

0 - Data Project – Team Winrate – Data Wrangling - Summer 2019(Compatible with all OraclesElixir datasets(only slight edits needed))

May 31, 2020

1 0 Begin Imports

```
[1]: #general imports
import numpy as np
import pandas as pd
pd.options.display.max_columns=100

#set width of window to preference
from IPython.core.display import display, HTML
display(HTML("<style>.container { width:90% !important; }</style>"))
```

<IPython.core.display.HTML object>

2 1 Begin Wrangling

2.0.1 1.1 Import Data

```
[2]: #year = "2019" #choose year
      ↳to get data from
#split = "summer" #choose split
      ↳to get data from(spring, summer, worlds)
#infile = r"C:\Users\Triplea657\000 MSCS-335 2020\Datasets\League_"#path
#inf = "OraclesElixir.csv" #file to read
#outf = "Wrangled.csv" #file to write
#filein = infile+year+"\"+"year+"-"+split+"-"+inf
#data = pd.read_csv(filein,low_memory=False)
#data.head(10)

#changed for submission version
alldata = pd.read_csv(r"Datasets/League_2019/2019-summer-OraclesElixir.csv",
↳low_memory=False)
```

```
[3]: #find data length for operations
datalength = alldata.count(axis=0)[0]
```

2.0.2 1.2 Grab data that we want (Team statistics)

```
[4]: inddatatxt = open("Data explanation - team stats.txt")
print(inddatatxt.read())
```

Data Project Data Categories

All data pulled from OraclesElixir.com.

OraclesElixir is a third party company that gathers data directly from Riot Games, the developers of League of Legends who captured the data directly from the games played.

League of Legends is a real-time strategy game in which 5 players each control a unique character with various abilities.

The goal of the game is to destroy the enemy team's nexus in the center of their base.

Killing enemy champions, minion and monsters gives you gold and experience and if you are considered "behind" your opponents you gain extra gold and experience upon champion kill or assist.

There are a number of "neutral objectives" on the map which can be killed by either team. The team that lands the death blow on these neutral objectives gains various permanent bonus strengths based on the objective killed. These objectives are Rift Herald, Dragons, and Baron.

The map has several towers which defend their allied champions and must be destroyed to access a team's base. Between these towers there is a jungle containing monsters that can be killed by either team.

The map is covered in the fog of war, a blanket of fog that blocks vision and thus preventing knowledge of what is happening outside of the vision radius of allied champions, minions and towers. Players may buy wards that grant vision of an area or vision of enemy's invisible wards which can be destroyed.

Your refers to the team represented by the current data point.

denotes not used (due to irrelevance or to reduce variable count)
- denotes a potential independent variable
--- denotes a dependent variable

Kept variables:

2 league - Which region the teams come from. This is influential because different regions have different tendencies and metas(perspectives on

what strategies are strong) which influence how the various stats. (One-hot vector)

19 gamelength	- game length will influence how effective different champions/roles are at different points in the game
20 result	- Victory or Defeat for your team
21 k	- Number of kills your team got
22 d	- Number of times your team members died
23 a	- Each kill multiplied by the number of players who assisted
30 fb	- First blood. Did your team get the first kill of the game?
34 kpm	- Your team's total kills per minute
35 okpm	- Enemy team's kills per minute
36 ckpm	- Total champion kills per minute(both teams)
37 fd	- Was the first dragon killed by your team?
38 fdtime	- What time the first dragon was killed
39 teamdragkills	- Times team killed a dragon
40 oppdragkills	- Times enemy team killed a dragon
41 elementals dragons	- Number of dragons killed by your team were elemental dragons
42 oppelementals dragons	- Number of dragons killed by enemy team were elemental dragons
43 firedrakes elemental dragons	- Number of dragons killed by your team were fire elemental dragons
44 waterdrakes elemental dragons	- Number of dragons killed by your team were water elemental dragons
45 earthdrakes elemental dragons	- Number of dragons killed by your team were earth elemental dragons
46 airdrakes elemental dragons	- Number of dragons killed by your team were wind elemental dragons
47 elders dragons	- Number of dragons killed by your team were elder dragons
48 oppelders dragons	- Number of dragons killed by enemy team were elder dragons
49 herald	- Number of rift heralds killed by your team
50 heralftime	- Time that the rift herald was taken
51 ft	- Was the first tower of the game taken by your team?
52 ftime	- What time was the first tower of the game taken
53 firstmidouter	- Was the first mid outer tower killed by your team?
This is especially significant as the midlane outer turret grants a lot of control over the map	
54 firsttothreetowers	- Was your team the first to kill three towers?
59 teambaronkills	- Number of barons killed by your team.
60 oppbaronkills	- Number of barons killed by enemy team
61 dmgtochamps	- Total damage dealt to enemy champions by allied champions
62 dmgtochampsperminute	- Amount of damage dealt to enemy champions by allied champions per minute

65 wards	- Total number of wards placed by your team
66 wpm	- Total number of wards placed by your team per minute
68 wardkills	- Total number of enemy wards destroyed
69 wcpm	- Total number of enemy wards destroyed per minute
74 totalgold	- Total gold earned by your team
75 earnedgpm	- Gold earned by your team per minute
76 goldspent	- Total gold spent by your team
77 gspd	- Percent difference in gold spent between teams
80 monsterkillsownjungle side of the jungle	- How many monsters your team killed in your own side of the jungle
81 monsterkillsenemyjungle enemy's side of the jungle	- How many monsters your team killed in the enemy's side of the jungle
82 cspm minute	- Number of minions and monsters killed by your team per minute
83 goldat10	- Total gold earned by your team at 10 minutes
84 oppgoldat10	- Total gold earned by enemy team at 10 minutes
85 gdat10	- Difference in gold between teams at 10 minutes
86 goldat15	- Total gold earned at 15 minutes
87 oppgoldat15	- Enemy gold earned at 15 minutes
88 gdat15	- Difference in gold at 15 minutes
89 xpat10	- Experience points earned at 10 minutes
90 oppxpat10	- Enemy Experience points earned at 10 minutes
91 xpat10	- Difference in experience earned at 10 minutes
92 csat10 your team	- Total minions and monsters killed at 10 minutes by your team
93 oppcsat10 enemy team	- Total minions and monsters killed at 10 minutes by enemy team
94 csdat10 minutes between teams	- Difference in total minions and monsters killed at 10 minutes between teams
95 csat15 your team	- Total minions and monsters killed at 15 minutes by your team
96 oppcsat15 enemy team	- Total minions and monsters killed at 15 minutes by enemy team
97 csdat15 minutes between teams	- Difference in total minions and monsters killed at 15 minutes between teams

