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

regular_stats = pd.read_csv('NBA Advanced Cleaned Stats.csv')
advanced_stats = pd.read_csv('nba_stats_cleaned.csv')
stats = pd.merge(regular_stats, advanced_stats, on='Player-
additional', suffixes=('_trad', '_adv'))
stats.head()
```

```
   Rk_trad       Player_trad Pos_trad  Age_trad Tm_trad  G_trad
MP_trad  \
0        1  Precious Achiuwa        C        23     TOR      55
1140
1        2      Steven Adams        C        29     MEM      42
1133
2        3       Bam Adebayo        C        25     MIA      75
2598
3        4      Ochai Agbaji       SG        22     UTA      59
1209
4        5      Santi Aldama       PF        22     MEM      77
1682

    PER    TS%   3PAr  ...    FT%  ORB  DRB  TRB  AST  STL  BLK  TOV
PF  \
0  15.2  0.554  0.267  ...  0.702  100  228  328   50   31   30   59
102
1  17.5  0.564  0.004  ...  0.364  214  271  485   97   36   46   79
98
2  20.1  0.592  0.011  ...  0.806  184  504  688  240   88   61  187
208
3   9.5  0.561  0.591  ...  0.812   43   78  121   67   16   15   41
99
4  13.9  0.591  0.507  ...  0.750   85  286  371   97   45   48   60
143

    PTS
0   508
1   361
2  1529
3   467
4   696

[5 rows x 61 columns]
```

```
sf = stats[stats['Pos_trad']=='SF']
sf.reset_index()
```

```
sf = sf.rename(columns={'Player':'Player Name'})
sf.head()
```

```
    Rk_x          Player Name Pos_x Unnamed: 3  Age_x Tm_x  G_x  GS
MP_x  \
13    14           OG Anunoby    SF        NaN     21  SAS   17   3
320
15    16          Deni Avdija    SF        NaN     35  MIN   67  66
2029
19    20  Patrick Baldwin Jr.    SF        NaN     34  PHO   47  47
1672
27    28       Scottie Barnes    SF        NaN     21  DET   47   3
750
36    37     MarJon Beauchamp    SF        NaN     29  HOU   36   0
235

     FG  ...  OWS  DWS   WS  WS/48  Unnamed: 24  OBPM  DBPM  BPM  VORP
\
13   59  ...  1.8  2.9  4.7  0.094          NaN  -0.3   0.7  0.4   1.5

15  261  ...  0.0  2.3  2.3  0.054          NaN  -2.8   0.5 -2.3  -0.1

19  483  ... -0.1  0.3  0.1  0.029          NaN  -0.7  -1.4 -2.1   0.0

27  102  ...  2.3  2.7  5.0  0.090          NaN   0.5  -0.1  0.4   1.6

36   31  ... -0.4  0.8  0.4  0.027          NaN  -4.1  -0.6 -4.8  -0.5


    Player-additional_y
13            anunoog01
15            avdijde01
19            baldwpa01
27            barnesc01
36            beaucma01

[5 rows x 61 columns]
```

```
top =
['MIL','BOS','PHI','DEN','MEM','CLE','NYK','SAC','PHO','BRK','LAC','GS
W','LAL','ATL','MIA']
bottom =
['PHI','CHO','SAS','HOU','POR','ORL','WAS','IND','UTA','DAL','OKC','CH
I','TOR','NOP','MIN']

top_sf = sf[sf['Tm_x'].isin(top)]
```

```
     Rk_x               Player Pos_x Unnamed: 3  Age_x Tm_x  G_x  GS
MP_x  \
19     20  Patrick Baldwin Jr.    SF        NaN     34  PHO   47  47
1672
```

```
44     44         Buddy Boeheim    SF         NaN     26  ATL   54   0
686
67     67        Sterling Brown    SF         NaN     23  LAL   78  65
1879
68     68        Troy Brown Jr.    SF         NaN     29  PHO   42   0
687
118   117         DeMar DeRozan    SF         NaN     21  DEN   76   6
1181

       FG  ...  OWS  DWS   WS  WS/48  Unnamed: 24  OBPM  DBPM  BPM
VORP  \
19    483  ... -0.1  0.3  0.1  0.029          NaN  -0.7  -1.4 -2.1
0.0
44     73  ... -0.2  0.0 -0.2 -0.091          NaN  -7.5  -2.0 -9.5  -
0.2
67    247  ...  0.0  0.1  0.0  0.040          NaN  -7.7   4.3 -3.3
0.0
68    132  ...  1.0  2.0  2.9  0.075          NaN  -1.8   0.8 -1.0
0.5
118   143  ...  5.4  3.2  8.5  0.153          NaN   1.7   0.3  2.0
2.6

     Player-additional_y
19             baldwpa01
44             boehebu01
67             brownst02
68             browntr01
118            derozde01

[5 rows x 61 columns]

bottom_sf=sf[sf['Tm_x'].isin(bottom)]

    Rk_x             Player Pos_x Unnamed: 3  Age_x Tm_x  G_x  GS  MP_x
FG  \
13    14         OG Anunoby    SF         NaN     21  SAS   17   3   320
59
15    16        Deni Avdija    SF         NaN     35  MIN   67  66  2029
261
36    37  MarJon Beauchamp    SF         NaN     29  HOU   36   0   235
31
40    40         Saddiq Bey    SF         NaN     22  DAL   15   0   108
22
48    48    Leandro Bolmaro    SF         NaN     25  CHO   32   8   468
77

    ...  OWS  DWS   WS  WS/48  Unnamed: 24  OBPM  DBPM   BPM  VORP  \
13  ...  1.8  2.9  4.7  0.094          NaN  -0.3   0.7   0.4   1.5
15  ...  0.0  2.3  2.3  0.054          NaN  -2.8   0.5  -2.3  -0.1
36  ... -0.4  0.8  0.4  0.027          NaN  -4.1  -0.6  -4.8  -0.5
```

```
40  ...  2.6  1.2  3.9  0.087          NaN   0.9  -1.2  -0.3   0.9
48  ... -0.4  0.0 -0.3 -0.231          NaN -12.4  -2.3 -14.7  -0.2

    Player-additional_y
13            anunoog01
15            avdijde01
36            beaucma01
40              beysa01
48            bolmale01

[5 rows x 61 columns]
```

```
top_sf.describe()
```

```
              Rk_x      Age_x        G_x         GS          MP_x
FG  \
count   47.000000  47.000000  47.000000  47.000000    47.000000
47.000000
mean   299.042553  26.063830  51.510638  19.106383  1077.893617
167.744681
std    138.386503   4.560722  23.366524  26.369642   755.049933
146.605722
min     20.000000  19.000000   4.000000   0.000000    20.000000
3.000000
25%    200.500000  22.500000  31.000000   1.000000   402.000000
54.500000
50%    311.000000  26.000000  61.000000   4.000000  1042.000000
143.000000
75%    399.000000  28.000000  70.500000  25.500000  1745.000000
248.500000
max    526.000000  36.000000  82.000000  78.000000  2382.000000
587.000000

                FGA         FG%          3P          3PA  ...  Unnamed:
19  \
count    47.000000  47.000000   47.000000   47.000000  ...
0.0
mean    357.000000   0.451191   58.489362  159.085106  ...
NaN
std     305.258835   0.074184   60.520522  149.747879  ...
NaN
min       9.000000   0.259000    0.000000    2.000000  ...
NaN
25%     142.500000   0.411500    9.000000   35.500000  ...
NaN
50%     288.000000   0.453000   44.000000  127.000000  ...
NaN
75%     469.500000   0.491000   83.500000  221.000000  ...
NaN
max    1252.000000   0.638000  301.000000  731.000000  ...
```

```
NaN

             OWS         DWS          WS       WS/48  Unnamed: 24
OBPM  \
count  47.000000  47.000000  47.000000  47.000000          0.0
47.000000
mean    0.953191   1.017021   1.957447   0.076681          NaN  -
1.378723
std     1.499689   1.015814   2.367419   0.095830          NaN
4.224099
min    -0.500000   0.000000  -0.200000  -0.288000          NaN -
12.700000
25%     0.050000   0.200000   0.200000   0.041000          NaN  -
2.850000
50%     0.400000   0.700000   1.000000   0.068000          NaN  -
1.900000
75%     1.050000   1.700000   2.900000   0.112500          NaN
0.100000
max     6.200000   4.300000  10.500000   0.367000          NaN
17.000000

            DBPM        BPM       VORP
count  47.000000  47.000000  47.000000
mean   -0.168085  -1.542553   0.300000
std     2.265824   5.640218   1.028295
min    -8.000000 -20.700000  -0.700000
25%    -1.300000  -3.400000  -0.300000
50%    -0.500000  -1.900000   0.000000
75%     0.750000   0.050000   0.400000
max     9.300000  17.800000   5.100000

[8 rows x 53 columns]

top_sf = top_sf[regular_stats['MP']>1700]

/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/
ipykernel_71183/387449806.py:1: UserWarning: Boolean Series key will
be reindexed to match DataFrame index.
  top_sf = top_sf[regular_stats['MP']>1700]

     Rk_x          Player Pos_x Unnamed: 3  Age_x Tm_x  G_x  GS  MP_x
FG  \
127   126    Tyler Dorsey    SF        NaN     23  LAL   76  45  1860
200
337   336     Josh Minott    SF        NaN     27  MIA   71  49  2077
254
378   377  Eugene Omoruyi    SF        NaN     22  SAC   80  78  2382
354

     ...  OWS  DWS   WS  WS/48  Unnamed: 24  OBPM  DBPM   BPM  VORP  \
```

```
127  ...  0.1  0.0  0.1  0.367          NaN  17.0   0.8  17.8   0.0
337  ...  0.1  0.2  0.3  0.146          NaN  -1.9   0.4  -1.6   0.0
378  ...  0.1  0.5  0.6  0.042          NaN  -3.5  -0.9  -4.4  -0.4

     Player-additional_y
127            dorsety01
337            minotjo01
378            omorueu01

[3 rows x 61 columns]
```

```
bottom_sf.describe()
```

```
              Rk_x      Age_x        G_x         GS          MP_x
FG  \
count   52.000000  52.000000  52.000000  52.000000    52.000000
52.000000
mean   250.634615  25.057692  50.019231  23.961538  1115.076923
190.750000
std    152.993275   4.117935  20.622176  28.342417   775.012482
152.601349
min     14.000000  19.000000   6.000000   0.000000    33.000000
6.000000
25%    126.750000  22.000000  33.500000   2.000000   465.500000
66.500000
50%    232.500000  24.500000  54.000000   7.000000   973.000000
148.000000
75%    370.750000  27.250000  65.500000  53.250000  1713.000000
284.250000
max    528.000000  37.000000  82.000000  80.000000  2678.000000
542.000000

               FGA        FG%          3P         3PA  ...  Unnamed:
19  \
count    52.000000  52.000000   52.000000   52.000000  ...
0.0
mean    412.980769   0.472635   53.884615  155.653846  ...
NaN
std     337.086914   0.057731   53.290787  148.936739  ...
NaN
min      12.000000   0.369000    2.000000    5.000000  ...
NaN
25%     128.750000   0.440500    7.750000   28.000000  ...
NaN
50%     309.500000   0.457000   35.500000  113.000000  ...
NaN
75%     610.750000   0.501500   80.000000  223.250000  ...
NaN
max    1142.000000   0.640000  212.000000  562.000000  ...
NaN
```

```
              OWS         DWS          WS      WS/48  Unnamed: 24
OBPM  \
count  52.000000  52.000000  52.000000  52.000000          0.0
52.000000
mean    0.905769   1.142308   2.059615   0.064192          NaN  -
1.401923
std     1.214038   0.931233   1.923055   0.068500          NaN
3.030530
min    -0.800000   0.000000  -0.300000  -0.231000          NaN -
12.400000
25%     0.000000   0.300000   0.200000   0.046000          NaN  -
3.000000
50%     0.700000   1.050000   1.950000   0.080000          NaN  -
1.100000
75%     1.500000   1.825000   3.425000   0.095250          NaN
0.025000
max     4.900000   3.400000   7.600000   0.194000          NaN
5.100000

            DBPM        BPM       VORP
count  52.000000  52.000000  52.000000
mean   -0.278846  -1.684615   0.348077
std     1.218056   3.527894   0.821164
min    -2.900000 -14.700000  -1.100000
25%    -0.750000  -3.425000  -0.100000
50%    -0.400000  -1.200000   0.150000
75%     0.500000  -0.300000   0.525000
max     3.500000   6.700000   3.500000

[8 rows x 53 columns]

bottom_sf = bottom_sf[regular_stats['MP']>1700]

/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/
ipykernel_71183/2020337568.py:1: UserWarning: Boolean Series key will
be reindexed to match DataFrame index.
  bottom_sf = bottom_sf[regular_stats['MP']>1700]

     Rk_x          Player Pos_x Unnamed: 3  Age_x Tm_x  G_x  GS  MP_x
FG  \
15     16     Deni Avdija    SF        NaN     35  MIN   67  66  2029
261
230   229  Brandon Ingram    SF        NaN     22  IND   56  56  1883
412
456   455    Xavier Sneed    SF        NaN     23  POR   62  62  2171
467

     ...  OWS  DWS   WS  WS/48  Unnamed: 24  OBPM  DBPM  BPM  VORP  \
15   ...  0.0  2.3  2.3  0.054          NaN  -2.8   0.5 -2.3  -0.1
```

```
230  ...  1.8  1.7  3.5  0.108          NaN   2.2  -0.4  1.7   1.4
456  ...  0.1  0.0  0.1  0.086          NaN  -3.1  -0.4 -3.6   0.0

     Player-additional_y
15             avdijde01
230            ingrabr01
456            sneedxa01

[3 rows x 61 columns]
```

```
#significance tests
#PTS
stat, p_value = ttest_ind(top_sf['PTS'], bottom_sf['PTS'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in points scored.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in points scored.")
```

```
Test Statistic: -1.791258483153853
P-Value: 0.14964091532573953
Fail to reject the null hypothesis. There is no significant difference
in points scored.
```

```
#rebounds **********************
stat, p_value = ttest_ind(top_sf['TRB'], bottom_sf['TRB'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in total rebounds.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in total rebounds.")
```

```
Test Statistic: 7.120551045460683
P-Value: 0.0031272607269830894
Reject the null hypothesis. There is a significant difference in total
rebounds.
```

```
#assists
stat, p_value = ttest_ind(top_sf['AST'], bottom_sf['AST'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in assists.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in assists.")
```

```
Test Statistic: -3.373296340413551
P-Value: 0.07668262409536224
Fail to reject the null hypothesis. There is no significant difference
in assists.
```

```
#turnovers ********************
stat, p_value = ttest_ind(top_sf['TOV'], bottom_sf['TOV'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in turnovers.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in turnovers.")
```

```
Test Statistic: -4.407261060653622
P-Value: 0.013595756736915786
Reject the null hypothesis. There is a significant difference in
turnovers.
```

```
#FG%
stat, p_value = ttest_ind(top_sf['FG%'], bottom_sf['FG%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in field goal percentage.")
```

```
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in field goal percentage.")
```

```
Test Statistic: -0.28712845225021355
P-Value: 0.792165623355615
Fail to reject the null hypothesis. There is no significant difference
in field goal percentage.
```

```
#FT%
stat, p_value = ttest_ind(top_sf['FT%'], bottom_sf['FT%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in free throw %.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in free throw %.")
```

```
Test Statistic: -1.4628881276098042
P-Value: 0.23573290335082125
Fail to reject the null hypothesis. There is no significant difference
in free throw %.
```

```
#threes
stat, p_value = ttest_ind(top_sf['3P%'], bottom_sf['3P%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in threes.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in threes.")
```

```
Test Statistic: -0.27023200276876314
P-Value: 0.8063209767115538
Fail to reject the null hypothesis. There is no significant difference
in threes.
```

```
#steals
stat, p_value = ttest_ind(top_sf['STL'], bottom_sf['STL'],
```

```
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in steals.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in steals.")
```

```
Test Statistic: -0.3382120517773775
P-Value: 0.7639899588339132
Fail to reject the null hypothesis. There is no significant difference
in steals.
```

```
#blocks
stat, p_value = ttest_ind(top_sf['BLK'], bottom_sf['BLK'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in blocks.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in blocks.")
```

```
Test Statistic: 1.4320031115163143
P-Value: 0.25061548700423797
Fail to reject the null hypothesis. There is no significant difference
in blocks.
```

```
#personal fouls
stat, p_value = ttest_ind(top_sf['PF'], bottom_sf['PF'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in personal fouls.")
else:
```

```
    print("Fail to reject the null hypothesis. There is no significant
difference in personal fouls.")
```

```
Test Statistic: 0.9581680931685118
P-Value: 0.40910865701561083
Fail to reject the null hypothesis. There is no significant difference
in personal fouls.
```

```
#offensive rebounds **********************
stat, p_value = ttest_ind(top_sf['ORB'], bottom_sf['ORB'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in offensive rebounds.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in offensive rebounds.")
```

```
Test Statistic: 5.08812427331425
P-Value: 0.012903219189329136
Reject the null hypothesis. There is a significant difference in
offensive rebounds.
```

```
#efg%
stat, p_value = ttest_ind(top_sf['eFG%'], bottom_sf['eFG%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in eFG%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in eFG%.")
```

```
Test Statistic: -0.066592715821201
P-Value: 0.9501052594481804
Fail to reject the null hypothesis. There is no significant difference
in eFG%.
```

```
#2P%
stat, p_value = ttest_ind(top_sf['2P%'], bottom_sf['2P%'],
equal_var=False)
```

```
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in 2P%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in 2P%.")
```

```
Test Statistic: -0.1095282862900281
P-Value: 0.920085898362465
Fail to reject the null hypothesis. There is no significant difference
in 2P%.
```

```
#Defensive rebounds ***********
stat, p_value = ttest_ind(top_sf['DRB'], bottom_sf['DRB'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in defensive rebounds.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in defensive rebounds.")
```

```
Test Statistic: 7.673618203378693
P-Value: 0.0017918062361505177
Reject the null hypothesis. There is a significant difference in
defensive rebounds.
```

```
#PER
stat, p_value = ttest_ind(top_sf['PER'], bottom_sf['PER'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in PER.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in PER.")
```

```
Test Statistic: 1.0446087901944998
P-Value: 0.39271913906295447
Fail to reject the null hypothesis. There is no significant difference
in PER.
```

```
#true shooting
stat, p_value = ttest_ind(top_sf['TS%'], bottom_sf['TS%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in TS%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in TS%.")
```

```
Test Statistic: 0.4551615564047948
P-Value: 0.6807830391044389
Fail to reject the null hypothesis. There is no significant difference
in TS%.
```

```
#Usage Rate
stat, p_value = ttest_ind(top_sf['USG%'], bottom_sf['USG%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in USG%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in USG%.")
```

```
Test Statistic: 0.3253206099316201
P-Value: 0.7653328578957281
Fail to reject the null hypothesis. There is no significant difference
in USG%.
```

```
#Win Shares
stat, p_value = ttest_ind(top_sf['WS'], bottom_sf['WS'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
```

```
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in win shares.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in win shares.")
```

```
Test Statistic: -1.6234424267103007
P-Value: 0.24093502655161894
Fail to reject the null hypothesis. There is no significant difference
in win shares.
```

```
#Plus/Minus
stat, p_value = ttest_ind(top_sf['BPM'], bottom_sf['BPM'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in plus/minus.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in plus/minus.")
```

```
Test Statistic: 0.7448631363348374
P-Value: 0.5275451436095321
Fail to reject the null hypothesis. There is no significant difference
in plus/minus.
```

```
#VORP
stat, p_value = ttest_ind(top_sf['VORP'], bottom_sf['VORP'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in VORP.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in VORP.")
```

```
Test Statistic: -1.1283296297199523
P-Value: 0.36299505201722154
```

```
Fail to reject the null hypothesis. There is no significant difference
in VORP.

#3PAr
stat, p_value = ttest_ind(top_sf['3PAr'], bottom_sf['3PAr'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in 3PAr.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in 3PAr.")

Test Statistic: -0.5745640055064876
P-Value: 0.6010338010087608
Fail to reject the null hypothesis. There is no significant difference
in 3PAr.

#FTr
stat, p_value = ttest_ind(top_sf['FTr'], bottom_sf['FTr'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in FTr.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in FTr.")

Test Statistic: -1.4949728104292632
P-Value: 0.2500205834580632
Fail to reject the null hypothesis. There is no significant difference
in FTr.

#TRB%
stat, p_value = ttest_ind(top_sf['TRB%'], bottom_sf['TRB%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')
```

```
if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in TRB%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in TRB%.")
```

```
Test Statistic: 1.2229371288986766
P-Value: 0.29286106573819953
Fail to reject the null hypothesis. There is no significant difference
in TRB%.
```

```
#ORB%
stat, p_value = ttest_ind(top_sf['ORB%'], bottom_sf['ORB%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in ORB%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in ORB%.")
```

```
Test Statistic: 2.452063837985608
P-Value: 0.09735057871545016
Fail to reject the null hypothesis. There is no significant difference
in ORB%.
```

```
#DRB%
stat, p_value = ttest_ind(top_sf['DRB%'], bottom_sf['DRB%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in DRB%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in DRB%.")
```

```
Test Statistic: -0.014754623763089749
P-Value: 0.9889390846688072
Fail to reject the null hypothesis. There is no significant difference
in DRB%.
```

```
#AST%
stat, p_value = ttest_ind(top_sf['AST%'], bottom_sf['AST%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in AST%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in AST%.")
```

```
Test Statistic: -2.6608821867764614
P-Value: 0.07871101030995326
Fail to reject the null hypothesis. There is no significant difference
in AST%.
```

```
#STL%
stat, p_value = ttest_ind(top_sf['STL%'], bottom_sf['STL%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in STL%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in STL%.")
```

```
Test Statistic: 0.6038772616713557
P-Value: 0.582554292759859
Fail to reject the null hypothesis. There is no significant difference
in STL%.
```

```
#BLK%
stat, p_value = ttest_ind(top_sf['BLK%'], bottom_sf['BLK%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in BLK%.")
```

```
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in BLK%.")
```

```
Test Statistic: 0.30499714066520933
P-Value: 0.7885210544983394
Fail to reject the null hypothesis. There is no significant difference
in BLK%.
```

```
#TOV%
stat, p_value = ttest_ind(top_sf['TOV%'], bottom_sf['TOV%'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in TOV%.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in TOV%.")
```

```
Test Statistic: -2.6425360276564973
P-Value: 0.07053587531728506
Fail to reject the null hypothesis. There is no significant difference
in TOV%.
```

```
#OWS
stat, p_value = ttest_ind(top_sf['OWS'], bottom_sf['OWS'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in OWS.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in OWS.")
```

```
Test Statistic: -0.9131682328565596
P-Value: 0.4575491971033516
Fail to reject the null hypothesis. There is no significant difference
in OWS.
```

```
/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/
ipykernel_71183/444259772.py:2: RuntimeWarning: Precision loss
```

```
occurred in moment calculation due to catastrophic cancellation. This
occurs when the data are nearly identical. Results may be unreliable.
  stat, p_value = ttest_ind(top_sf['OWS'], bottom_sf['OWS'],
equal_var=False)

#DWS
stat, p_value = ttest_ind(top_sf['DWS'], bottom_sf['DWS'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in DWS.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in DWS.")
```

```
Test Statistic: -1.5625952885742485
P-Value: 0.24857340343788484
Fail to reject the null hypothesis. There is no significant difference
in DWS.
```

```
#WS/48
stat, p_value = ttest_ind(top_sf['WS/48'], bottom_sf['WS/48'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in WS/48.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in WS/48.")
```

```
Test Statistic: 1.0539130319282333
P-Value: 0.3976268475084289
Fail to reject the null hypothesis. There is no significant difference
in WS/48.
```

```
#OBPM
stat, p_value = ttest_ind(top_sf['OBPM'], bottom_sf['OBPM'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
```

```
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in OBPM.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in OBPM.")
```

```
Test Statistic: 0.7496038319971363
P-Value: 0.5234199786381961
Fail to reject the null hypothesis. There is no significant difference
in OBPM.
```

```
#DBPM
stat, p_value = ttest_ind(top_sf['DBPM'], bottom_sf['DBPM'],
equal_var=False)
alpha = 0.05

print(f'Test Statistic: {stat}')
print(f'P-Value: {p_value}')

if p_value < alpha:
    print("Reject the null hypothesis. There is a significant
difference in DBPM.")
else:
    print("Fail to reject the null hypothesis. There is no significant
difference in DBPM.")
```

```
Test Statistic: 0.33646329245522666
P-Value: 0.7572438453181312
Fail to reject the null hypothesis. There is no significant difference
in DBPM.
```

```
#Stats of significance: TOV, TRB, ORB, DRB

weights = {'TOV': 0.25, 'TRB': 0.25, 'ORB': 0.25, 'DRB': 0.25}
for stat in weights.keys():
    max_value = sfs[stat].max()
    sfs.loc[:, stat + '_norm'] = sfs[stat]/max_value

sfs.loc[:, 'Weighted_Score'] = sum([sfs[stat + '_norm'] * weight for
stat, weight in weights.items()])

ranked_sf = sfs.sort_values('Weighted_Score', ascending=False)

print(ranked_sf[['Player','Weighted_Score']].head(25))
```

```
                  Player  Weighted_Score
408          Cam Reddish        0.776684
96            Amir Coffey        0.746137
```

```
221          Caleb Houstan        0.742874
392        Otto Porter Jr.        0.736813
67          Sterling Brown        0.730085
461              Max Strus        0.695419
190       Tim Hardaway Jr.        0.678223
310           Caleb Martin        0.665365
495          Jabari Walker        0.532698
180          Javonte Green        0.492434
503          Yuta Watanabe        0.489638
149      Simone Fontecchio        0.486385
378         Eugene Omoruyi        0.450185
337            Josh Minott        0.448499
478  Juan Toscano-Anderson        0.421273
128          Luguentz Dort        0.406768
511             Jack White        0.401645
336          Justin Minaya        0.389453
230         Brandon Ingram        0.370089
121         Hamidou Diallo        0.366111
127           Tyler Dorsey        0.364787
380        Kelly Oubre Jr.        0.347918
229             Joe Ingles        0.313076
456           Xavier Sneed        0.306511
15             Deni Avdija        0.303863

