```python
import numpy as np
import pandas as pd


from google.colab import drive
drive.mount('/content/drive')
```

⬕→ Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.m

```python
data = pd.read_csv('/content/drive/My Drive/Colab Notebooks/project21july/Laliga.csv')
```

```python
data
```

⬕→

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	G
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	
2	3	Atletico Madrid	80	3442	2614	1241	598	775	
3	4	Valencia	82	3386	2664	1187	616	861	
4	5	Athletic Bilbao	86	3368	2762	1209	633	920	
5	6	Sevilla	73	2819	2408	990	531	887	
6	7	Espanyol	82	2792	2626	948	608	1070	
7	8	Real Sociedad	70	2573	2302	864	577	861	
8	9	Zaragoza	58	2109	1986	698	522	766	
9	10	Real Betis	51	1884	1728	606	440	682	
10	11	Deportivo La Coruna	45	1814	1530	563	392	575	
11	12	Celta Vigo	51	1789	1698	586	389	723	
12	13	Valladolid	42	1471	1466	463	384	619	
13	14	Racing Santander	44	1416	1428	453	336	639	
14	15	Sporting Gijon	43	1389	1458	471	358	629	
15	16	Osasuna	37	1351	1318	426	327	565	
16	17	Malaga	36	1314	1255	390	330	535	
17	18	Oviedo	38	1174	1192	408	292	492	
18	19	Mallorca	27	1148	988	333	256	399	
19	20	Las Palmas	33	1020	1096	367	242	487	
20	21	Villarreal	17	970	646	266	172	208	
21	22	Granada	23	667	742	218	175	349	

22	23	Rayo Vallecano	17	662	652	189	148	305
23	24	Elche	21	606	678	203	180	295
24	25	Getafe	12	553	456	147	112	197
25	26	Hercules	20	538	628	184	149	295
26	27	Tenerife	13	510	494	155	128	211
27	28	Murcia	18	445	586	145	143	298
28	29	Alaves	12	421	380	125	81	174
29	30	Levante	11	416	402	113	95	194
...	...	...	...	...	...	...	...	...
31	32	Sabadell	14	353	426	129	95	202
32	33	Cadiz	12	343	448	104	127	217
33	34	Logrones	9	293	346	96	92	158
34	35	Castellon	11	285	334	103	79	152
35	36	Albacete	7	277	270	76	76	118
36	37	Almeria	6	242	228	62	56	110
37	38	Cordoba	9	230	282	82	63	137
38	39	Compostela	4	190	160	52	45	63

```
data=data.replace('-', 0)
print(data_replace)
#replace dashes with 0 to make sure you can perform arithmetic operations on the data
```

↪

	Pos	Team	Seasons	...	BestPosition	DebutFirst	DebutSecond
0	1	Real Madrid	86	...	1	1929	None
1	2	Barcelona	86	...	1	1929	None
2	3	Atletico Madrid	80	...	1	1929	None
3	4	Valencia	82	...	1	1931	32
4	5	Athletic Bilbao	86	...	1	1929	None
5	6	Sevilla	73	...	1	1934	35
6	7	Espanyol	82	...	3	1929	None
7	8	Real Sociedad	70	...	1	1929	None
8	9	Zaragoza	58	...	2	1939	40
9	10	Real Betis	51	...	1	1932	33
10	11	Deportivo La Coruna	45	...	1	1941	42
11	12	Celta Vigo	51	...	4	1939	40
12	13	Valladolid	42	...	4	1948	49
13	14	Racing Santander	44	...	2	1929	None
14	15	Sporting Gijon	43	...	2	1944	45
15	16	Osasuna	37	...	4	1935	36
16	17	Malaga	36	...	4	1949	50
17	18	Oviedo	38	...	3	1933	34
18	19	Mallorca	27	...	3	1960	61
19	20	Las Palmas	33	...	2	1951	52
20	21	Villarreal	17	...	2	1998	99
21	22	Granada	23	...	6	1941	42
22	23	Rayo Vallecano	17	...	8	1977	78
23	24	Elche	21	...	5	1959	60
24	25	Getafe	12	...	6	2004	05
25	26	Hercules	20	...	5	1935	36
26	27	Tenerife	13	...	5	1961	62
27	28	Murcia	18	...	11	1940	41
28	29	Alaves	12	...	6	1930	31
29	30	Levante	11	...	6	1963	64
..	...	...	...	...	...	...	...
31	32	Sabadell	14	...	4	1943	44
32	33	Cadiz	12	...	12	1977	78
33	34	Logrones	9	...	7	1987	88
34	35	Castellon	11	...	4	1941	42
35	36	Albacete	7	...	7	1991	92
36	37	Almeria	6	...	8	2007	08
37	38	Cordoba	9	...	5	1962	63
38	39	Compostela	4	...	10	1994	95
39	40	Recreativo	5	...	8	1978	79
40	41	Burgos CF	6	...	12	1971	72
41	42	Pontevedra	6	...	7	1963	64
42	43	Numancia	4	...	17	1999	00
43	44	Eibar	3	...	10	2014	15
44	45	Arenas	7	...	3	1929	None
45	46	Real Burgos	3	...	9	1990	91
46	47	Gimnastic	4	...	7	1947	48
47	48	Extremadura	2	...	17	1996	97
48	49	Merida	2	...	19	1995	96
49	50	Alcoyano	4	...	10	1945	46
50	51	Jaen	3	...	14	1953	54
51	52	Real Union	4	...	6	1929	None
52	53	AD Almeria	2	...	10	1979	80
53	54	Europa	3	...	8	1929	None
54	55	Lleida	2	...	16	1950	51
55	56	Leganes	1	...	17	2016	17
56	57	Xerez	1	...	20	2009	10
57	58	Condal	1	...	16	1956	57
58	59	Atletico Tetuan	1	...	16	1951	52
59	60	Cultural Leonesa	1	...	15	1955	56

```
    60   61              Girona       1 ...              9      2017        18

    [61 rows x 22 columns]
```

```python
new = data_replace["Debut"].str.split("-", n = 1, expand = True)
data_replace["DebutFirst"]= new[0]
data_replace["DebutSecond"]= new[1]


data_replace
```

⤷

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	G
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	
2	3	Atletico Madrid	80	3442	2614	1241	598	775	
3	4	Valencia	82	3386	2664	1187	616	861	
4	5	Athletic Bilbao	86	3368	2762	1209	633	920	
5	6	Sevilla	73	2819	2408	990	531	887	
6	7	Espanyol	82	2792	2626	948	608	1070	
7	8	Real Sociedad	70	2573	2302	864	577	861	
8	9	Zaragoza	58	2109	1986	698	522	766	
9	10	Real Betis	51	1884	1728	606	440	682	
10	11	Deportivo La Coruna	45	1814	1530	563	392	575	
11	12	Celta Vigo	51	1789	1698	586	389	723	
12	13	Valladolid	42	1471	1466	463	384	619	
13	14	Racing Santander	44	1416	1428	453	336	639	
14	15	Sporting Gijon	43	1389	1458	471	358	629	
15	16	Osasuna	37	1351	1318	426	327	565	
16	17	Malaga	36	1314	1255	390	330	535	
17	18	Oviedo	38	1174	1192	408	292	492	
18	19	Mallorca	27	1148	988	333	256	399	
19	20	Las Palmas	33	1020	1096	367	242	487	
20	21	Villarreal	17	970	646	266	172	208	
21	22	Granada	23	667	742	218	175	349	

22	23	Rayo Vallecano	17	662	652	189	148	305
23	24	Elche	21	606	678	203	180	295
24	25	Getafe	12	553	456	147	112	197
25	26	Hercules	20	538	628	184	149	295
26	27	Tenerife	13	510	494	155	128	211
27	28	Murcia	18	445	586	145	143	298
28	29	Alaves	12	421	380	125	81	174
29	30	Levante	11	416	402	113	95	194
...	...	...	...	...	...	...	...	...
31	32	Sabadell	14	353	426	129	95	202
32	33	Cadiz	12	343	448	104	127	217
33	34	Logrones	9	293	346	96	92	158
34	35	Castellon	11	285	334	103	79	152
35	36	Albacete	7	277	270	76	76	118
36	37	Almeria	6	242	228	62	56	110
37	38	Cordoba	9	230	282	82	63	137
38	39	Compostela	4	190	160	52	45	63

```
Debute_Data= data_replace.loc[(data_replace['DebutFirst'] > '1930') & (data_replace['DebutFirst']
```

| **39** | 40 | Recreativo | 3 | 188 | 180 | 50 | 40 | 90 |

```
Debute_Data
#output of the teams which have started playing between 1930-1980
```

⤷

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	Go
3	4	Valencia	82	3386	2664	1187	616	861	
5	6	Sevilla	73	2819	2408	990	531	887	
8	9	Zaragoza	58	2109	1986	698	522	766	
9	10	Real Betis	51	1884	1728	606	440	682	
10	11	Deportivo La Coruna	45	1814	1530	563	392	575	
11	12	Celta Vigo	51	1789	1698	586	389	723	
12	13	Valladolid	42	1471	1466	463	384	619	
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16	17	Malaga	36	1314	1255	390	330	535	
17	18	Oviedo	38	1174	1192	408	292	492	
18	19	Mallorca	27	1148	988	333	256	399	
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26	27	Tenerife	13	510	494	155	128	211	
27	28	Murcia	18	445	586	145	143	298	
29	30	Levante	11	416	402	113	95	194	

```
data.sort_values('Points', inplace=True, ascending=True )
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-49-a798c8171df8> in <module>()
----> 1 data.sort_values('Points', inplace=True, ascending=True )
```

↕ 1 frames

```
/usr/local/lib/python3.6/dist-packages/pandas/core/sorting.py in nargsort(items, kind
    271             non_nans = non_nans[::-1]
    272             non_nan_idx = non_nan_idx[::-1]
--> 273         indexer = non_nan_idx[non_nans.argsort(kind=kind)]
    274         if not ascending:
    275             indexer = indexer[::-1]

TypeError: '<' not supported between instances of 'int' and 'str'
```

SEARCH STACK OVERFLOW

```
data_replace[:5]
#list of teams which came Top 5 in terms of points
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	Goal
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	
2	3	Atletico Madrid	80	3442	2614	1241	598	775	

```
data=data.replace('-', 0)
#replace dashes with 0 to make sure you can perform arithmetic operations on the data
```

```
data['GoalsAgainst'] =data['GoalsAgainst'].astype(int)
data['GoalsFor'] =data['GoalsFor'].astype(int)
data['GamesPlayed'] =data['GamesPlayed'].astype(int)
data['GamesWon'] =data['GamesWon'].astype(int)
data['Points'] =data['Points'].astype(int)
```

```
data['Goal_diff_count'] = data['GoalsFor'] - data['GoalsAgainst']

#output of Goal_diff_count = GoalsFor - GoalsAgainst
```

```
data
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	G
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	
2	3	Atletico Madrid	80	3442	2614	1241	598	775	
3	4	Valencia	82	3386	2664	1187	616	861	
4	5	Athletic Bilbao	86	3368	2762	1209	633	920	
5	6	Sevilla	73	2819	2408	990	531	887	
6	7	Espanyol	82	2792	2626	948	608	1070	
7	8	Real Sociedad	70	2573	2302	864	577	861	
8	9	Zaragoza	58	2109	1986	698	522	766	
9	10	Real Betis	51	1884	1728	606	440	682	
10	11	Deportivo La Coruna	45	1814	1530	563	392	575	
11	12	Celta Vigo	51	1789	1698	586	389	723	
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13	14	Racing Santander	44	1416	1428	453	336	639	
14	15	Sporting Gijon	43	1389	1458	471	358	629	
15	16	Osasuna	37	1351	1318	426	327	565	
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17	18	Oviedo	38	1174	1192	408	292	492	
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25	26	Hercules	20	538	628	184	149	295
26	27	Tenerife	13	510	494	155	128	211
27	28	Murcia	18	445	586	145	143	298
28	29	Alaves	12	421	380	125	81	174
29	30	Levante	11	416	402	113	95	194
...	...	...	...	...	...	...	...	...
31	32	Sabadell	14	353	426	129	95	202
32	33	Cadiz	12	343	448	104	127	217
33	34	Logrones	9	293	346	96	92	158
34	35	Castellon	11	285	334	103	79	152
35	36	Albacete	7	277	270	76	76	118
36	37	Almeria	6	242	228	62	56	110
37	38	Cordoba	9	230	282	82	63	137
38	39	Compostela	4	190	160	52	45	63

```python
print(data.dtypes)
```

```
Pos                 int64
Team               object
Seasons             int64
Points              int64
GamesPlayed         int64
GamesWon            int64
GamesDrawn         object
GamesLost          object
GoalsFor            int64
GoalsAgainst        int64
Champion           object
Runner-up          object
Third              object
Fourth             object
Fifth              object
Sixth              object
T                  object
Debut              object
Since/LastApp      object
BestPosition        int64
```

```python
Gaoldiffmax = data.groupby(['Team'])['Goal_diff_count'].max()
```

```python
Gaoldiffmax
```

⊏→

```
Team
AD Almeria              -45
Alaves                 -165
Albacete                -90
Alcoyano               -107
Almeria                -122
Arenas                  -81
Athletic Bilbao         931
Atletico Madrid        1225
Atletico Tetuan         -34
Barcelona              2786
Burgos CF               -94
Cadiz                  -269
Castellon              -169
Celta Vigo             -346
Compostela              -42
Condal                  -20
Cordoba                -145
Cultural Leonesa        -31
Deportivo La Coruna    -136
Eibar                   -28
Elche                  -272
Espanyol               -280
Europa                  -34
Extremadura             -55
Getafe                 -113
Gimnastic              -114
Girona                    0
Granada                -338
Hercules               -334
Jaen                    -62
                        ...
Leganes                 -19
Levante                -202
Lleida                 -112
Logrones               -198
Malaga                 -342
Mallorca               -189
Merida                  -45
Murcia                 -385
Numancia                -98
Osasuna                -334
Oviedo                 -309
Pontevedra              -56
Racing Santander       -525
Rayo Vallecano         -328
Real Betis             -333
Real Burgos             -38
Real Madrid            2807
Real Sociedad            -2
Real Union              -31
Recreativo              -94
Sabadell               -228
Salamanca              -159
Sevilla                 307
Sporting Gijon         -399
Tenerife               -125
Valencia                929
Valladolid             -413
Villarreal              103
Xerez                   -28
```

```
        Zaragoza                     -164
        Name: Goal_diff_count, Length: 61, dtype: int64
```

```
data[data['Goal_diff_count']==data['Goal_diff_count'].max()]
```

```
#the team which has maximum  goal difference
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	GoalsFo
		Real							

```
data[data['Goal_diff_count']==data['Goal_diff_count'].min()]
```

```
#the team which has minimum  goal difference
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	Goa
		Racing							

```
data['WinningPct'] = data['GamesWon']/data['GamesPlayed'].sum()
```

```
#Percentage of Winning = (GamesWon / GamesPlayed)*100
```

```
data
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	G
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	
2	3	Atletico Madrid	80	3442	2614	1241	598	775	
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8	9	Zaragoza	58	2109	1986	698	522	766	
9	10	Real Betis	51	1884	1728	606	440	682	
10	11	Deportivo La Coruna	45	1814	1530	563	392	575	
11	12	Celta Vigo	51	1789	1698	586	389	723	
12	13	Valladolid	42	1471	1466	463	384	619	
13	14	Racing Santander	44	1416	1428	453	336	639	
14	15	Sporting Gijon	43	1389	1458	471	358	629	
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19	20	Las Palmas	33	1020	1096	367	242	487	
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28	29	Alaves	12	421	380	125	81	174
29	30	Levante	11	416	402	113	95	194
...	...	...	...	...	...	...	...	...
31	32	Sabadell	14	353	426	129	95	202
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37	38	Cordoba	9	230	282	82	63	137
38	39	Compostela	4	190	160	52	45	63

```
winpcttop5 =data.sort_values('WinningPct', ascending=False )
```

| 39 | 40 | Recreativo | 3 | 188 | 180 | 50 | 48 | 90 |

```
winpcttop5[:5]
#the top 5 teams which has the highest Winning percentage
```

⇥

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	Goal
0	1	Real Madrid	86	4385	2762	1647	552	563	
1	2	Barcelona	86	4262	2762	1581	573	608	

```
data.groupby(['BestPosition']).agg({'Points':'sum'})
#6. Group teams based on their "Best position" and print the sum of their points for all position
```

	Points
BestPosition	
1	27933
2	6904
3	5221
4	6563
5	1884
6	2113
7	1186
8	1134
9	96
10	450
11	445
12	511
14	71
15	14
16	81
17	266
19	81
20	34

```
data
```

	Pos	Team	Seasons	Points	GamesPlayed	GamesWon	GamesDrawn	GamesLost	G
0	1	Real Madrid	86	4385	2762	1647	552	563	
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15	16	Osasuna	37	1351	1318	426	327	565	
16	17	Malaga	36	1314	1255	390	330	535	
17	18	Oviedo	38	1174	1192	408	292	492	
18	19	Mallorca	27	1148	988	333	256	399	
19	20	Las Palmas	33	1020	1096	367	242	487	
20	21	Villarreal	17	970	646	266	172	208	
21	22	Granada	23	667	742	218	175	349	

22	23	Rayo Vallecano	17	662	652	189	148	305
23	24	Elche	21	606	678	203	180	295
24	25	Getafe	12	553	456	147	112	197
25	26	Hercules	20	538	628	184	149	295
26	27	Tenerife	13	510	494	155	128	211
27	28	Murcia	18	445	586	145	143	298
28	29	Alaves	12	421	380	125	81	174
29	30	Levante	11	416	402	113	95	194
...	...	...	...	...	...	...	...	...
31	32	Sabadell	14	353	426	129	95	202
32	33	Cadiz	12	343	448	104	127	217
33	34	Logrones	9	293	346	96	92	158
34	35	Castellon	11	285	334	103	79	152
35	36	Albacete	7	277	270	76	76	118
36	37	Almeria	6	242	228	62	56	110
37	38	Cordoba	9	230	282	82	63	137
38	39	Compostela	4	190	160	52	45	63
39	40	Recreativo	5	188	186	50	46	90