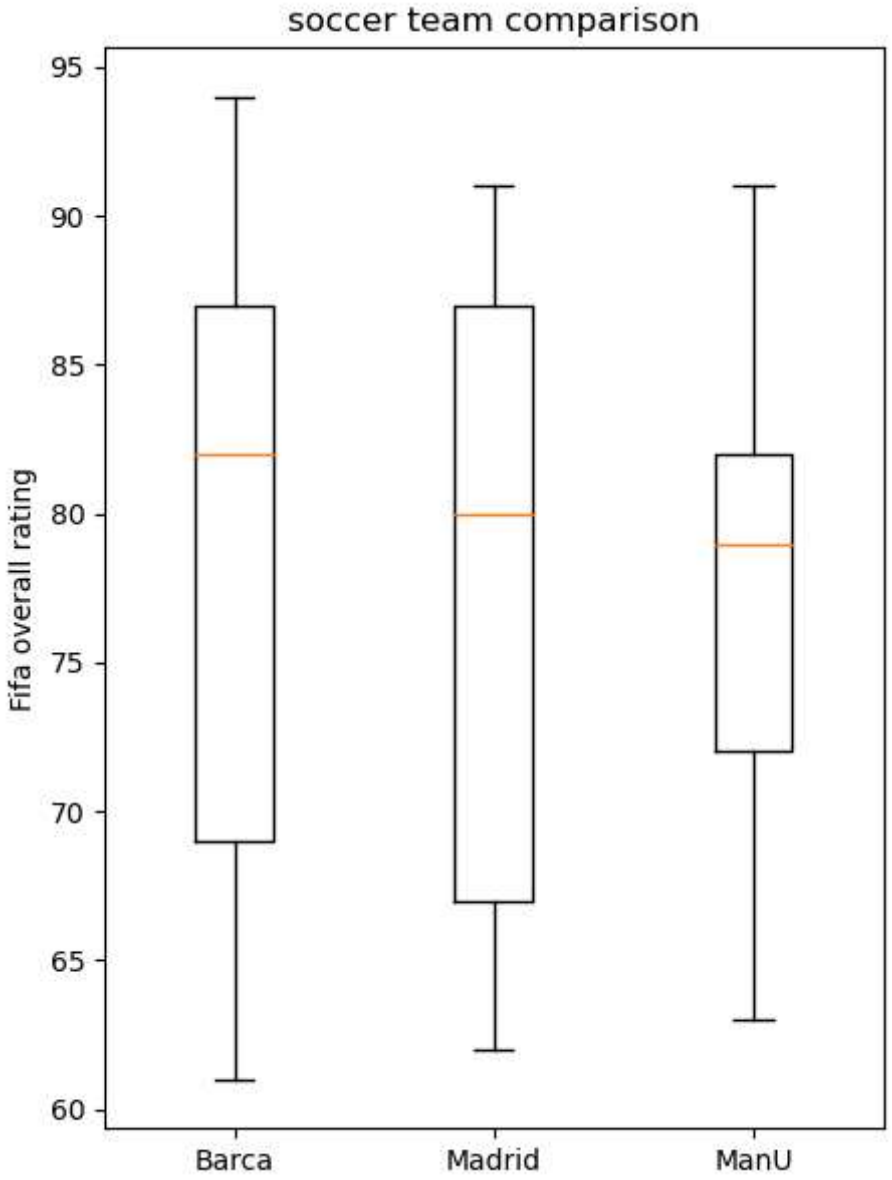
Out[64]:

	Unnamed: 0	ID	Name	Age	Photo	Nationality	Flag	Overall	Potential	
0	0	158023	L. Messi	31	https://cdn.sofifa.org/players/4/19/158023.png	Argentina	https://cdn.sofifa.org/flags/52.png	94	94	Barc
1	1	20801	Cristiano Ronaldo	33	https://cdn.sofifa.org/players/4/19/20801.png	Portugal	https://cdn.sofifa.org/flags/38.png	94	94	Juv
2	2	190871	Neymar Jr	26	https://cdn.sofifa.org/players/4/19/190871.png	Brazil	https://cdn.sofifa.org/flags/54.png	92	93	Paris Ge
3	3	193080	De Gea	27	https://cdn.sofifa.org/players/4/19/193080.png	Spain	https://cdn.sofifa.org/flags/45.png	91	93	Manch U
4	4	192985	K. De Bruyne	27	https://cdn.sofifa.org/players/4/19/192985.png	Belgium	https://cdn.sofifa.org/flags/7.png	91	92	Manch
5	5	183277	E. Hazard	27	https://cdn.sofifa.org/players/4/19/183277.png	Belgium	https://cdn.sofifa.org/flags/7.png	91	91	Ch
6	6	177003	L. Modrić	32	https://cdn.sofifa.org/players/4/19/177003.png	Croatia	https://cdn.sofifa.org/flags/10.png	91	91	M
7	7	176580	L. Suárez	31	https://cdn.sofifa.org/players/4/19/176580.png	Uruguay	https://cdn.sofifa.org/flags/60.png	91	91	Barc
8	8	155862	Sergio Ramos	32	https://cdn.sofifa.org/players/4/19/155862.png	Spain	https://cdn.sofifa.org/flags/45.png	91	91	M
12	12	182493	D. Godín	32	https://cdn.sofifa.org/players/4/19/182493.png	Uruguay	https://cdn.sofifa.org/flags/60.png	90	90	A M