/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/
ipykernel_71183/4022255224.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  sfs.loc[:, stat + '_norm'] = sfs[stat]/max_value
/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/ipykernel_71183/40222
55224.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  sfs.loc[:, stat + '_norm'] = sfs[stat]/max_value
/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/ipykernel_71183/40222
55224.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
```

```
  sfs.loc[:, stat + '_norm'] = sfs[stat]/max_value
/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/ipykernel_71183/4022255224.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  sfs.loc[:, stat + '_norm'] = sfs[stat]/max_value
/var/folders/wp/jqq6rhr97930vxndhx84wd8w0000gn/T/ipykernel_71183/4022255224.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  sfs.loc[:, 'Weighted_Score'] = sum([sfs[stat + '_norm'] * weight for stat, weight in weights.items()])
```

```
salaries = pd.read_csv('Nba Player Salaries.csv')
salaries = salaries.rename(columns={'2022/2023': 'Salary'})
salaries['Salary'] = salaries['Salary'].replace('[\$,]', '', regex=True).astype(int)
salaries.head()
```

	Player Id	Player Name	Salary	2023/2024	2024/2025	2024/2025.1
0	1	Stephen Curry	48070014	$51,915,615	$55,761,217	$59,606,817
1	2	John Wall	47345760	$0	$0	$0
2	3	Russell Westbrook	47080179	$0	$0	$0
3	4	LeBron James	44474988	$46,698,737	$50,434,636	$0
4	5	Kevin Durant	44119845	$47,649,433	$51,179,020	$54,708,608

```
final_sfs = pd.merge(ranked_sf, salaries, on='Player Name')
final_sfs = final_sfs[['Player Name','Weighted_Score','Salary']]
final_sfs = pd.merge(final_sfs, sf[['Player Name','Pos_x','Tm_x']],on='Player Name')
```

```
final_sfs =
final_sfs.rename(columns={'Pos_x':'Position','Tm_x':'Team'})
order = ['Player Name', 'Team', 'Position', 'Weighted_Score',
'Salary']
final_sfs = final_sfs[order] if all(col in final_sfs.columns for col
in order) else final_sfs
final_sfs
```

	Player Name	Team	Position	Weighted_Score	Salary
0	Cam Reddish	MIL	SF	0.776684	5954454
1	Amir Coffey	TOR	SF	0.746137	3395062
2	Caleb Houstan	GSW	SF	0.742874	2000000
3	Sterling Brown	LAL	SF	0.730085	3122602
4	Max Strus	HOU	SF	0.695419	1815677
5	Caleb Martin	WAS	SF	0.665365	6479000
6	Jabari Walker	ORL	SF	0.532698	1017781
7	Javonte Green	OKC	SF	0.492434	1815677
8	Yuta Watanabe	CHO	SF	0.489638	1968175
9	Simone Fontecchio	UTA	SF	0.486385	3205128
10	Eugene Omoruyi	SAC	SF	0.450185	1013119
11	Josh Minott	MIA	SF	0.448499	1017781
12	Juan Toscano-Anderson	GSW	SF	0.421273	2133278
13	Luguentz Dort	NYK	SF	0.406768	15277778
14	Jack White	BOS	SF	0.401645	508891
15	Justin Minaya	NOP	SF	0.389453	35096
16	Brandon Ingram	IND	SF	0.370089	31650600
17	Hamidou Diallo	MEM	SF	0.366111	5200000
18	Tyler Dorsey	LAL	SF	0.364787	201802
19	Joe Ingles	NYK	SF	0.313076	6479000
20	Xavier Sneed	POR	SF	0.306511	102910
21	Deni Avdija	MIN	SF	0.303863	4916160

```
final_sfs.to_csv('sfs_final_list.csv',index=False)
```