#Not kept variables:	#many not kept due to only applying to a single player
#0 gameid	
#1 url	
#3 split	
#4 date	
#5 week	
#6 game	
#7 patchno	
#8 playerid	
#9 side	
#10 position	# whole team, so no individual player data

```

#11 player
#12 team
#13 champion          # not implemented for team statistics - may implement
being added from player statistics at a later date
#14 ban1              # too many extra variables for almost no impact (only
captures champions NOT in game)
#15 ban2
#16 ban3
#17 ban4
#18 ban5
#24 teamkills         #- superfluous
#25 teamdeaths        #- superfluous
#26 doubles           #- doublekills player got
#27 triples           #- triplekills player got
#28 quadras           #- quadrakills player got
#29 pentas            #- pentakills player got
#31 fbassist
#32 fbvictim
#33 fbtime
#55 teamtowerkills    #too indicative of who won
#56 opptowerkills     #too indicative of who won
#57 fbaron            #missing too much data which sucks since baron is such
an influential objective to take
#58 fbarontime        #missing too much data
#63 dmgshare
#64 earnedgoldshare
#67 wardshare
#70 visionwards
#71 visionwardbuys
#72 visiblewardclearrate
#73 invisiblewardclearrate
#78 minionkills      -basically superfluous with cs
#79 monsterkills     -basically superfluous with cs

```

More details on not kept variables at:

<https://oracleselixir.com/matchdata/match-data-dictionary/>

```

[5]: #drop player data rows, leaving only team stats
inddata = alldata
for i in range(int(datalength/12)):
    for j in range(10):
        if ((j != 10) and (j != 11)):
            inddata = inddata.drop([12*(i)+j])

# make sure the operations worked properly
print(inddata.head(12))

```

```
#inddata.tail(21)
```

	gameid	url	league	split	\
10	1092338	http://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
11	1092338	http://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
22	1092362	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
23	1092362	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
34	1092372	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
35	1092372	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
46	1092386	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
47	1092386	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
58	1092401	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
59	1092401	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
70	1092577	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	
71	1092577	https://matchhistory.na.leagueoflegends.com/en...	LCS	2019-2	

	date	week	game	patchno	playerid	side	position	player	\
10	43617.64992	1	1	9.1	100	Blue	Team	Team	
11	43617.64992	1	1	9.1	200	Red	Team	Team	
22	43617.69661	1	1	9.1	100	Blue	Team	Team	
23	43617.69661	1	1	9.1	200	Red	Team	Team	
34	43617.73742	1	1	9.1	100	Blue	Team	Team	
35	43617.73742	1	1	9.1	200	Red	Team	Team	
46	43617.77995	1	1	9.1	100	Blue	Team	Team	
47	43617.77995	1	1	9.1	200	Red	Team	Team	
58	43617.82647	1	1	9.1	100	Blue	Team	Team	
59	43617.82647	1	1	9.1	200	Red	Team	Team	
70	43618.7205	1	2	9.1	100	Blue	Team	Team	
71	43618.7205	1	2	9.1	200	Red	Team	Team	

	team	champion	ban1	ban2	ban3	ban4	\
10	Cloud9		Draven	Rakan	Rek'Sai	Ezreal	
11	FlyQuest		Sona	Yuumi	Jayce	Kai'Sa	
22	Team Liquid		Ryze	Yuumi	Aatrox	Draven	
23	Team SoloMid		Taric	Jayce	Akali	Jarvan IV	
34	Counter Logic Gaming		Irelia	Akali	Morgana	Jayce	
35	100 Thieves		Sylas	Ryze	Aatrox	LeBlanc	
46	Clutch Gaming		Irelia	Yuumi	Ryze	LeBlanc	
47	OpTic Gaming		Aatrox	Taric	Sylas	Sivir	
58	Golden Guardians		Yuumi	Taric	Aatrox	Kalista	
59	Echo Fox		Varus	Galio	Jayce	Sejuani	
70	100 Thieves		Ryze	Yuumi	Taric	Rakan	
71	OpTic Gaming		Aatrox	Sylas	Irelia	Braum	

	ban5	gamelength	result	k	d	a	teamkills	teamdeaths	doubles	\
10	Sejuani	35.500000	1	21	14	52	21	14		
11	Sivir	35.500000	0	14	21	32	14	21		

22	Sivir	29.700000	1	11	4	25	11	4
23	Rek'Sai	29.700000	0	4	11	10	4	11
34	Vladimir	31.983333	1	12	3	26	12	3
35	Neeko	31.983333	0	3	12	4	3	12
46	Rakan	38.883333	0	9	14	16	9	14
47	Kai'Sa	38.883333	1	14	9	34	14	9
58	Xayah	28.600000	1	10	2	30	10	2
59	Braum	28.600000	0	2	10	6	2	10
70	LeBlanc	34.316667	0	6	9	15	6	9
71	Thresh	34.316667	1	9	7	22	9	7

	triples	quadrass	pentass	fb	fbassist	fbvictim	fbtime	kpm	\
10				0	0.0	1	5.609116667	0.591549	
11				1	0.0	0	5.609116667	0.394366	
22				1	1.0	0	6.394916667	0.370370	
23				0	0.0	1	6.394916667	0.134680	
34				1	1.0	0	6.819116667	0.375195	
35				0	0.0	1	6.819116667	0.093799	
46				0	0.0	1	6.9768	0.231462	
47				1	1.0	0	6.9768	0.360051	
58				1	1.0	0	5.21725	0.349650	
59				0	0.0	1	5.21725	0.069930	
70				0	0.0	1	3.806633333	0.174842	
71				1	1.0	0	3.806633333	0.262263	

	okpm	ckpm	fd	fdtime	teamdragkills	oppdragkills	elementals	\
10	0.394366	0.985915	0	12.556633	2	2	2.0	
11	0.591549	0.985915	1	12.556633	2	2	2.0	
22	0.134680	0.505051	1	12.306967	2	1	2.0	
23	0.370370	0.505051	0	12.306967	1	2	1.0	
34	0.093799	0.468994	0	10.158933	3	1	3.0	
35	0.375195	0.468994	1	10.158933	1	3	1.0	
46	0.360051	0.591513	0	9.217850	3	2	3.0	
47	0.231462	0.591513	1	9.217850	2	3	2.0	
58	0.069930	0.419580	1	7.632033	4	0	4.0	
59	0.349650	0.419580	0	7.632033	0	4	0.0	
70	0.262263	0.437105	0	11.409500	2	2	2.0	
71	0.174842	0.437105	1	11.409500	2	2	2.0	

	oppelementals	firedrakes	waterdrakes	earthdrakes	airdrakes	elders	\
10	2.0	2.0	0.0	0.0	0.0	0.0	
11	2.0	1.0	0.0	0.0	1.0	0.0	
22	1.0	0.0	0.0	1.0	1.0	0.0	
23	2.0	0.0	1.0	0.0	0.0	0.0	
34	1.0	1.0	0.0	0.0	2.0	0.0	
35	3.0	1.0	0.0	0.0	0.0	0.0	
46	2.0	2.0	0.0	0.0	1.0	0.0	
47	3.0	0.0	1.0	0.0	1.0	0.0	

58	0.0	1.0	1.0	2.0	0.0	0.0
59	4.0	0.0	0.0	0.0	0.0	0.0
70	2.0	0.0	1.0	1.0	0.0	0.0
71	2.0	0.0	1.0	1.0	0.0	0.0

	oppelders	herald	heraldtime	ft	fttime	firstmidouter \
10	0.0	1.0	13.369417	1.0	15.162683	1.0
11	0.0	0.0	13.369417	0.0	15.162683	0.0
22	0.0	0.0	12.377433	1.0	12.791600	1.0
23	0.0	1.0	12.377433	0.0	12.791600	0.0
34	0.0	0.0	12.242783	0.0	14.386333	1.0
35	0.0	1.0	12.242783	1.0	14.386333	0.0
46	0.0	0.0	15.910367	1.0	17.642883	1.0
47	0.0	1.0	15.910367	0.0	17.642883	0.0
58	0.0	1.0	11.299117	1.0	11.728900	0.0
59	0.0	0.0	11.299117	0.0	11.728900	1.0
70	0.0	1.0	11.511367	1.0	15.343750	1.0
71	0.0	0.0	11.511367	0.0	15.343750	0.0

	firsttothreetowers	teamtowerkills	opptowerkills	fbaron	fbarontime \
10	0	10	4	1.0	25.638017
11	1	4	10	0.0	25.638017
22	1	11	0	1.0	24.396583
23	0	0	11	0.0	24.396583
34	1	11	3	1.0	28.554733
35	0	3	11	0.0	28.554733
46	1	3	10	0.0	31.944900
47	0	10	3	1.0	31.944900
58	1	10	2	1.0	24.894633
59	0	2	10	0.0	24.894633
70	1	3	7	1.0	32.930983
71	0	7	3	0.0	32.930983

	teambaronkills	oppbaronkills	dmgtochamps	dmgtochampspersminute	dmgshare \
10	1.0	0.0	70545.0	1987.183099	
11	0.0	1.0	71736.0	2020.732394	
22	1.0	0.0	51538.0	1735.286195	
23	0.0	1.0	38185.0	1285.690236	
34	1.0	0.0	49421.0	1545.211047	
35	0.0	1.0	26486.0	828.118812	
46	0.0	1.0	89202.0	2294.093442	
47	1.0	0.0	52709.0	1355.567938	
58	1.0	0.0	31891.0	1115.069930	
59	0.0	1.0	28073.0	981.573427	
70	1.0	0.0	50629.0	1475.347256	
71	0.0	1.0	55682.0	1622.593492	

earnedgoldshare	wards	wpm	wardshare	wardkills	wcpm \
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10	109.0	3.070423	1.0	51.0	1.436620
11	108.0	3.042254	1.0	37.0	1.042254
22	96.0	3.232323	1.0	44.0	1.481481
23	93.0	3.131313	1.0	41.0	1.380471
34	143.0	4.471079	1.0	44.0	1.375717
35	80.0	2.501303	1.0	69.0	2.157374
46	156.0	4.012002	1.0	88.0	2.263180
47	173.0	4.449207	1.0	78.0	2.006001
58	103.0	3.601399	1.0	64.0	2.237762
59	129.0	4.510490	1.0	43.0	1.503497
70	97.0	2.826615	1.0	54.0	1.573579
71	129.0	3.759106	1.0	44.0	1.282176

	visionwards	visionwardbuys	visiblewardclearrate	invisiblewardclearrate	\
10	42.0	50.0	0.6	0.3970588235	
11	39.0	41.0	0.5	0.2222222222	
22	34.0	37.0	0.75	0.2641509434	
23	36.0	43.0	0.5641025641	0.3333333333	
34	52.0	55.0	0.7027027027	0.4186046512	
35	30.0	36.0	0.6	0.3725490196	
46	56.0	63.0	0.5970149254	0.3648648649	
47	58.0	64.0	0.65	0.3506493506	
58	40.0	40.0	0.6341463415	0.431372549	
59	34.0	38.0	0.487804878	0.3709677419	
70	35.0	38.0	0.6111111111	0.1636363636	
71	50.0	56.0	0.6585365854	0.3035714286	

	totalgold	earnedgpm	goldspent	gspd	minionkills	monsterkills	\
10	69022.0	1293.464789	65108.0	0.110966	881.0	248.0	
11	61541.0	1082.732394	58263.0	-0.110966	982.0	189.0	
22	59081.0	1330.861953	50910.0	0.135867	854.0	205.0	
23	45794.0	883.488215	44433.0	-0.135867	870.0	118.0	
34	61326.0	1262.351225	54340.0	0.158169	884.0	213.0	
35	48986.0	876.525274	46375.0	-0.158169	849.0	173.0	
46	61952.0	945.839691	59625.0	-0.067339	1045.0	236.0	
47	70016.0	1153.229318	63780.0	0.067339	1082.0	194.0	
58	56851.0	1327.615385	47031.0	0.084915	901.0	180.0	
59	45207.0	920.482518	43200.0	-0.084915	845.0	152.0	
70	53441.0	905.134531	51025.0	-0.024488	815.0	169.0	
71	59641.0	1085.804760	52290.0	0.024488	979.0	197.0	

	monsterkillsownjungle	monsterkillsenemyjungle	cspm	goldat10	\
10	151.0	24.0	31.802817	16118.0	
11	155.0	4.0	32.985915	15436.0	
22	102.0	56.0	35.656566	16270.0	
23	82.0	0.0	33.265993	14985.0	
34	128.0	18.0	34.299114	16157.0	
35	136.0	5.0	31.954143	14365.0	

46	157.0	22.0	32.944706	16107.0
47	128.0	15.0	32.816117	16223.0
58	104.0	13.0	37.797203	16356.0
59	130.0	0.0	34.860140	15378.0
70	120.0	8.0	28.674114	14368.0
71	125.0	19.0	34.269063	16191.0

	oppgoldat10	gdat10	goldat15	oppgoldat15	gdat15	xpat10	oppypat10	\
10	15436.0	682.0	24287.0	23616.0	671.0	19260.0	18621.0	
11	16118.0	-682.0	23616.0	24287.0	-671.0	18621.0	19260.0	
22	14985.0	1285.0	27399.0	23026.0	4373.0	19015.0	18226.0	
23	16270.0	-1285.0	23026.0	27399.0	-4373.0	18226.0	19015.0	
34	14365.0	1792.0	26339.0	22782.0	3557.0	19284.0	18656.0	
35	16157.0	-1792.0	22782.0	26339.0	-3557.0	18656.0	19284.0	
46	16223.0	-116.0	24066.0	23318.0	748.0	18307.0	18250.0	
47	16107.0	116.0	23318.0	24066.0	-748.0	18250.0	18307.0	
58	15378.0	978.0	25719.0	24055.0	1664.0	18205.0	18488.0	
59	16356.0	-978.0	24055.0	25719.0	-1664.0	18488.0	18205.0	
70	16191.0	-1823.0	21551.0	24253.0	-2702.0	17963.0	18981.0	
71	14368.0	1823.0	24253.0	21551.0	2702.0	18981.0	17963.0	