10 rows × 89 columns

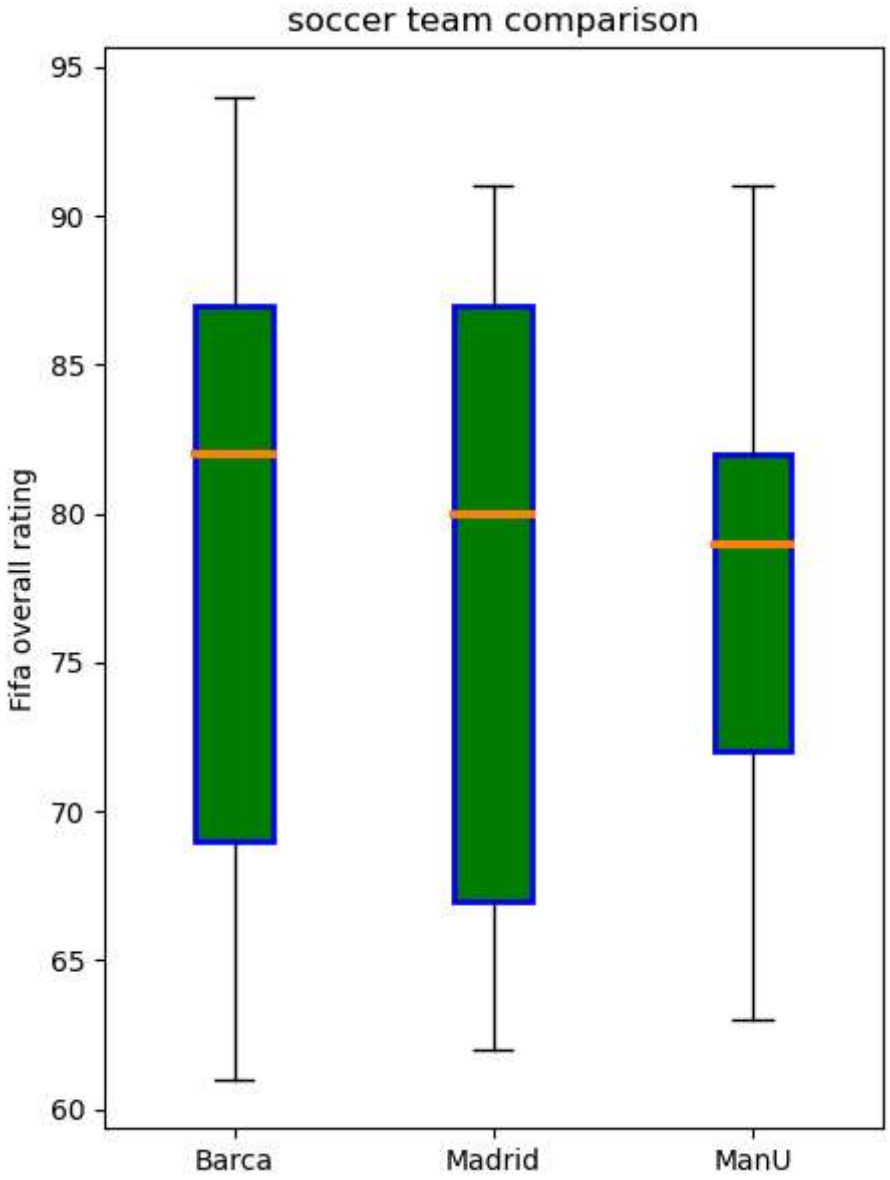
plot 1

In [70]:
```
barca=fifa[fifa.Club=='FC Barcelona']['Overall']
madrid=fifa[fifa.Club=='Real Madrid']['Overall']
ManU=fifa[fifa.Club=='Manchester United']['Overall']

plt.figure(figsize=(5,7),dpi=100)
plt.style.use('default')
my_labels=['Barca','Madrid','ManU']

plt.boxplot([barca,madrid,ManU],labels=my_labels)
plt.title('soccer team comparison')
plt.ylabel('Fifa overall rating')

plt.show()
```


soccer team comparison
Fifa overall rating
95
90
85
80
75
70
65
60
Barca
Madrid
ManU

plot 2

In [73]:
```
barca=fifa[fifa.Club=='FC Barcelona']['Overall']
madrid=fifa[fifa.Club=='Real Madrid']['Overall']
ManU=fifa[fifa.Club=='Manchester United']['Overall']

plt.figure(figsize=(5,7),dpi=100)
plt.style.use('default')
my_labels=['Barca','Madrid','ManU']

boxes=plt.boxplot([barca,madrid,ManU],labels=my_labels,patch_artist=True,medianprops={'linewidth':3})

for box in boxes['boxes']:
    box.set(color='b',linewidth=2)
    box.set(facecolor='g')

plt.title('soccer team comparison')
plt.ylabel('Fifa overall rating')

plt.show()
```


soccer team comparison
Fifa overall rating
95
90
85
80
75
70
65
60
Barca
Madrid
ManU

In [ ]: