In [22]:

```
#libraries

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [23]:

```
dpc_weu_avg_df = pd.read_csv("dpc_weu_2021_2022_tour_3_division_1.csv")
dpc_weu_avg_df.head()
```

Out[23]:

	Player	Position	Total Count	Wins	Losses	Winrate	As Radiant	As Dire	Kills	Deaths	...	Avg. KAL	G
0	Nisha	2	20	11	9	55.00%	10	10	9.30	2.80	...	7.07	
1	Puppey	5	20	11	9	55.00%	10	10	1.80	7.15	...	2.16	
2	Crystallis	1	20	11	9	55.00%	10	10	7.05	3.90	...	4.33	
3	Iceiceice	3	20	11	9	55.00%	10	10	5.25	5.70	...	2.98	
4	Tobi	3	19	11	8	57.89%	5	14	3.53	3.89	...	4.54	

5 rows × 22 columns

Terms:

Dire / Radiant: the two sides of Dota2 teams. Dire, usually represented in color red, owns the top right half of the map, and radiant, usually represented in color blue, owns the bottom left half of the map.

Position 1 - 5:

1. 1 = safe-lane carry (the carry player that plays the top lane of dire, or bottom lane of radiant. takes the most resources of the team and deals the most damage in most cases)
2. 2 = mid-lane carry (the carry player that plays the midlane of both dire and radiant. takes about the same resources of position 1, but starts involving in teamfights earlier than position 1)
3. 3 = off-lane carry (the carry player that plays the bottom lane of dire, or top lane of radiant. takes the least resources of carry positions, usually do stun, tank damage from opponent, and suppress opponent position 1 from farming (getting resources))
4. 4 = soft-support (supports position 3. takes a little resources occasionally. Do stun, teamfight initiation, lane helping etc)
5. 5 = hard-support (supports position 1. some position 5 heroes can heal. takes the least resources in most cases)

GPM = Golds Per Minute
XPM = Experience Per Minute
Denies = Last hit on their own creeps
HD = Hero Damage

TD = Tower Damage
HH = Hero Heal
GS = Gold Sum

BASIC INFO

All data is gathered from https://www.datdota.com/ (https://www.datdota.com/).

In [24]:

```
#basic info of the df
dpc_weu_avg_df.info
```

```
38        11   5.86    6.14  ...       1.72  493  571         275       6   21
39         8   1.90    6.00  ...       1.33  370  458         184       9   19
40         1   2.00    6.00  ...       2.08  321  418         140       2   16
41         1   1.00    7.50  ...       1.47  328  428         114       6   18
42         2   2.00   10.00  ...       0.50  447  428         198       8   18

       HD     TD    HH     GS
0   39091   3843   323  25470
1   12655    582  4012  10392
2   26695   9438     3  23111
3   18919   2946  2440  19175
4   22615   4561   910  16371
5   17455    385  2235  12710
6   11409    251  1939   9079
7   31480   3356   447  25576
8   28023   5254    27  21787
9   27182   2318   375  19408
10  10963    905  5289   9834
11  11515    277  1717  10733
```

In [25]:

```
#df description
dpc_weu_avg_df.describe()
```

Out[25]:

	Position	Total Count	Wins	Losses	As Radiant	As Dire	Kills	Deaths
count	43.000000	43.000000	43.000000	43.000000	43.000000	43.000000	43.000000	43.000000
mean	3.000000	16.279070	8.139535	8.139535	8.139535	8.139535	4.633023	5.175581
std	1.380131	4.404141	4.683209	3.700588	3.839527	3.522590	2.489144	2.028285
min	1.000000	2.000000	0.000000	2.000000	0.000000	1.000000	1.000000	2.410000
25%	2.000000	16.000000	5.000000	5.000000	5.000000	6.000000	2.245000	3.460000
50%	3.000000	18.000000	10.000000	8.000000	9.000000	7.000000	4.370000	4.890000
75%	4.000000	18.000000	11.000000	11.000000	11.000000	11.000000	6.790000	6.555000
max	5.000000	20.000000	13.000000	14.000000	13.000000	14.000000	9.580000	10.000000

In [26]:

```
#check null values
dpc_weu_avg_df.isna().sum()
```

Out[26]:

```
Player         0
Position       0
Total Count    0
Wins           0
Losses         0
Winrate        0
As Radiant     0
As Dire        0
Kills          0
Deaths         0
Assists        0
KDA            0
Avg. KAL       0
GPM            0
XPM            0
Last Hits      0
Denies         0
LVL            0
HD             0
TD             0
HH             0
GS             0
dtype: int64
```

In [27]:

```
#HD, TD, HH, AND GS are vague abbreviations. Changing names of certain columns
dpc_weu_avg_df.rename(columns = {'HD': 'Hero Damage',
                 'TD': 'Tower Damage',
                 'HH': 'Hero Heal',
                 'GS': 'Gold Sum'}, inplace = True)
print(dpc_weu_avg_df.columns)
```

```
Index(['Player', 'Position', 'Total Count', 'Wins', 'Losses', 'Winrate',
       'As Radiant', 'As Dire', 'Kills', 'Deaths', 'Assists', 'KDA',
       'Avg. KAL', 'GPM', 'XPM', 'Last Hits', 'Denies', 'LVL', 'Hero Damage',
       'Tower Damage', 'Hero Heal', 'Gold Sum'],
      dtype='object')
```

In [28]:

```
#Unique Positions
dpc_weu_avg_df['Position'].unique()
```

Out[28]:

```
array([2, 5, 1, 3, 4], dtype=int64)
```

In [30]:

```
#position 1 to 5 may be vague and unclear to non-dota players. Here I renamed each rows:
#position 1: safelane carry; position 2: midlane carry; position 3: offlane carry; position 4: soft-
dpc_weu_avg_df['Position'].replace({5: 'hard-support(safelane_support)', 4: 'soft-support(offlane-su
dpc_weu_avg_df.head()
```

Out[30]:

	Player	Position	Total Count	Wins	Losses	Winrate	As Radiant	As Dire	Kills	Deatl
0	Nisha	midlane carry	20	11	9	55.00%	10	10	9.30	2.8
1	Puppey	hard-support(safelane_support)	20	11	9	55.00%	10	10	1.80	7.1
2	Crystallis	safelane carry	20	11	9	55.00%	10	10	7.05	3.9
3	Iceiceice	offlane carry	20	11	9	55.00%	10	10	5.25	5.7
4	Tobi	offlane carry	19	11	8	57.89%	5	14	3.53	3.8

5 rows × 22 columns

In [31]:

```
#players count in each position
count_df = dpc_weu_avg_df.groupby(by = 'Position').count()
count_df.drop(count_df.columns[1:], axis = 1, inplace = True)
count_df
```

Out[31]:

Position	Player
hard-support(safelane_support)	8
midlane carry	8
offlane carry	11
safelane carry	8
soft-support(offlane-support)	8

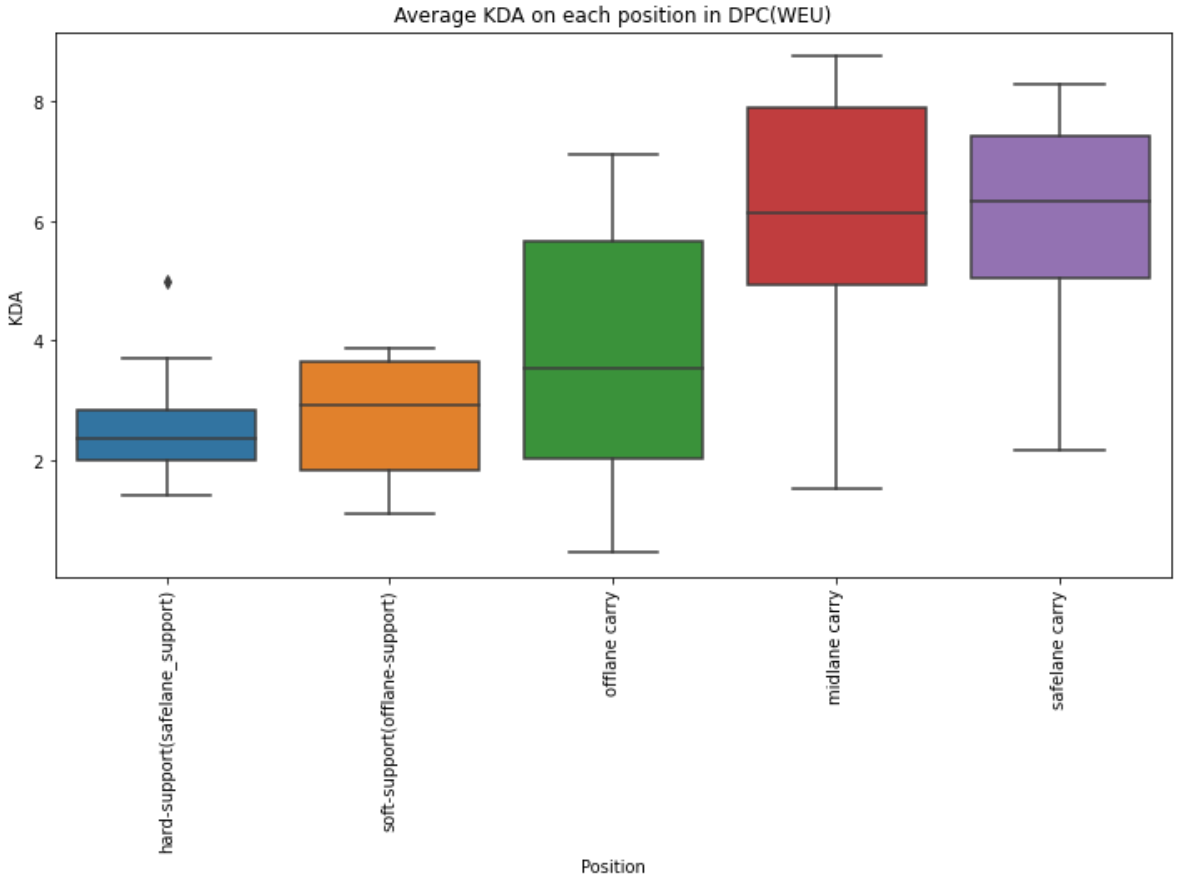
General Analysis of All DPC(WEU) Players in the 2021/2022 Tour 3 Division I

In [33]:

```
 KDA(kill/death/assist) index of players in each position
re(figsize = (12, 6))
lot(x = 'Position', y = 'KDA', data = dpc_weu_avg_df, order = ['hard-support(safelane_support)',
                                                               'soft-support(offlane-support)',
                                                              'offlane carry',
                                                              'midlane carry',
                                                              'safelane carry']).set(title = 'Averag
ks(rotation = 90)
```

Out[33]:

```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'hard-support(safelane_support)'),
  Text(1, 0, 'soft-support(offlane-support)'),
  Text(2, 0, 'offlane carry'),
  Text(3, 0, 'midlane carry'),
  Text(4, 0, 'safelane carry')])
```



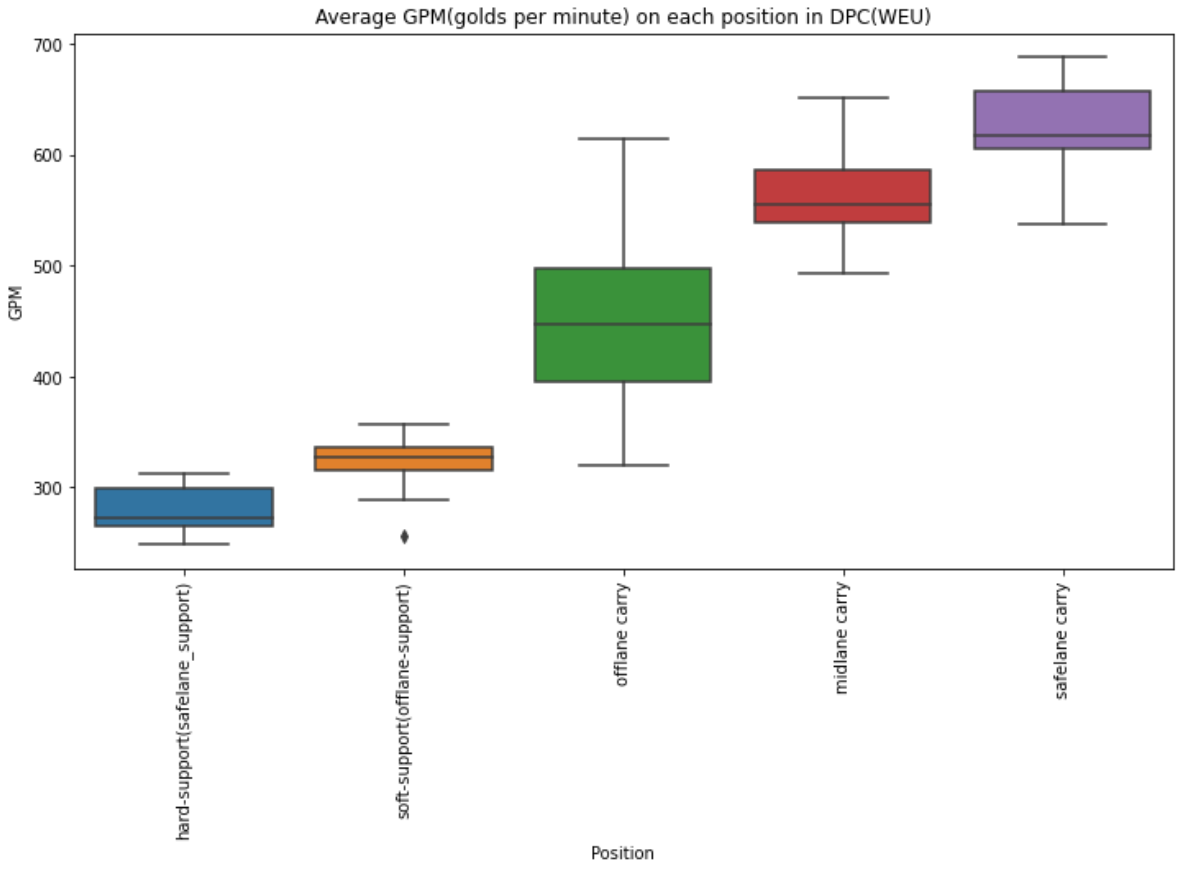
In DPC West Europe2021/2022 Tour 3 Division I, midlane carry players (position 2) have the highest KDA (Kill/Death/Assist) ratio. The KDA ranges the most in offlane carry players, ranging from <2 to >8.

In [38]:

```
#average GPM index of players in each position
plt.figure(figsize = (12, 6))
sns.boxplot(x = 'Position', y = 'GPM', data = dpc_weu_avg_df, order = ['hard-support(safelane_suppo
                                                                       'soft-support(offlane-support
                                                                      'offlane carry',
                                                                      'midlane carry',
                                                                      'safelane carry']).set(title =
plt.xticks(rotation = 90)
```

Out[38]:

```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'hard-support(safelane_support)'),
  Text(1, 0, 'soft-support(offlane-support)'),
  Text(2, 0, 'offlane carry'),
  Text(3, 0, 'midlane carry'),
  Text(4, 0, 'safelane carry')])
```



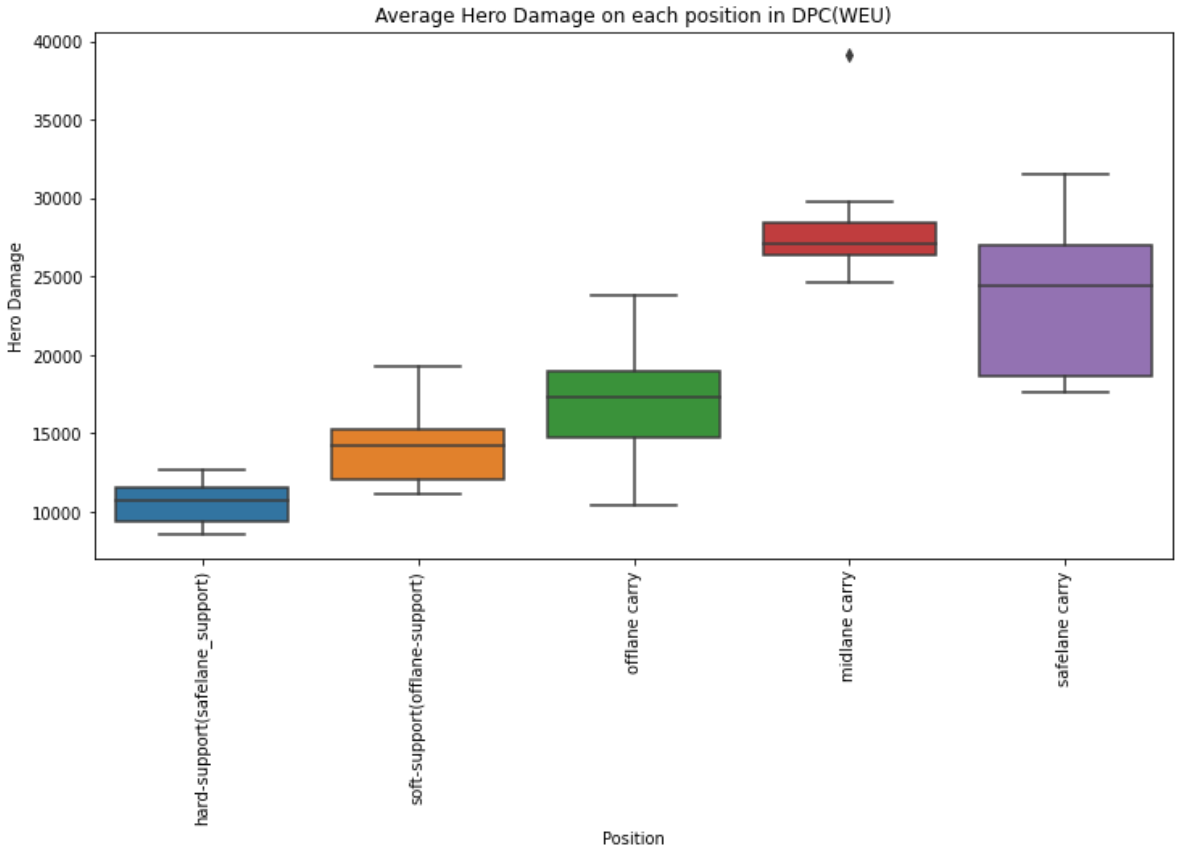
As for GPM (gold per minute, the index that reflects the how much resources on the map a player takes), safelane carry players take the most resources, and offlane carry players take the least among the carry positions. Position 4 and position 5 (supports) take resources much less, with a highest average GPM player at about 360 and 310.

In [89]:

```
#average Hero Damage index of players in each position
plt.figure(figsize = (12, 6))
sns.boxplot(x = 'Position', y = 'Hero Damage', data = dpc_weu_avg_df, order = ['hard-support(safelan
                                                                               'soft-support(offlane-support
                                                                              'offlane carry',
                                                                              'midlane carry',
                                                                              'safelane carry']).set(title =

plt.xticks(rotation = 90)
```

Out[89]:

```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'hard-support(safelane_support)'),
  Text(1, 0, 'soft-support(offlane-support)'),
  Text(2, 0, 'offlane carry'),
  Text(3, 0, 'midlane carry'),
  Text(4, 0, 'safelane carry')])
```



In DPC(WEU) 2021/2022 Tour 3 Division I, midlane carry players generally deal the most damage. The highest average damage is done by a nisha, a mid-lane carry player, who has an extreme value of almost 40k. Safelane carry players' damage vary hugely ranging from 18k to almost 33k. As for offlane carry players, much less damge is done. This can be possibly be explained with the hero picks in west EU teams. Compared to

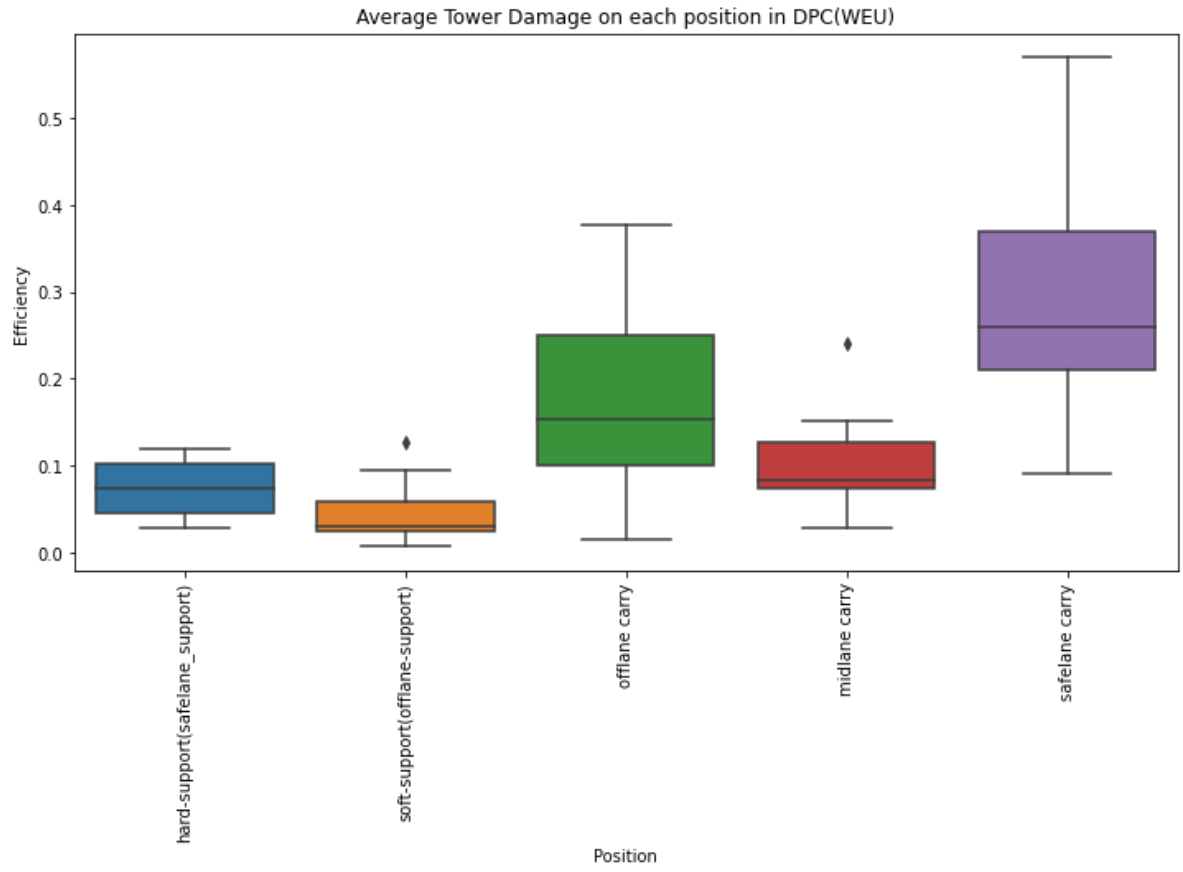
previously analyzed DPC(CN) tour, west European teams tend to pick mid and safe-lane players with high damage heroes, instead of those heroes with more heavy focus on teamfight tactics and pushing abilities in China.

In [90]:

```
g the average gold sum to the tower damage, which states how much gold it takes for a player to deal
']/ dpc_weu_avg_df['Gold Sum']).astype(float)

_avg_df, order = ['hard-support(safelane_support)',
          'soft-support(offlane-support)',
         'offlane carry',
         'midlane carry',
         'safelane carry']).set(title = 'Average Tower Damage on each position in DPC(WEU)')
```

Out[90]:

```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'hard-support(safelane_support)'),
  Text(1, 0, 'soft-support(offlane-support)'),
  Text(2, 0, 'offlane carry'),
  Text(3, 0, 'midlane carry'),
  Text(4, 0, 'safelane carry')])
```



It can be seen from this chart that most tower damage and pushing is done by position 1, instead of both position 1 and 3 in Chinese teams. It appears that in west European teams, offlane carry players are more dedicated in teamfight, and safelane carry players have hero picks that are both strong in teamfights and pushing. As compared to Chinese region, where pushing ability is done by both offlane and safelane carries, WEU tend to rely mostly on safelane carries. Both region have low midlane carry tower damage efficiency.

In [40]:

```
#Average minutes per game of each player (by dividing GPM from gold sum).
#This would reflect the efficiency of each player and the optimum length of game for them to perform

dpc_weu_avg_df['Average Game Length (min)'] = dpc_weu_avg_df['Gold Sum'] / dpc_weu_avg_df['GPM']
```

In [41]:

```
#Players that requires the largest game length:

max_len = dpc_weu_avg_df[['Player', 'Average Game Length (min)', 'Position', 'KDA']].nlargest(n = 5,
print(max_len)
```

	Player	Average Game Length (min)	Position	KDA
0	Nisha	39.124424	midlane carry	8.76
3	Iceiceice	38.273453	offlane carry	3.54
21	Boxi	37.628125	offlane carry	4.05
16	Zayac	37.176471	soft-support(offlane-support)	2.95
7	Pure	37.174419	safelane carry	8.29

In [42]:

```
#Players that requires the least game length:

min_len = dpc_weu_avg_df[['Player', 'Average Game Length (min)', 'Position', 'KDA']].nsmallest(n = 5
print(min_len)
```

	Player	Average Game Length (min)	Position	KDA
37	Aramis	29.632812	soft-support(offlane-support)	1.11
29	Saksa	29.906061	soft-support(offlane-support)	2.90
30	Taiga	30.101852	soft-support(offlane-support)	3.57
32	ATF	30.695740	offlane carry	4.91
31	Yuragi	30.700658	safelane carry	7.06

Player **Nisha**, **Zayac**, and **Iceiceice**, all from Team Secret, have the longest average game length, as well as **Boxi** from Team Liquid and **Pure** from Entity. This not only reflects the fact that these three teams plays a longer game than other teams, but also indicates that these players require longer game length and more farming time than others.
On the other hand, **Taiga**, **ATF**, and **Yuragi** from OG all have the least game length on average. It partially reflects that PSG.LGD plays a faster pace game than other teams.

Best Players / Stand-out Players

In [91]:

```
age kills of players in Dota Pro Circuit West Europe 2021-2022 Summer Division 1 is 4.333902, with a


kill + std_kill

istinct value for selecting distinct players, we list the relative important data of these players
['Kills'].values >= distinct_kill
c_weu_avg_df.loc[mask]
(distinct_players.columns[2:5], axis = 1, inplace = True)
s)
```

	Player	Position	Winrate	As Radiant	As Dire	Kills	Deaths	\
0	Nisha	midlane carry	55.00%	10	10	9.30	2.80	
2	Crystallis	safelane carry	55.00%	10	10	7.05	3.90	
7	Pure	safelane carry	57.89%	5	14	9.58	3.42	
8	Stormstormer	midlane carry	57.89%	5	14	8.37	3.00	
9	MiCKe	midlane carry	72.22%	12	6	7.33	3.17	
15	DyrachYO	safelane carry	38.89%	11	7	6.56	4.89	
19	MATUMBAMAN	safelane carry	72.22%	12	6	9.06	2.50	
20	Zai	offlane carry	72.22%	12	6	6.83	3.28	
22	Limmp	midlane carry	27.78%	7	11	6.44	3.56	
23	BOOM	midlane carry	38.89%	11	7	7.28	3.56	
27	Nine	midlane carry	76.47%	13	4	6.76	3.00	
28	skiter	safelane carry	76.47%	13	4	6.82	2.41	
31	Yuragi	safelane carry	62.50%	9	7	7.44	2.69	
32	ATF	offlane carry	62.50%	9	7	6.69	4.38	
34	bzm	midlane carry	62.50%	9	7	7.38	3.31	

	Assists	KDA	Avg. KAL	...	XPM	Last Hits	Denies	LVL	Hero Damage	\
0	10.50	8.76	7.07	...	759	405	10	26	39091	
2	9.85	5.45	4.33	...	688	390	10	25	26695	
7	10.21	8.29	5.78	...	696	396	9	25	31480	
8	12.58	8.55	6.98	...	736	373	10	25	28023	
9	12.06	6.75	6.12	...	679	303	11	23	27182	
15	9.11	5.62	3.20	...	718	366	13	23	24453	
19	9.33	8.06	7.36	...	717	362	12	24	27982	
20	13.72	6.42	6.27	...	657	281	9	23	23821	
22	8.67	4.94	4.25	...	605	290	6	22	29786	
23	8.39	5.54	4.41	...	678	292	9	23	24587	
27	11.06	7.70	5.94	...	681	271	8	22	27013	
28	8.24	7.23	6.24	...	668	330	19	22	18914	
31	8.44	7.06	5.91	...	688	281	10	22	17907	
32	9.81	4.91	3.77	...	641	222	10	21	18101	
34	9.38	4.93	5.06	...	696	292	8	22	26958	

	Tower Damage	Hero Heal	Gold Sum	Efficiency	Average Game Length (min)
0	3843	323	25470	0.150883	39.124424
2	9438	3	23111	0.408377	36.918530
7	3356	447	25576	0.131217	37.174419
8	5254	27	21787	0.241153	35.541599
9	2318	375	19408	0.119435	34.906475
15	5292	1764	22362	0.236651	32.933726
19	13205	181	23176	0.569770	35.655385
20	2054	2693	19526	0.105193	35.959484
22	1219	36	18677	0.065267	36.266019
23	1364	52	17970	0.075904	32.851920
27	1404	1196	17353	0.080908	31.323105
28	5108	196	18966	0.269324	31.297030

```
31          6637         705        18666    0.355566                30.700658
32          1568           0        15133    0.103615                30.695740
34          1621         886        19214    0.084366                33.242215

[15 rows x 21 columns]

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\4205091641.py:9: SettingWithCopy
Warning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  distinct_players.drop(distinct_players.columns[2:5], axis = 1, inplace = True)
```

In [51]:

```
#top 10 players with respect to KDA index:

top_5_kda = dpc_weu_avg_df[['Player', 'Position', 'KDA', 'Winrate']].nlargest(n = 5, columns = 'KDA'
top_5_kda
```

Out[51]:

	Player	Position	KDA	Winrate
0	Nisha	midlane carry	8.76	55.00%
8	Stormstormer	midlane carry	8.55	57.89%
7	Pure	safelane carry	8.29	57.89%
19	MATUMBAMAN	safelane carry	8.06	72.22%
27	Nine	midlane carry	7.70	76.47%

The player that performs the best (based on KDA data) is **Nisha** , midlane carry player from Team Secret, with a winrate of 55.00%. The second best midlane carry player in DPC West EU is **Stormstormer** , from Entity, with a winrate of 57.89.
As for safelane carry players, **Pure** from Entity and **MATUMBAMAN** from Team Liquid stands out from all players with KDA of 8.29 and 8.06. Compared to DPC in China, WEU players with the best performances are mostly midlane or safelane carries. It can be reflected that position 3 (offlane carries) are less focused and are less performing well among all players compared to DPC China, where multiple position 3 players have a high KDA.

In [53]:

```
top_5_kda['Winrate'] = top_5_kda['Winrate'].str.rstrip('%').astype('float') / 100.0
```

In [54]:

```
#top 10 players' winrate:
top_5_kda_wr = top_5_kda[['Player', 'Position', 'KDA', 'Winrate']].nlargest(n = 5, columns = 'Winrat
top_5_kda_wr
```

Out[54]:

	Player	Position	KDA	Winrate
27	Nine	midlane carry	7.70	0.7647
19	MATUMBAMAN	safelane carry	8.06	0.7222
8	Stormstormer	midlane carry	8.55	0.5789
7	Pure	safelane carry	8.29	0.5789
0	Nisha	midlane carry	8.76	0.5500

This part is only sorting top 5 KDA players with their winrate. We can see that even though Nisha has such a extraordinary performance with an extreme value of average damage and highest KDA of 8.76, his team's winrate is only 0.55. It can draw two possible conclusions, without further data: either Nisha is not a great team player that his performance does not contribute to the winning of the team, or his teammate are not performing good enough to match his extraordinary performance in mid-lane.

In [92]:

```
top_5_rd = dpc_weu_avg_df.nlargest(n = 5, columns = 'KDA')
top_5_rd.drop(['Player', 'Position', 'Total Count', 'Wins', 'Losses', 'Winrate', 'As Radiant', 'As D
top_5_rd.reset_index()
top_5_rd
```

Out[92]:

	Player	Position	Total Count	Wins	Losses	Winrate	As Radiant	As Dire	Kills	Deaths	...
0	Nisha	midlane carry	20	11	9	55.00%	10	10	9.30	2.80	...
8	Stormstormer	midlane carry	19	11	8	57.89%	5	14	8.37	3.00	...
7	Pure	safelane carry	19	11	8	57.89%	5	14	9.58	3.42	...
19	MATUMBAMAN	safelane carry	18	13	5	72.22%	12	6	9.06	2.50	...
27	Nine	midlane carry	17	13	4	76.47%	13	4	6.76	3.00	...

5 rows × 24 columns

In [93]:

```
top_5_rd['Laning Ability'] = (top_5_rd['Last Hits'] / top_5_rd['Denies']).astype(float)
top_5_rd_data = top_5_rd.drop(['Player', 'Position', 'Total Count', 'Wins', 'Losses', 'Winrate', 'As
top_5_rd_data
```

Out[93]:

	KDA	GPM	XPM	Hero Damage	Tower Damage	Gold Sum	Efficiency	Average Game Length (min)	Laning Ability
0	8.76	651	759	39091	3843	25470	0.150883	39.124424	40.500000
8	8.55	613	736	28023	5254	21787	0.241153	35.541599	37.300000
7	8.29	688	696	31480	3356	25576	0.131217	37.174419	44.000000
19	8.06	650	717	27982	13205	23176	0.569770	35.655385	30.166667
27	7.70	554	681	27013	1404	17353	0.080908	31.323105	33.875000

In [94]:

```
top_5_rd_name = top_5_rd.iloc[:, [0]].copy()
top_5_rd_name
```

Out[94]:

	Player
0	Nisha
8	Stormstormer
7	Pure
19	MATUMBAMAN
27	Nine

In [95]:

```
#Normalilzing data

top_5_rd_data_max_scaled = top_5_rd_data.copy()

for columns in top_5_rd_data_max_scaled.columns:
    top_5_rd_data_max_scaled[columns] = top_5_rd_data_max_scaled[columns]  / top_5_rd_data_max_scale

top_5_rd_data_max_scaled = top_5_rd_data_max_scaled.multiply(10)
top_5_rd_data_max_scaled.iloc[0]
```

Out[95]:

```
KDA                          10.000000
GPM                           9.462209
XPM                          10.000000
Hero Damage                  10.000000
Tower Damage                  2.910261
Gold Sum                      9.958555
Efficiency                    2.648144
Average Game Length (min)    10.000000
Laning Ability                9.204545
Name: 0, dtype: float64
```

In [96]:

```
nisha = top_5_rd_data_max_scaled.iloc[0].tolist()
nisha = np.concatenate((nisha, [nisha[0]]))

stormstormer = top_5_rd_data_max_scaled.iloc[1].tolist()
stormstormer = np.concatenate((stormstormer, [stormstormer[0]]))

pure = top_5_rd_data_max_scaled.iloc[2].tolist()
pure = np.concatenate((pure, [pure[0]]))

matumbaman = top_5_rd_data_max_scaled.iloc[3].tolist()
matumbaman = np.concatenate((matumbaman, [matumbaman[0]]))

nine = top_5_rd_data_max_scaled.iloc[4].tolist()
nine = np.concatenate((nine, [nine[0]]))

nisha
```

Out[96]:

```
array([10.        ,  9.4622093 , 10.        , 10.        ,  2.91026126,
        9.9585549 ,  2.6481435 , 10.        ,  9.20454545, 10.        ])
```

In [97]:

```
categories = top_5_rd_data_max_scaled.columns.tolist()
categories = np.concatenate((categories, [categories[0]]))
len(categories)
```

Out[97]:

```
10
```

In [98]:

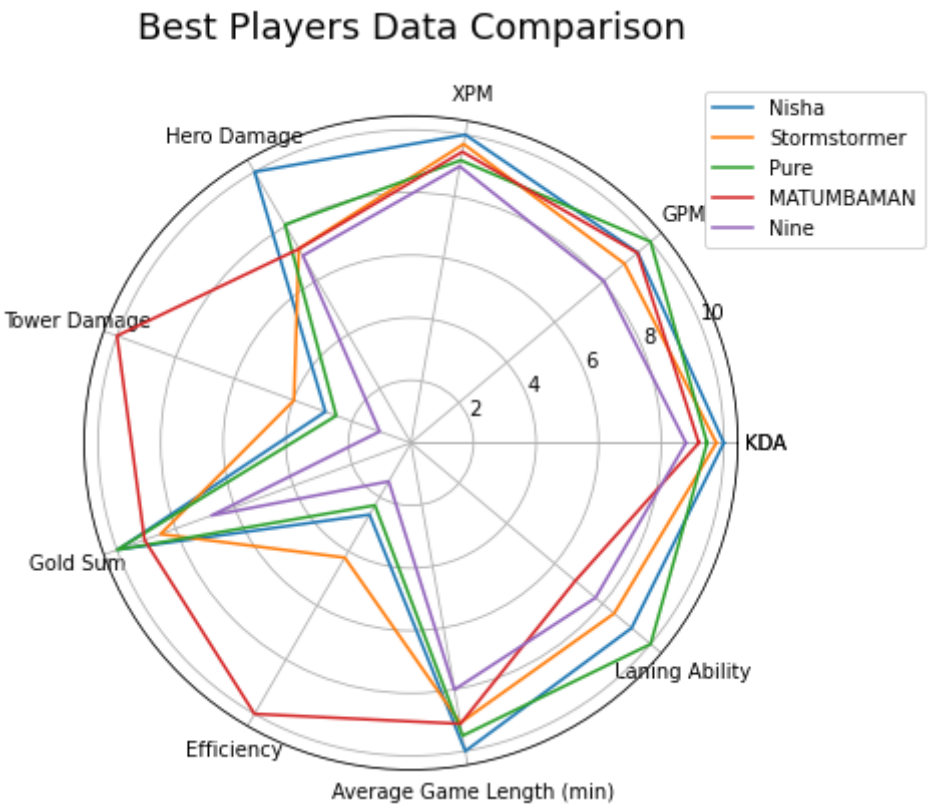
```
label_placement = np.linspace(start = 0, stop = 2*np.pi, num = len(nisha))
```

In [99]:

```
plt.figure(figsize = (6, 6))
plt.subplot(polar = True)
plt.plot(label_placement, nisha)
plt.plot(label_placement, stormstormer)
plt.plot(label_placement, pure)
plt.plot(label_placement, matumbaman)
plt.plot(label_placement, nine)
lines, labels = plt.thetagrids(np.degrees(label_placement), labels = categories)
plt.title('Best Players Data Comparison', y = 1.1, fontdict = {'fontsize': 18})
plt.legend(labels = top_5_rd_name['Player'].tolist(), loc = (0.95, 0.8))
```

Out[99]:

<matplotlib.legend.Legend at 0x1ae46fae6d0>



In [100]:

```
#isolate 2 best midlane player comparison in the top 5 KDA chart


best_mid = dpc_weu_avg_df[(dpc_cn_avg_df['Player'] == 'Nisha') | (dpc_weu_avg_df['Player'] == 'Nine
best_mid
```

Out[100]:

	index	Player	Position	Total Count	Wins	Losses	Winrate	As Radiant	As Dire	Kills	...	XPM	Last Hits
0	0	Nisha	midlane carry	20	11	9	55.00%	10	10	9.30	...	759	405
1	27	Nine	midlane carry	17	13	4	76.47%	13	4	6.76	...	681	271

2 rows × 25 columns

In [101]:

```
best_mid['Laning Ability'] = (best_mid['Last Hits'] / best_mid['Denies']).astype(float)
best_mid_data = best_mid.drop(['index', 'Player', 'Position', 'Total Count', 'Wins', 'Losses', 'Winr
best_mid_data
```

Out[101]:

	KDA	GPM	XPM	Hero Damage	Tower Damage	Gold Sum	Efficiency	Average Game Length (min)	Laning Ability
0	8.76	651	759	39091	3843	25470	0.150883	39.124424	40.500
1	7.70	554	681	27013	1404	17353	0.080908	31.323105	33.875

In [102]:

```
best_mid_name = best_mid.iloc[:, [1]].copy()
best_mid_name
```

Out[102]:

	Player
0	Nisha
1	Nine

In [103]:

```
best_mid_data
```

Out[103]:

	KDA	GPM	XPM	Hero Damage	Tower Damage	Gold Sum	Efficiency	Average Game Length (min)	Laning Ability
0	8.76	651	759	39091	3843	25470	0.150883	39.124424	40.500
1	7.70	554	681	27013	1404	17353	0.080908	31.323105	33.875

In [104]:

```
from sklearn.preprocessing import MinMaxScaler
```

In [105]:

```
test = best_mid_data.copy().astype(float)
test
```

Out[105]:

	KDA	GPM	XPM	Hero Damage	Tower Damage	Gold Sum	Efficiency	Average Game Length (min)	Laning Ability
0	8.76	651.0	759.0	39091.0	3843.0	25470.0	0.150883	39.124424	40.500
1	7.70	554.0	681.0	27013.0	1404.0	17353.0	0.080908	31.323105	33.875

In [106]:

```
#Normalilzing data

best_mid_data_max_scaled = best_mid_data.copy()

for columns in best_mid_data_max_scaled.columns:
    best_mid_data_max_scaled[columns] = best_mid_data_max_scaled[columns]  / best_mid_data_max_scale

best_mid_data_max_scaled = best_mid_data_max_scaled.multiply(10)
best_mid_data_max_scaled
```

Out[106]:

	KDA	GPM	XPM	Hero Damage	Tower Damage	Gold Sum	Efficiency	Average Game Length (min)	I
0	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.0000	10.000000	10.0
1	8.789954	8.509985	8.972332	6.910286	3.653396	6.813113	5.3623	8.006023	8.3

In [107]:

```
nisha2 = best_mid_data_max_scaled.loc[0].tolist()
nisha2 = np.concatenate((nisha2, [nisha2[0]]))

nine2 = best_mid_data_max_scaled.loc[1].tolist()
nine2 = np.concatenate((nine2, [nine2[0]]))

nisha2
```

Out[107]:

```
array([10., 10., 10., 10., 10., 10., 10., 10., 10., 10.])
```

In [108]:

```
categories = best_mid_data_max_scaled.columns.tolist()
categories = np.concatenate((categories, [categories[0]]))
len(categories)
```

Out[108]:

```
10
```

In [109]:

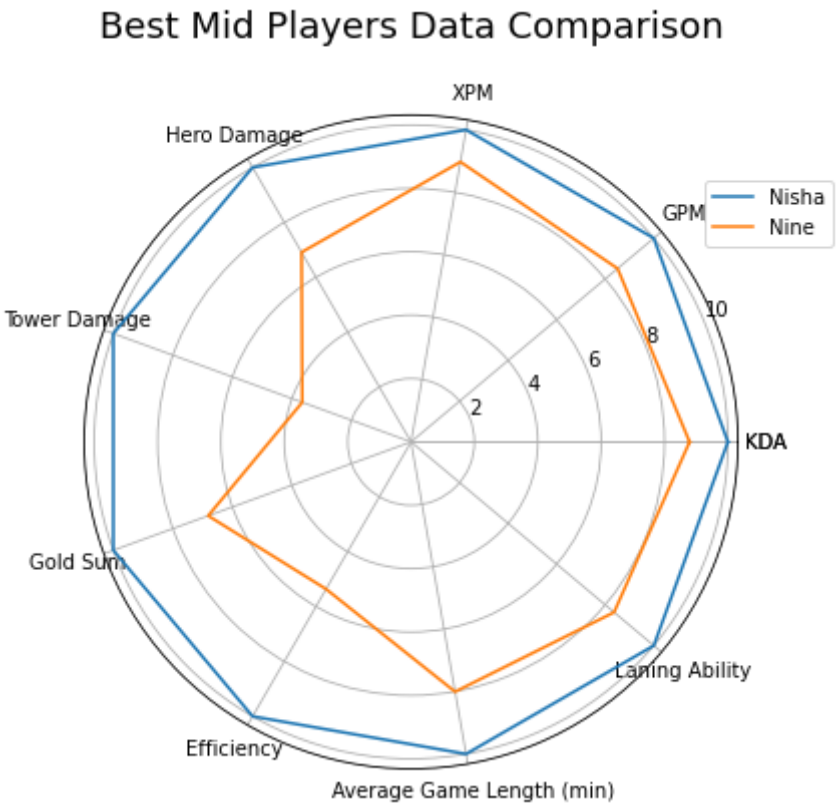
```
label_placement = np.linspace(start = 0, stop = 2*np.pi, num = len(nts))
```

In [110]:

```
plt.figure(figsize = (6, 6))
plt.subplot(polar = True)
plt.plot(label_placement, nisha2)
plt.plot(label_placement, nine2)
lines, labels = plt.thetagrids(np.degrees(label_placement), labels = categories)
plt.title('Best Mid Players Data Comparison', y = 1.1, fontdict = {'fontsize': 18})
plt.legend(labels = best_mid_name['Player'].tolist(), loc = (0.95, 0.8))
```

Out[110]:

<matplotlib.legend.Legend at 0x1ae480013d0>

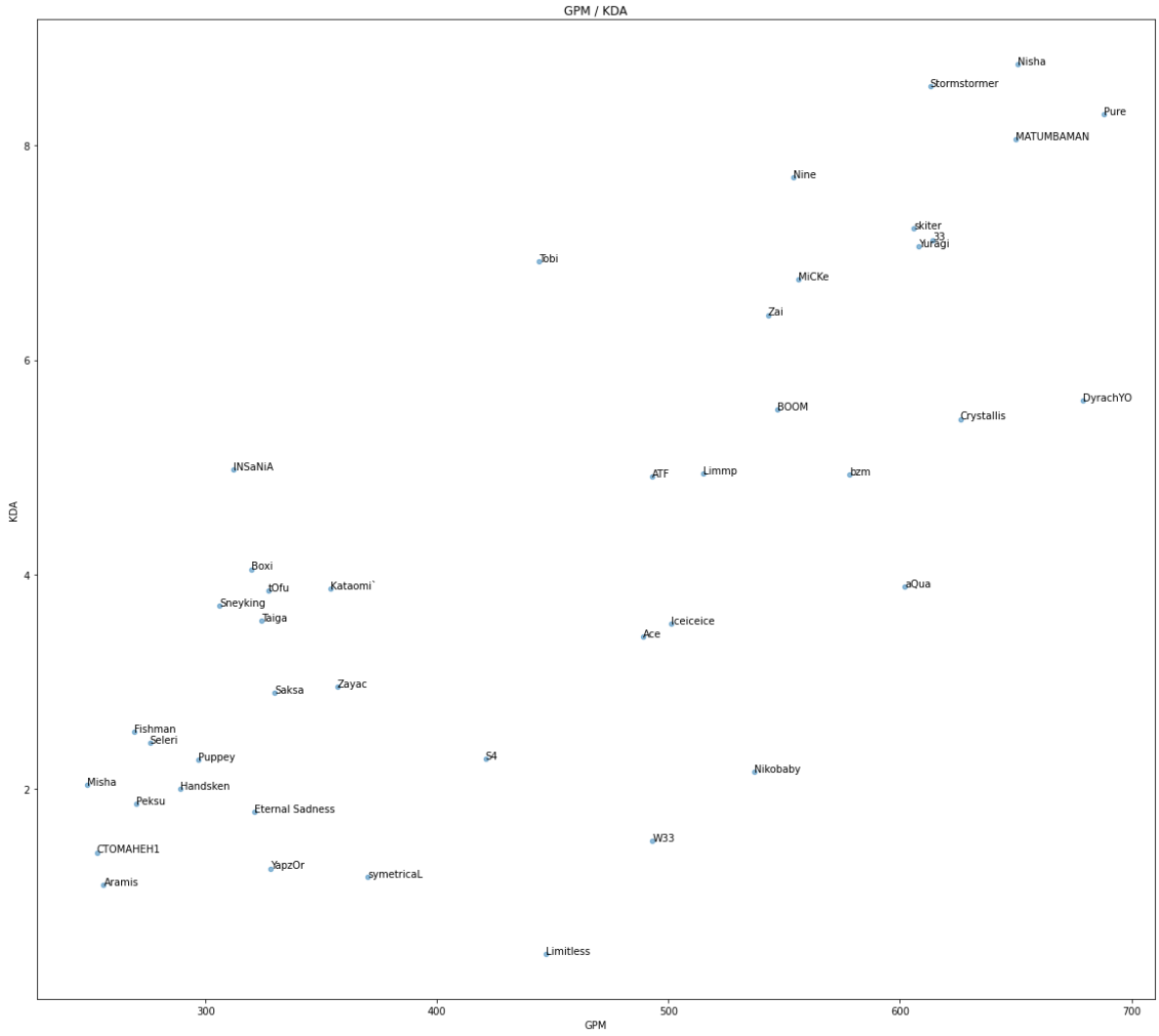


In [111]:

```
#Player efficiency based on GPM with KDA

a = plt.figure()
a.set_figwidth(20)
a.set_figheight(18)

plt.scatter(x = dpc_cn_avg_df['GPM'],
       y = dpc_cn_avg_df['KDA'],
       s = 20,
       alpha = 0.5)

plt.title('GPM / KDA')
plt.xlabel('GPM')
plt.ylabel('KDA')

x, y = dpc_weu_avg_df['GPM'], dpc_weu_avg_df['KDA']
for i, txt in enumerate(dpc_weu_avg_df['Player']):
  plt.annotate(txt, (x[i], y[i]))
  print(i, txt, x[i], y[i], dpc_weu_avg_df['Player'][i])
```

```
0 Nisha 651 8.76 Nisha
1 Puppey 297 2.27 Puppey
2 Crystallis 626 5.45 Crystallis
3 Iceiceice 501 3.54 Iceiceice
4 Tobi 444 6.92 Tobi
5 Kataomi` 354 3.87 Kataomi`
6 Fishman 269 2.53 Fishman
7 Pure 688 8.29 Pure
8 Stormstormer 613 8.55 Stormstormer
9 MiCKe 556 6.75 MiCKe
10 Peksu 270 1.86 Peksu
11 tOfu 327 3.85 tOfu
12 Ace 489 3.42 Ace
13 Handsken 289 2.0 Handsken
14 S4 421 2.28 S4
15 DyrachYO 679 5.62 DyrachYO
16 Zayac 357 2.95 Zayac
17 aQua 602 3.89 aQua
18 INSaNiA 312 4.98 INSaNiA
19 MATUMBAMAN 650 8.06 MATUMBAMAN
20 Zai 543 6.42 Zai
21 Boxi 320 4.05 Boxi
22 Limmp 515 4.94 Limmp
23 BOOM 547 5.54 BOOM
24 Seleri 276 2.43 Seleri
25 33 614 7.12 33
26 Sneyking 306 3.71 Sneyking
27 Nine 554 7.7 Nine
28 skiter 606 7.23 skiter
29 Saksa 330 2.9 Saksa
30 Taiga 324 3.57 Taiga
31 Yuragi 608 7.06 Yuragi
32 ATF 493 4.91 ATF
33 Misha 249 2.04 Misha
34 bzm 578 4.93 bzm
35 CTOMAHEH1 253 1.41 CTOMAHEH1
36 Nikobaby 537 2.16 Nikobaby
37 Aramis 256 1.11 Aramis
38 W33 493 1.52 W33
```

```
39 symetricaL 370 1.18 symetricaL
40 Eternal Sadness 321 1.79 Eternal Sadness
41 YapzOr 328 1.26 YapzOr
42 Limitless 447 0.46 Limitless
```



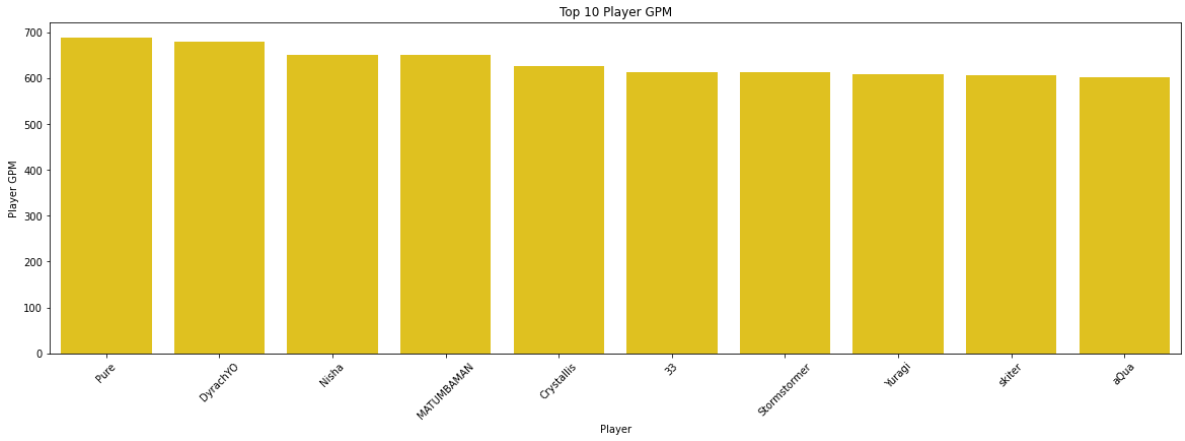
This chart shows the amount of resource a player takes and the amount of impact (here, only indicated through KDA) they created in the game.
It can be seen that **Nisha** from Team Secret takes about 640 GPM and has the highest KDA of all players. As for the player that has both a high GPM and a high KDA, **Pure** from Entity, **MATUMBAMAN** from Team Liquid, and **Stormstormer** from Entity all stand on the top left corner.
Players that has a high GPM but is only medicre in KDA includes **DyrachYO** from Gaimin Gladiator, **Crystallis** from Team Secret, **aQua** from goonsquad, **bzm** from OG, and **Nikobaby** from Alliance.

In [112]:

```
# top 10 Players with the highest GPM

dpc_weu_gpm = dpc_weu_avg_df.sort_values(by = 'GPM', ascending = False)[:10]
plt.figure(figsize = (20, 6))
plt.title("Top 10 Player GPM")
gpm_chart = sns.barplot(x = dpc_weu_gpm['Player'], y = dpc_weu_gpm['GPM'], label = 'Players', color
plt.ylabel('Player GPM')
gpm_chart.set_xticklabels(gpm_chart.get_xticklabels(), rotation = 45)
gpm_chart
```

Out[112]:

```
<AxesSubplot:title={'center':'Top 10 Player GPM'}, xlabel='Player', ylabel='Player G
PM'>
```



From the chart, most position 1 players have the highest GPM. **Pure** from Entity has the highest average gpm of all West EU DPC players. **Nisha** from Team Secret has the highest GPM of all position 2 players.

Position Analysis - Position 5 (Hard Support)

In [113]:

```
#Best Player at each position:

#isolating position 5 (hard support) players
mask_5 = dpc_weu_avg_df['Position'].values == 'hard-support(safelane_support)'
pos_5_players = dpc_weu_avg_df.loc[mask_5]
print(pos_5_players)
```

```
      Player                        Position  Total Count  Wins  Losses  \
1     Puppey  hard-support(safelane_support)           20    11       9
6    Fishman  hard-support(safelane_support)           19    11       8
10     Peksu  hard-support(safelane_support)           18     5      13
18   INSaNiA  hard-support(safelane_support)           18    13       5
24    Seleri  hard-support(safelane_support)           18     7      11
26  Sneyking  hard-support(safelane_support)           17    13       4
33     Misha  hard-support(safelane_support)           16    10       6
35  CTOMAHEH1  hard-support(safelane_support)           14     0      14

    Winrate  As Radiant  As Dire  Kills  Deaths  ...  XPM  Last Hits  Denies  \
1    55.00%          10       10   1.80    7.15  ...  420         74       6
6    57.89%           5       14   2.37    9.21  ...  379         36       8
10   27.78%           7       11   1.89    7.94  ...  346         55       3
18   72.22%          12        6   2.89    4.28  ...  411         63       2
24   38.89%          11        7   1.89    6.89  ...  378         57       3
26   76.47%          13        4   2.12    4.41  ...  460         63       5
33   62.50%           9        7   1.69    7.81  ...  381         32       2
35    0.00%           3       11   1.79    7.57  ...  303         60       3

    LVL  Hero Damage  Tower Damage  Hero Heal  Gold Sum  Efficiency  \
1    19        12655           582       4012     10392    0.056005
6    18        11409           251       1939      9079    0.027646
10   17        10963           905       5289      9834    0.092028
18   18        12100          1061       3850     10806    0.098186
24   16         8582          1057       5801      8865    0.119233
26   18         9398           398       7691      9920    0.040121
33   16        10406           904       1359      7779    0.116210
35   14         9429           371       1128      7989    0.046439

    Average Game Length (min)
1                   34.989899
6                   33.750929
10                  36.422222
18                  34.634615
24                  32.119565
26                  32.418301
33                  31.240964
35                  31.577075

[8 rows x 24 columns]
```

In [114]:

```
#For position 5, the best players should be analyzed based on their general impact.
#By dividing gold sum from hero damage, we can see the ratio of gold they consumes (resources of a t
#I will call this index 'resource/impact ratio'
pos_5_players['resource/impact ratio'] = ((pos_5_players['Hero Damage'] + pos_5_players['Hero Heal']
top_pos_5_players = pos_5_players[['Player', 'KDA', 'Winrate', 'GPM', 'XPM', 'Hero Damage', 'Hero He
print(top_pos_5_players)
```

```
      Player   KDA Winrate  GPM  XPM  Hero Damage  Hero Heal  \
26  Sneyking  3.71  76.47%  306  460         9398       7691
10     Peksu  1.86  27.78%  270  346        10963       5289
24    Seleri  2.43  38.89%  276  378         8582       5801

    resource/impact ratio
26               1.722681
10               1.652634
24               1.622448

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\1032153592.py:4: SettingWithCopy
Warning:
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/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  pos_5_players['resource/impact ratio'] = ((pos_5_players['Hero Damage'] + pos_5_pl
ayers['Hero Heal']) / pos_5_players['Gold Sum']).astype(float)
```

Position Analysis - Position 4 (Soft Support)

In [81]:

```
#Best Player at each position:

#isolating position 4 (Soft support) players
mask_4 = dpc_weu_avg_df['Position'].values == 'soft-support(offlane-support)'
pos_4_players = dpc_weu_avg_df.loc[mask_4]
print(pos_4_players)
```

```
      Player                      Position  Total Count  Wins  Losses  \
5   Kataomi`  soft-support(offlane-support)           19    11       8
11      tOfu  soft-support(offlane-support)           18     7      11
13  Handsken  soft-support(offlane-support)           18     5      13
16     Zayac  soft-support(offlane-support)           18    11       7
29     Saksa  soft-support(offlane-support)           17    13       4
30     Taiga  soft-support(offlane-support)           16    10       6
37    Aramis  soft-support(offlane-support)           14     0      14
41    YapzOr  soft-support(offlane-support)            2     0       2

   Winrate  As Radiant  As Dire  Kills  Deaths  ...  XPM  Last Hits  Denies  \
5   57.89%           5       14   4.37    5.05  ...  476        104       2
11  38.89%          11        7   2.89    5.72  ...  441        101       5
13  27.78%           7       11   3.61    7.72  ...  409         73       3
16  61.11%           9        9   2.67    7.56  ...  477        116       5
29  76.47%          13        4   2.94    5.88  ...  438         91       4
30  62.50%           9        7   2.38    5.56  ...  428         84       9
37   0.00%           3       11   1.79    8.64  ...  323         57       2
41   0.00%           1        1   1.00    7.50  ...  428        114       6

    LVL  Hero Damage  Tower Damage  Hero Heal  Gold Sum  Efficiency  \
5    20        17455           385       2235     12710    0.030291
11   18        11515           277       1717     10733    0.025808
13   18        14184           309       3291     10215    0.030250
16   20        19223           635       2224     13272    0.047845
29   18        12312          1257       1299      9869    0.127369
30   17        14513           919        986      9753    0.094227
37   15        11149            60        387      7586    0.007909
41   18        14286           284        396     11610    0.024462

    Average Game Length (min)
5                   35.903955
11                  32.822630
13                  35.346021
16                  37.176471
29                  29.906061
30                  30.101852
37                  29.632812
41                  35.396341

[8 rows x 24 columns]
```

In [82]:

```
#For position 4, the best players should be analyzed based on their assist and their general impact.
#By dividing gold sum from hero damage, we can see the ratio of gold they consumes (resources of a t
#I will call this index 'resource/impact ratio'
pos_4_players['resource/impact ratio'] = ((pos_4_players['Hero Damage'] + pos_4_players['Hero Heal']
top_pos_4_players = pos_4_players[['Player', 'KDA', 'Winrate', 'GPM', 'XPM', 'Hero Damage', 'Hero He
print(top_pos_4_players)
```

```
      Player   KDA Winrate  GPM  XPM  Hero Damage  Hero Heal  \
13  Handsken  2.00  27.78%  289  409        14184       3291
16     Zayac  2.95  61.11%  357  477        19223       2224
30     Taiga  3.57  62.50%  324  428        14513        986

    resource/impact ratio
13               1.710720
16               1.615958
30               1.589152

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\3353686895.py:4: SettingWithCopy
Warning:
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/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  pos_4_players['resource/impact ratio'] = ((pos_4_players['Hero Damage'] + pos_4_pl
ayers['Hero Heal']) / pos_4_players['Gold Sum']).astype(float)
```

Position Analysis - Position 3 (Off-lane Carry)

In [83]:

```
#Best Player at each position:

#isolating position 3 (offlane carry) players
mask_3 = dpc_weu_avg_df['Position'].values == 'offlane carry'
pos_3_players = dpc_weu_avg_df.loc[mask_3]
print(pos_3_players)
```

```
            Player       Position  Total Count  Wins  Losses Winrate  \
3         Iceiceice  offlane carry           20    11       9  55.00%
4              Tobi  offlane carry           19    11       8  57.89%
12              Ace  offlane carry           18     7      11  38.89%
14               S4  offlane carry           18     5      13  27.78%
20              Zai  offlane carry           18    13       5  72.22%
21            Boxi  offlane carry           18    13       5  72.22%
25              33  offlane carry           17    13       4  76.47%
32             ATF  offlane carry           16    10       6  62.50%
39      symetricaL  offlane carry           10     0      10   0.00%
40  Eternal Sadness  offlane carry            2     0       2   0.00%
42       Limitless  offlane carry            2     0       2   0.00%

    As Radiant  As Dire  Kills  Deaths  ...  XPM  Last Hits  Denies  LVL  \
3           10       10   5.25    5.70  ...  631        280      11   23
4            5       14   3.53    3.89  ...  545        233      22   22
12          11        7   4.11    5.06  ...  582        259      15   21
14           7       11   3.56    6.22  ...  513        200      11   20
20          12        6   6.83    3.28  ...  657        281       9   23
21          12        6   4.44    4.89  ...  487         75       3   20
25          13        4   5.94    2.82  ...  668        287       7   22
32           9        7   6.69    4.38  ...  641        222      10   21
39           2        8   1.90    6.00  ...  458        184       9   19
40           1        1   2.00    6.00  ...  418        140       2   16
42           0        2   2.00   10.00  ...  428        198       8   18

    Hero Damage  Tower Damage  Hero Heal  Gold Sum  Efficiency  \
3         18919          2946       2440     19175    0.153638
4         22615          4561        910     16371    0.278602
12        16890          4162       1288     16369    0.254261
14        17111          3430       1272     14010    0.244825
20        23821          2054       2693     19526    0.105193
21        12567           182       1167     12041    0.015115
25        17324          7616       1420     20184    0.377329
32        18101          1568          0     15133    0.103615
39        12613          1130        480     12292    0.091930
40        10386          2205       1838     11558    0.190777
42        19048          1354       1022     13820    0.097974

    Average Game Length (min)
3                   38.273453
4                   36.871622
12                  33.474438
14                  33.277910
20                  35.959484
21                  37.628125
25                  32.872964
32                  30.695740
39                  33.221622
40                  36.006231
42                  30.917226
```

[11 rows x 24 columns]

In [84]:

```
#For position 3, the best players should be analyzed based on their KDA, hero damage, tower damage,
#The index would be calculated by (hero damage + tower damage / gold sum) * KDA
pos_3_players['carry index'] = ((pos_3_players['Hero Damage'] + pos_3_players['Tower Damage']) / pos
top_pos_3_players = pos_3_players[['Player', 'KDA', 'Winrate', 'Hero Damage', 'Tower Damage', 'Gold
print(top_pos_3_players)
```

```
       Player   KDA Winrate  Hero Damage  Tower Damage  Gold Sum  carry index
4        Tobi  6.92  57.89%        22615          4561     16371     1.660009
42  Limitless  0.46   0.00%        19048          1354     13820     1.476266
14         S4  2.28  27.78%        17111          3430     14010     1.466167

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\3398803657.py:3: SettingWithCopy
Warning:
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/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  pos_3_players['carry index'] = ((pos_3_players['Hero Damage'] + pos_3_players['Tow
er Damage']) / pos_3_players['Gold Sum']).astype(float)
```

Position Analysis - Position 2 (Mid-lane Carry)

In [85]:

```
#Best Player at each position:

#isolating position 2 (midlane carry) players
mask_2 = dpc_weu_avg_df['Position'].values == 'midlane carry'
pos_2_players = dpc_weu_avg_df.loc[mask_2]
print(pos_2_players)
```

```
          Player       Position  Total Count  Wins  Losses Winrate  \
0          Nisha  midlane carry           20    11       9  55.00%
8   Stormstormer  midlane carry           19    11       8  57.89%
9          MiCKe  midlane carry           18    13       5  72.22%
22         Limmp  midlane carry           18     5      13  27.78%
23          BOOM  midlane carry           18     7      11  38.89%
27          Nine  midlane carry           17    13       4  76.47%
34           bzm  midlane carry           16    10       6  62.50%
38           W33  midlane carry           14     0      14   0.00%

    As Radiant  As Dire  Kills  Deaths  ...  XPM  Last Hits  Denies  LVL  \
0           10       10   9.30    2.80  ...  759        405      10   26
8            5       14   8.37    3.00  ...  736        373      10   25
9           12        6   7.33    3.17  ...  679        303      11   23
22           7       11   6.44    3.56  ...  605        290       6   22
23          11        7   7.28    3.56  ...  678        292       9   23
27          13        4   6.76    3.00  ...  681        271       8   22
34           9        7   7.38    3.31  ...  696        292       8   22
38           3       11   5.86    6.14  ...  571        275       6   21

    Hero Damage  Tower Damage  Hero Heal  Gold Sum  Efficiency  \
0         39091          3843        323     25470    0.150883
8         28023          5254         27     21787    0.241153
9         27182          2318        375     19408    0.119435
22        29786          1219         36     18677    0.065267
23        24587          1364         52     17970    0.075904
27        27013          1404       1196     17353    0.080908
34        26958          1621        886     19214    0.084366
38        24698           463       1318     16140    0.028686

    Average Game Length (min)
0                   39.124424
8                   35.541599
9                   34.906475
22                  36.266019
23                  32.851920
27                  31.323105
34                  33.242215
38                  32.738337

[8 rows x 24 columns]
```

In [86]:

```
#For position 2, the best players should be analyzed based on their KDA, hero damage, tower damage,
#The index would be calculated by (hero damage + tower damage / gold sum) * KDA
pos_2_players['carry index'] = ((pos_2_players['Hero Damage'] + pos_2_players['Tower Damage']) / pos
top_pos_2_players = pos_2_players[['Player', 'KDA', 'Winrate', 'Hero Damage', 'Tower Damage', 'Gold
print(top_pos_2_players)
```

```
   Player   KDA Winrate  Hero Damage  Tower Damage  Gold Sum  carry index
0   Nisha  8.76  55.00%        39091          3843     25470     1.685669
22  Limmp  4.94  27.78%        29786          1219     18677     1.660063
27   Nine  7.70  76.47%        27013          1404     17353     1.637584

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\1646841894.py:3: SettingWithCopy
Warning:
A value is trying to be set on a copy of a slice from a DataFrame.
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See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  pos_2_players['carry index'] = ((pos_2_players['Hero Damage'] + pos_2_players['Tow
er Damage']) / pos_2_players['Gold Sum']).astype(float)
```

Position Analysis - Position 1 (Safe-lane Carry)

In [87]:

```
#Best Player at each position:

#isolating position 1 (safelane carry) players
mask_1 = dpc_weu_avg_df['Position'].values == 'safelane carry'
pos_1_players = dpc_weu_avg_df.loc[mask_1]
print(pos_1_players)
```

```
        Player        Position  Total Count  Wins  Losses Winrate  As Radiant  \
2   Crystallis  safelane carry           20    11       9  55.00%          10
7         Pure  safelane carry           19    11       8  57.89%           5
15    DyrachYO  safelane carry           18     7      11  38.89%          11
17        aQua  safelane carry           18     5      13  27.78%           7
19  MATUMBAMAN  safelane carry           18    13       5  72.22%          12
28      skiter  safelane carry           17    13       4  76.47%          13
31      Yuragi  safelane carry           16    10       6  62.50%           9
36    Nikobaby  safelane carry           14     0      14   0.00%           3

    As Dire  Kills  Deaths  ...  XPM  Last Hits  Denies  LVL  Hero Damage  \
2        10   7.05    3.90  ...  688        390      10   25        26695
7        14   9.58    3.42  ...  696        396       9   25        31480
15        7   6.56    4.89  ...  718        366      13   23        24453
17       11   5.22    3.50  ...  643        367       9   23        24424
19        6   9.06    2.50  ...  717        362      12   24        27982
28        4   6.82    2.41  ...  668        330      19   22        18914
31        7   7.44    2.69  ...  688        281      10   22        17907
36       11   4.43    3.57  ...  630        302       5   22        17625

    Tower Damage  Hero Heal  Gold Sum  Efficiency  Average Game Length (min)
2           9438          3     23111    0.408377                  36.918530
7           3356        447     25576    0.131217                  37.174419
15          5292       1764     22362    0.236651                  32.933726
17          5413        685     21570    0.250950                  35.830565
19         13205        181     23176    0.569770                  35.655385
28          5108        196     18966    0.269324                  31.297030
31          6637        705     18666    0.355566                  30.700658
36          1631        514     17788    0.091691                  33.124767

[8 rows x 24 columns]
```

In [88]:

```
#For position 1, the best players should be analyzed based on their KDA, hero damage, tower damage,
#The index would be calculated by (hero damage + tower damage / gold sum) * KDA
pos_1_players['carry index'] = ((pos_1_players['Hero Damage'] + pos_1_players['Tower Damage']) / pos
top_pos_1_players = pos_1_players[['Player', 'KDA', 'Winrate', 'Hero Damage', 'Tower Damage', 'Gold
print(top_pos_1_players)
```

```
        Player   KDA Winrate  Hero Damage  Tower Damage  Gold Sum  carry index
19  MATUMBAMAN  8.06  72.22%        27982         13205     23176     1.777140
2   Crystallis  5.45  55.00%        26695          9438     23111     1.563455
17         aQua  3.89  27.78%        24424          5413     21570     1.383264

C:\Users\Dominic\AppData\Local\Temp\ipykernel_27988\2148039120.py:3: SettingWithCopy
Warning:
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/u
ser_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  pos_1_players['carry index'] = ((pos_1_players['Hero Damage'] + pos_1_players['Tow
er Damage']) / pos_1_players['Gold Sum']).astype(float)
```