	xpdatt10	csatt10	oppccatt10	csdatt10	csatt15	oppccatt15	csdatt15
10	639.0	334.0	316.0	18.0	548.0	535.0	13.0
11	-639.0	316.0	334.0	-18.0	535.0	548.0	-13.0
22	789.0	316.0	335.0	-19.0	509.0	506.0	3.0
23	-789.0	335.0	316.0	19.0	506.0	509.0	-3.0
34	628.0	322.0	305.0	17.0	512.0	470.0	42.0
35	-628.0	305.0	322.0	-17.0	470.0	512.0	-42.0
46	57.0	310.0	313.0	-3.0	473.0	467.0	6.0
47	-57.0	313.0	310.0	3.0	467.0	473.0	-6.0
58	-283.0	335.0	340.0	-5.0	547.0	548.0	-1.0
59	283.0	340.0	335.0	5.0	548.0	547.0	1.0
70	-1018.0	270.0	320.0	-50.0	435.0	519.0	-84.0
71	1018.0	320.0	270.0	50.0	519.0	435.0	84.0

```
[6]: #some data was missing for this game
inddata = inddata.loc[inddata['gameid']!=str(1220188)]
print(inddata.head())
```

	gameid	url	league	split	\
10	1092338	http://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
11	1092338	http://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
22	1092362	https://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
23	1092362	https://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	
34	1092372	https://matchhistory.na.leagueoflegends.com/en/...	LCS	2019-2	

	date	week	game	patchno	playerid	side	position	player	\
10	43617.64992	1	1	9.1	100	Blue	Team	Team	

11	43617.64992	1	1	9.1	200	Red	Team	Team
22	43617.69661	1	1	9.1	100	Blue	Team	Team
23	43617.69661	1	1	9.1	200	Red	Team	Team
34	43617.73742	1	1	9.1	100	Blue	Team	Team

	team	champion	ban1	ban2	ban3	ban4	\
10		Cloud9	Draven	Rakan	Rek'Sai	Ezreal	
11		FlyQuest	Sona	Yuumi	Jayce	Kai'Sa	
22		Team Liquid	Ryze	Yuumi	Aatrox	Draven	
23		Team SoloMid	Taric	Jayce	Akali	Jarvan IV	
34	Counter Logic Gaming		Irelia	Akali	Morgana	Jayce	

	ban5	gamelength	result	k	d	a	teamkills	teamdeaths	doubles	\
10	Sejuani	35.500000	1	21	14	52	21	14		
11	Sivir	35.500000	0	14	21	32	14	21		
22	Sivir	29.700000	1	11	4	25	11	4		
23	Rek'Sai	29.700000	0	4	11	10	4	11		
34	Vladimir	31.983333	1	12	3	26	12	3		

	triples	quadrass	pentass	fb	fbassist	fbvictim	fbtime	kpm	\
10				0	0.0	1	5.609116667	0.591549	
11				1	0.0	0	5.609116667	0.394366	
22				1	1.0	0	6.394916667	0.370370	
23				0	0.0	1	6.394916667	0.134680	
34				1	1.0	0	6.819116667	0.375195	

	okpm	ckpm	fd	fdtime	teamdragkills	oppdragkills	elementals	\
10	0.394366	0.985915	0	12.556633	2	2	2.0	
11	0.591549	0.985915	1	12.556633	2	2	2.0	
22	0.134680	0.505051	1	12.306967	2	1	2.0	
23	0.370370	0.505051	0	12.306967	1	2	1.0	
34	0.093799	0.468994	0	10.158933	3	1	3.0	

	oppelementals	firedrakes	waterdrakes	earthdrakes	airdrakes	elders	\
10	2.0	2.0	0.0	0.0	0.0	0.0	
11	2.0	1.0	0.0	0.0	1.0	0.0	
22	1.0	0.0	0.0	1.0	1.0	0.0	
23	2.0	0.0	1.0	0.0	0.0	0.0	
34	1.0	1.0	0.0	0.0	2.0	0.0	

	oppelders	herald	heraldtime	ft	fttime	firstmidouter	\
10	0.0	1.0	13.369417	1.0	15.162683	1.0	
11	0.0	0.0	13.369417	0.0	15.162683	0.0	
22	0.0	0.0	12.377433	1.0	12.791600	1.0	
23	0.0	1.0	12.377433	0.0	12.791600	0.0	
34	0.0	0.0	12.242783	0.0	14.386333	1.0	

firsttotothreetowers	teamtowerkills	opptowerkills	fbaron	fbarontime	\
----------------------	----------------	---------------	--------	------------	---

10	0	10	4	1.0	25.638017
11	1	4	10	0.0	25.638017
22	1	11	0	1.0	24.396583
23	0	0	11	0.0	24.396583
34	1	11	3	1.0	28.554733

	teambaronkills	oppbaronkills	dmgtochamps	dmgtochampsperminute	dmgshare \
10	1.0	0.0	70545.0	1987.183099	
11	0.0	1.0	71736.0	2020.732394	
22	1.0	0.0	51538.0	1735.286195	
23	0.0	1.0	38185.0	1285.690236	
34	1.0	0.0	49421.0	1545.211047	

	earnedgoldshare	wards	wpm	wardshare	wardkills	wcpm \
10		109.0	3.070423	1.0	51.0	1.436620
11		108.0	3.042254	1.0	37.0	1.042254
22		96.0	3.232323	1.0	44.0	1.481481
23		93.0	3.131313	1.0	41.0	1.380471
34		143.0	4.471079	1.0	44.0	1.375717

	visionwards	visionwardbuys	visiblewardclearrate	invisiblewardclearrate \
10	42.0	50.0	0.6	0.3970588235
11	39.0	41.0	0.5	0.2222222222
22	34.0	37.0	0.75	0.2641509434
23	36.0	43.0	0.5641025641	0.3333333333
34	52.0	55.0	0.7027027027	0.4186046512

	totalgold	earnedgpm	goldspent	gspd	minionkills	monsterkills \
10	69022.0	1293.464789	65108.0	0.110966	881.0	248.0
11	61541.0	1082.732394	58263.0	-0.110966	982.0	189.0
22	59081.0	1330.861953	50910.0	0.135867	854.0	205.0
23	45794.0	883.488215	44433.0	-0.135867	870.0	118.0
34	61326.0	1262.351225	54340.0	0.158169	884.0	213.0

	monsterkillsownjungle	monsterkillsenemyjungle	cspm	goldat10 \
10	151.0	24.0	31.802817	16118.0
11	155.0	4.0	32.985915	15436.0
22	102.0	56.0	35.656566	16270.0
23	82.0	0.0	33.265993	14985.0
34	128.0	18.0	34.299114	16157.0

	oppgoldat10	gdat10	goldat15	oppgoldat15	gdat15	xpat10	oppxpat10 \
10	15436.0	682.0	24287.0	23616.0	671.0	19260.0	18621.0
11	16118.0	-682.0	23616.0	24287.0	-671.0	18621.0	19260.0
22	14985.0	1285.0	27399.0	23026.0	4373.0	19015.0	18226.0
23	16270.0	-1285.0	23026.0	27399.0	-4373.0	18226.0	19015.0
34	14365.0	1792.0	26339.0	22782.0	3557.0	19284.0	18656.0

	xpdat10	csat10	oppcsat10	csdat10	csat15	oppcsat15	csdat15
10	639.0	334.0	316.0	18.0	548.0	535.0	13.0
11	-639.0	316.0	334.0	-18.0	535.0	548.0	-13.0
22	789.0	316.0	335.0	-19.0	509.0	506.0	3.0
23	-789.0	335.0	316.0	19.0	506.0	509.0	-3.0
34	628.0	322.0	305.0	17.0	512.0	470.0	42.0

```
[7]: var = []
for i in inddata:
    var.append(i)
print("Variables:")
print(var)
for i, v in enumerate(var):
    print(i, v)
```

Variables:

```
['gameid', 'url', 'league', 'split', 'date', 'week', 'game', 'patchno',
'playerid', 'side', 'position', 'player', 'team', 'champion', 'ban1', 'ban2',
'ban3', 'ban4', 'ban5', 'gamelength', 'result', 'k', 'd', 'a', 'teamkills',
'teamdeaths', 'doubles', 'triples', 'quadrass', 'pentas', 'fb', 'fbassist',
'fbvictim', 'fbtime', 'kpm', 'okpm', 'ckpm', 'fd', 'fdtime', 'teamdragkills',
'oppdragkills', 'elementals', 'oppelementals', 'firedrakes', 'waterdrakes',
'earthdrakes', 'airdrakes', 'elders', 'oppelders', 'herald', 'heraldtime', 'ft',
'fttime', 'firstmidouter', 'firsttreetowers', 'teamtowerkills',
'opptowerkills', 'fbaron', 'fbarontime', 'teambaronkills', 'oppbaronkills',
'dmgtochamps', 'dmgtochampsperminute', 'dmgshare', 'earnedgoldshare', 'wards',
'wpm', 'wardshare', 'wardkills', 'wcpm', 'visionwards', 'visionwardbuys',
'visiblewardclearrate', 'invisiblewardclearrate', 'totalgold', 'earnedgpm',
'goldspent', 'gsdp', 'minionkills', 'monsterkills', 'monsterkillsownjungle',
'monsterkillsenemyjungle', 'cspm', 'goldat10', 'oppgoldat10', 'gdat10',
'goldat15', 'oppgoldat15', 'gdat15', 'xpat10', 'oppdatap10', 'xpdat10', 'csat10',
'oppcsat10', 'csdat10', 'csat15', 'oppcsat15', 'csdat15']
```

```
0 gameid
1 url
2 league
3 split
4 date
5 week
6 game
7 patchno
8 playerid
9 side
10 position
11 player
12 team
13 champion
14 ban1
15 ban2
```

16 ban3
17 ban4
18 ban5
19 gamelength
20 result
21 k
22 d
23 a
24 teamkills
25 teamdeaths
26 doubles
27 triples
28 quadras
29 pentas
30 fb
31 fbassist
32 fbvictim
33 fbtime
34 kpm
35 okpm
36 ckpm
37 fd
38 fdtime
39 teamdragkills
40 oppdragkills
41 elementals
42 oppelementals
43 firedrakes
44 waterdrakes
45 earthdrakes
46 airdrakes
47 elders
48 oppelders
49 herald
50 heraldtime
51 ft
52 ftime
53 firstmidouter
54 firsttothreetowers
55 teamtowerkills
56 opptowerkills
57 fbaron
58 fbarontime
59 teambaronkills
60 oppbaronkills
61 dmgtochamps
62 dmgtochampsperminute
63 dmgshare

```
64 earnedgoldshare
65 wards
66 wpm
67 wardshare
68 wardkills
69 wcpm
70 visionwards
71 visionwardbuys
72 visiblewardclearrate
73 invisiblewardclearrate
74 totalgold
75 earnedgpm
76 goldspent
77 gspd
78 minionkills
79 monsterkills
80 monsterkillsownjungle
81 monsterkillsenemyjungle
82 cspm
83 goldat10
84 oppgoldat10
85 gdat10
86 goldat15
87 oppgoldat15
88 gdat15
89 xpat10
90 oppxpat10
91 xpdat10
92 csat10
93 oppcsat10
94 csdat10
95 csat15
96 oppcsat15
97 csdat15
```

```
[8]: data = inddata.copy()
      #del inddata

      #add desired variables (as detailed in the first block of 1.2) to list
      tokeep = [2]
      for i in range(5):
          tokeep.append(19+i)
      tokeep.append(30)
      for i in range(21):
          tokeep.append(34+i)
      for i in range(4):
          tokeep.append(59+i)
```

```

tokeep.append(65)
tokeep.append(66)
tokeep.append(68)
tokeep.append(69)
for i in range(4):
    tokeep.append(74+i)
for i in range(18):
    tokeep.append(80+i)

print("keeping column IDs:{}".format(tokeep))
tokeepstr = ""
for i in tokeep:
    if i != tokeep[0]:
        tokeepstr += ", "
    tokeepstr += var[i]
print("keeping columns: {}".format(tokeepstr))

datakp = data.iloc[:,tokeep]
datakp = datakp[datakp['league']!='LPL']#had to drop chinese games since they
→keep so little data

#reindex data with new indices
datakp.reset_index(drop=True,inplace=True)

#write to file before league split into one-hot (used in part 3)
outnothot = "WrangledNotHot.csv"
#datakp.to_csv(infile+outnothot)
datakp.to_csv("Datasets/League_2019/2019-summer-WrangledNotHot.csv")

print("\nKept data:")
datakp.head()

```

keeping column IDs:[2, 19, 20, 21, 22, 23, 30, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 59, 60, 61, 62, 65, 66, 68, 69, 74, 75, 76, 77, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97]

keeping columns: league, gamelength, result, k, d, a, fb, kpm, okpm, ckpm, fd, fdtime, teamdragkills, oppdragkills, elementals, oppelementals, firedrakes, waterdrakes, earthdrakes, airdrakes, elders, oppelders, herald, heraldtime, ft, ftime, firstmidouter, firsttothreetowers, teambaronkills, oppbaronkills, dmgtochamps, dmgtochampsperminute, wards, wpm, wardkills, wcpm, totalgold, earnedgpm, goldspent, gspd, monsterkillsownjungle, monsterkillsenemyjungle, cspm, goldat10, oppgoldat10, gdat10, goldat15, oppgoldat15, gdat15, xpat10,

oppxpat10, xpdat10, csat10, oppcsat10, csdat10, csat15, oppcsat15, csdat15

Kept data:

```
[8]: league gamelength result k d a fb kpm okpm ckpm fd \
0 LCS 35.500000 1 21 14 52 0 0.591549 0.394366 0.985915 0
1 LCS 35.500000 0 14 21 32 1 0.394366 0.591549 0.985915 1
2 LCS 29.700000 1 11 4 25 1 0.370370 0.134680 0.505051 1
3 LCS 29.700000 0 4 11 10 0 0.134680 0.370370 0.505051 0
4 LCS 31.983333 1 12 3 26 1 0.375195 0.093799 0.468994 0

fdtime teamdragkills oppdragkills elementals oppelementals \
0 12.556633 2 2 2.0 2.0
1 12.556633 2 2 2.0 2.0
2 12.306967 2 1 2.0 1.0
3 12.306967 1 2 1.0 2.0
4 10.158933 3 1 3.0 1.0

firedrakes waterdrakes earthdrakes airdrakes elders oppelders herald \
0 2.0 0.0 0.0 0.0 0.0 0.0 1.0
1 1.0 0.0 0.0 1.0 0.0 0.0 0.0
2 0.0 0.0 1.0 1.0 0.0 0.0 0.0
3 0.0 1.0 0.0 0.0 0.0 0.0 1.0
4 1.0 0.0 0.0 2.0 0.0 0.0 0.0

heraldtime ft ftime firstmidouter firsttothreetowers \
0 13.369417 1.0 15.162683 1.0 0
1 13.369417 0.0 15.162683 0.0 1
2 12.377433 1.0 12.791600 1.0 1
3 12.377433 0.0 12.791600 0.0 0
4 12.242783 0.0 14.386333 1.0 1

teambaronkills oppbaronkills dmgtochamps dmgtochampsperminute wards \
0 1.0 0.0 70545.0 1987.183099 109.0
1 0.0 1.0 71736.0 2020.732394 108.0
2 1.0 0.0 51538.0 1735.286195 96.0
3 0.0 1.0 38185.0 1285.690236 93.0
4 1.0 0.0 49421.0 1545.211047 143.0

wpm wardkills wcpm totalgold earnedgpm goldspent gspd \
0 3.070423 51.0 1.436620 69022.0 1293.464789 65108.0 0.110966
1 3.042254 37.0 1.042254 61541.0 1082.732394 58263.0 -0.110966
2 3.232323 44.0 1.481481 59081.0 1330.861953 50910.0 0.135867
3 3.131313 41.0 1.380471 45794.0 883.488215 44433.0 -0.135867
4 4.471079 44.0 1.375717 61326.0 1262.351225 54340.0 0.158169

monsterkillsownjungle monsterkillsenemyjungle cspm goldat10 \
```

0	151.0	24.0	31.802817	16118.0
1	155.0	4.0	32.985915	15436.0
2	102.0	56.0	35.656566	16270.0
3	82.0	0.0	33.265993	14985.0
4	128.0	18.0	34.299114	16157.0

	oppgoldat10	gdat10	goldat15	oppgoldat15	gdat15	xpat10	oppxpat10	\
0	15436.0	682.0	24287.0	23616.0	671.0	19260.0	18621.0	
1	16118.0	-682.0	23616.0	24287.0	-671.0	18621.0	19260.0	
2	14985.0	1285.0	27399.0	23026.0	4373.0	19015.0	18226.0	
3	16270.0	-1285.0	23026.0	27399.0	-4373.0	18226.0	19015.0	
4	14365.0	1792.0	26339.0	22782.0	3557.0	19284.0	18656.0	

	xpdat10	csat10	oppcsat10	csdat10	csat15	oppcsat15	csdat15
0	639.0	334.0	316.0	18.0	548.0	535.0	13.0
1	-639.0	316.0	334.0	-18.0	535.0	548.0	-13.0
2	789.0	316.0	335.0	-19.0	509.0	506.0	3.0
3	-789.0	335.0	316.0	19.0	506.0	509.0	-3.0
4	628.0	322.0	305.0	17.0	512.0	470.0	42.0

```
[9]: #split league data (the region in which the game was played) into one-hot
hotleague = pd.get_dummies(datakp["league"],prefix='league')
dataleague = datakp.drop(['league'],axis=1)
hotdata = pd.concat([hotleague,dataleague],axis=1)
hotdata = hotdata.astype(float)
hotdata.head(10)
```

```
[9]: league_CBLol league_LCK league_LCS league_LEC league_LMS gamelength \
0 0.0 0.0 1.0 0.0 0.0 35.500000
1 0.0 0.0 1.0 0.0 0.0 35.500000
2 0.0 0.0 1.0 0.0 0.0 29.700000
3 0.0 0.0 1.0 0.0 0.0 29.700000
4 0.0 0.0 1.0 0.0 0.0 31.983333
5 0.0 0.0 1.0 0.0 0.0 31.983333
6 0.0 0.0 1.0 0.0 0.0 38.883333
7 0.0 0.0 1.0 0.0 0.0 38.883333
8 0.0 0.0 1.0 0.0 0.0 28.600000
9 0.0 0.0 1.0 0.0 0.0 28.600000
```


	result	k	d	a	fb	kpm	okpm	ckpm	fd	\
0	1.0	21.0	14.0	52.0	0.0	0.591549	0.394366	0.985915	0.0	
1	0.0	14.0	21.0	32.0	1.0	0.394366	0.591549	0.985915	1.0	
2	1.0	11.0	4.0	25.0	1.0	0.370370	0.134680	0.505051	1.0	
3	0.0	4.0	11.0	10.0	0.0	0.134680	0.370370	0.505051	0.0	
4	1.0	12.0	3.0	26.0	1.0	0.375195	0.093799	0.468994	0.0	
5	0.0	3.0	12.0	4.0	0.0	0.093799	0.375195	0.468994	1.0	
6	0.0	9.0	14.0	16.0	0.0	0.231462	0.360051	0.591513	0.0	

7	1.0	14.0	9.0	34.0	1.0	0.360051	0.231462	0.591513	1.0
8	1.0	10.0	2.0	30.0	1.0	0.349650	0.069930	0.419580	1.0
9	0.0	2.0	10.0	6.0	0.0	0.069930	0.349650	0.419580	0.0

	fdtime	teamdragkills	oppdragkills	elementals	oppelementals	\
0	12.556633	2.0	2.0	2.0	2.0	
1	12.556633	2.0	2.0	2.0	2.0	
2	12.306967	2.0	1.0	2.0	1.0	
3	12.306967	1.0	2.0	1.0	2.0	
4	10.158933	3.0	1.0	3.0	1.0	
5	10.158933	1.0	3.0	1.0	3.0	
6	9.217850	3.0	2.0	3.0	2.0	
7	9.217850	2.0	3.0	2.0	3.0	
8	7.632033	4.0	0.0	4.0	0.0	
9	7.632033	0.0	4.0	0.0	4.0	

	firedrakes	waterdrakes	earthdrakes	airdrakes	elders	oppelders	herald	\
0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	
1	1.0	0.0	0.0	1.0	0.0	0.0	0.0	
2	0.0	0.0	1.0	1.0	0.0	0.0	0.0	
3	0.0	1.0	0.0	0.0	0.0	0.0	1.0	
4	1.0	0.0	0.0	2.0	0.0	0.0	0.0	
5	1.0	0.0	0.0	0.0	0.0	0.0	1.0	
6	2.0	0.0	0.0	1.0	0.0	0.0	0.0	
7	0.0	1.0	0.0	1.0	0.0	0.0	1.0	
8	1.0	1.0	2.0	0.0	0.0	0.0	1.0	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

	heraldtime	ft	fttime	firstmidouter	firsttothreetowers	\
0	13.369417	1.0	15.162683	1.0	0.0	
1	13.369417	0.0	15.162683	0.0	1.0	
2	12.377433	1.0	12.791600	1.0	1.0	
3	12.377433	0.0	12.791600	0.0	0.0	
4	12.242783	0.0	14.386333	1.0	1.0	
5	12.242783	1.0	14.386333	0.0	0.0	
6	15.910367	1.0	17.642883	1.0	1.0	
7	15.910367	0.0	17.642883	0.0	0.0	
8	11.299117	1.0	11.728900	0.0	1.0	
9	11.299117	0.0	11.728900	1.0	0.0	

	teambaronkills	oppbaronkills	dmgtochamps	dmgtochampspersminute	wards	\
0	1.0	0.0	70545.0	1987.183099	109.0	
1	0.0	1.0	71736.0	2020.732394	108.0	
2	1.0	0.0	51538.0	1735.286195	96.0	
3	0.0	1.0	38185.0	1285.690236	93.0	
4	1.0	0.0	49421.0	1545.211047	143.0	
5	0.0	1.0	26486.0	828.118812	80.0	

6	0.0	1.0	89202.0	2294.093442	156.0
7	1.0	0.0	52709.0	1355.567938	173.0
8	1.0	0.0	31891.0	1115.069930	103.0
9	0.0	1.0	28073.0	981.573427	129.0

	wpm	wardkills	wcpm	totalgold	earnedgpm	goldspent	gspd \
0	3.070423	51.0	1.436620	69022.0	1293.464789	65108.0	0.110966
1	3.042254	37.0	1.042254	61541.0	1082.732394	58263.0	-0.110966
2	3.232323	44.0	1.481481	59081.0	1330.861953	50910.0	0.135867
3	3.131313	41.0	1.380471	45794.0	883.488215	44433.0	-0.135867
4	4.471079	44.0	1.375717	61326.0	1262.351225	54340.0	0.158169
5	2.501303	69.0	2.157374	48986.0	876.525274	46375.0	-0.158169
6	4.012002	88.0	2.263180	61952.0	945.839691	59625.0	-0.067339
7	4.449207	78.0	2.006001	70016.0	1153.229318	63780.0	0.067339
8	3.601399	64.0	2.237762	56851.0	1327.615385	47031.0	0.084915
9	4.510490	43.0	1.503497	45207.0	920.482518	43200.0	-0.084915

	monsterkillsownjungle	monsterkillsenemyjungle	cspm	goldat10 \
0	151.0	24.0	31.802817	16118.0
1	155.0	4.0	32.985915	15436.0
2	102.0	56.0	35.656566	16270.0
3	82.0	0.0	33.265993	14985.0
4	128.0	18.0	34.299114	16157.0
5	136.0	5.0	31.954143	14365.0
6	157.0	22.0	32.944706	16107.0
7	128.0	15.0	32.816117	16223.0
8	104.0	13.0	37.797203	16356.0
9	130.0	0.0	34.860140	15378.0

	oppgoldat10	gdat10	goldat15	oppgoldat15	gdat15	xpat10	oppxpat10 \
0	15436.0	682.0	24287.0	23616.0	671.0	19260.0	18621.0
1	16118.0	-682.0	23616.0	24287.0	-671.0	18621.0	19260.0
2	14985.0	1285.0	27399.0	23026.0	4373.0	19015.0	18226.0
3	16270.0	-1285.0	23026.0	27399.0	-4373.0	18226.0	19015.0
4	14365.0	1792.0	26339.0	22782.0	3557.0	19284.0	18656.0
5	16157.0	-1792.0	22782.0	26339.0	-3557.0	18656.0	19284.0
6	16223.0	-116.0	24066.0	23318.0	748.0	18307.0	18250.0
7	16107.0	116.0	23318.0	24066.0	-748.0	18250.0	18307.0
8	15378.0	978.0	25719.0	24055.0	1664.0	18205.0	18488.0
9	16356.0	-978.0	24055.0	25719.0	-1664.0	18488.0	18205.0

	xpdatt10	csatt10	oppcsat10	csdat10	csatt15	oppcsat15	csdat15
0	639.0	334.0	316.0	18.0	548.0	535.0	13.0
1	-639.0	316.0	334.0	-18.0	535.0	548.0	-13.0
2	789.0	316.0	335.0	-19.0	509.0	506.0	3.0
3	-789.0	335.0	316.0	19.0	506.0	509.0	-3.0
4	628.0	322.0	305.0	17.0	512.0	470.0	42.0

5	-628.0	305.0	322.0	-17.0	470.0	512.0	-42.0
6	57.0	310.0	313.0	-3.0	473.0	467.0	6.0
7	-57.0	313.0	310.0	3.0	467.0	473.0	-6.0
8	-283.0	335.0	340.0	-5.0	547.0	548.0	-1.0
9	283.0	340.0	335.0	5.0	548.0	547.0	1.0

3 2 Write data to file

```
[10]: #hotdata.to_csv(infile+outf)
hotdata.to_csv("Datasets/League_2019/2019-summer-Wrangled.csv")
```

4 3 Glance at data before moving on

```
[11]: hotdata.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1444 entries, 0 to 1443
Data columns (total 62 columns):
#   Column                Non-Null Count  Dtype
---  -
0   league_CBLol          1444 non-null   float64
1   league_LCK            1444 non-null   float64
2   league_LCS            1444 non-null   float64
3   league_LEC            1444 non-null   float64
4   league_LMS            1444 non-null   float64
5   gamelength            1444 non-null   float64
6   result                1444 non-null   float64
7   k                     1444 non-null   float64
8   d                     1444 non-null   float64
9   a                     1444 non-null   float64
10  fb                     1444 non-null   float64
11  kpm                    1444 non-null   float64
12  okpm                  1444 non-null   float64
13  ckpm                  1444 non-null   float64
14  fd                     1444 non-null   float64
15  fdtime                1444 non-null   float64
16  teamdragkills         1444 non-null   float64
17  oppdragkills          1444 non-null   float64
18  elementals            1444 non-null   float64
19  oppelementals        1444 non-null   float64
20  firedrakes            1444 non-null   float64
21  waterdrakes           1444 non-null   float64
22  earthdrakes           1444 non-null   float64
23  airdrakes             1444 non-null   float64
24  elders                1444 non-null   float64
```

```

25  oppelders          1444 non-null  float64
26  herald             1444 non-null  float64
27  heraldtime         1444 non-null  float64
28  ft                 1444 non-null  float64
29  fftime             1444 non-null  float64
30  firstmidouter       1444 non-null  float64
31  firsttothreetowers 1444 non-null  float64
32  teambaronkills     1444 non-null  float64
33  oppbaronkills       1444 non-null  float64
34  dmgttochamps        1444 non-null  float64
35  dmgttochampsperminute 1444 non-null  float64
36  wards              1444 non-null  float64
37  wpm                1444 non-null  float64
38  wardkills          1444 non-null  float64
39  wcpm               1444 non-null  float64
40  totalgold          1444 non-null  float64
41  earnedgpm          1444 non-null  float64
42  goldspent          1444 non-null  float64
43  gspd               1444 non-null  float64
44  monsterkillsownjungle 1444 non-null  float64
45  monsterkillsenemyjungle 1444 non-null  float64
46  cspm               1444 non-null  float64
47  goldat10           1444 non-null  float64
48  oppgoldat10        1444 non-null  float64
49  gdat10             1444 non-null  float64
50  goldat15           1444 non-null  float64
51  oppgoldat15        1444 non-null  float64
52  gdat15             1444 non-null  float64
53  xpat10             1444 non-null  float64
54  oppxpat10          1444 non-null  float64
55  xpdat10            1444 non-null  float64
56  csat10             1444 non-null  float64
57  oppcsat10          1444 non-null  float64
58  csdat10            1444 non-null  float64
59  csat15             1444 non-null  float64
60  oppcsat15          1444 non-null  float64
61  csdat15            1444 non-null  float64

```

dtypes: float64(62)

memory usage: 699.6 KB

```
[12]: hotdata.describe()
```

```

[12]:      league_CBLol  league_LCK  league_LCS  league_LEC  league_LMS  \
count      1444.000000  1444.000000  1444.000000  1444.000000  1444.000000
mean         0.132964    0.337950    0.182825    0.173130    0.173130
std         0.339653    0.473175    0.386657    0.378491    0.378491
min         0.000000    0.000000    0.000000    0.000000    0.000000

```

25%	0.000000	0.000000	0.000000	0.000000	0.000000
50%	0.000000	0.000000	0.000000	0.000000	0.000000
75%	0.000000	1.000000	0.000000	0.000000	0.000000
max	1.000000	1.000000	1.000000	1.000000	1.000000

	gamelength	result	k	d	a \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	33.158264	0.500000	11.702909	11.730609	26.707064
std	5.728629	0.500173	6.419368	6.422425	15.655001
min	19.650000	0.000000	0.000000	0.000000	0.000000
25%	28.900000	0.000000	6.000000	7.000000	14.000000
50%	32.450000	0.500000	12.000000	12.000000	26.000000
75%	36.583333	1.000000	16.000000	16.000000	38.000000
max	55.100000	1.000000	49.000000	49.000000	93.000000

	fb	kpm	okpm	ckpm	fd \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	0.500000	0.358566	0.358566	0.717132	0.500000
std	0.500173	0.210606	0.210606	0.262660	0.500173
min	0.000000	0.000000	0.000000	0.161377	0.000000
25%	0.000000	0.200952	0.200952	0.536513	0.000000
50%	0.500000	0.334642	0.334642	0.687453	0.500000
75%	1.000000	0.479891	0.479891	0.862866	1.000000
max	1.000000	1.818182	1.818182	2.782931	1.000000

	fdtime	teamdragkills	oppdragkills	elementals	oppelementals \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	9.445253	2.146122	2.146122	2.058172	2.058172
std	2.715042	1.509537	1.509537	1.437811	1.437811
min	5.243533	0.000000	0.000000	0.000000	0.000000
25%	7.364117	1.000000	1.000000	1.000000	1.000000
50%	9.072300	2.000000	2.000000	2.000000	2.000000
75%	10.819917	3.000000	3.000000	3.000000	3.000000
max	19.959433	8.000000	8.000000	6.000000	6.000000

	firedrakes	waterdrakes	earthdrakes	airdrakes	elders \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	0.535319	0.490305	0.505540	0.527008	0.08795
std	0.760785	0.751466	0.737546	0.774662	0.31351
min	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000
50%	0.000000	0.000000	0.000000	0.000000	0.000000
75%	1.000000	1.000000	1.000000	1.000000	0.000000
max	3.000000	3.000000	3.000000	3.000000	2.000000

	oppelders	herald	heraldtime	ft	fttime \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000

mean	0.08795	0.500000	12.732520	0.500000	14.394222
std	0.31351	0.500173	2.093523	0.500173	2.118794
min	0.00000	0.000000	10.331233	0.000000	7.992817
25%	0.00000	0.000000	11.106767	0.000000	12.852267
50%	0.00000	0.500000	12.172167	0.500000	14.260283
75%	0.00000	1.000000	13.697883	1.000000	15.847783
max	2.00000	1.000000	19.754383	1.000000	21.891283

	firstmidouter	firstttothreetowers	teambaronkills	oppbaronkills	\
count	1444.000000	1444.000000	1444.000000	1444.000000	
mean	0.500000	0.500000	0.689751	0.689751	
std	0.500173	0.500173	0.759786	0.759786	
min	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	0.000000	
50%	0.500000	0.500000	1.000000	1.000000	
75%	1.000000	1.000000	1.000000	1.000000	
max	1.000000	1.000000	4.000000	4.000000	

	dmgtochamps	dmgtochampspminute	wards	wpm	\
count	1444.000000	1444.000000	1444.000000	1444.000000	
mean	58525.909972	1747.419090	122.184211	3.646594	
std	20540.656601	460.186628	34.183831	0.589878	
min	17289.000000	484.611187	46.000000	1.855288	
25%	43811.750000	1410.317454	98.000000	3.201770	
50%	55327.000000	1722.070090	118.000000	3.612641	
75%	71162.250000	2039.444496	142.000000	4.013803	
max	166213.000000	4517.736549	265.000000	5.906164	

	wardkills	wcpm	totalgold	earnedgpm	goldspent	\
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000	
mean	53.675208	1.586687	59413.476454	1137.281272	55213.081717	
std	20.289872	0.425033	11745.008087	187.750225	11086.575351	
min	10.000000	0.371058	27127.000000	665.866005	25050.000000	
25%	40.000000	1.289954	51621.500000	974.054378	47587.500000	
50%	51.000000	1.566251	58937.500000	1151.879748	54349.000000	
75%	64.000000	1.848845	66712.500000	1293.803444	61308.500000	
max	147.000000	3.249001	102319.000000	1824.141002	103743.000000	

	gspd	monsterkillsownjungle	monsterkillsenemyjungle	\
count	1444.000000	1444.000000	1444.000000	
mean	0.000000	128.574792	16.769391	
std	0.136291	29.046989	14.356374	
min	-0.449614	54.000000	0.000000	
25%	-0.100638	108.000000	5.000000	
50%	0.000000	126.000000	13.000000	
75%	0.100638	147.000000	26.000000	
max	0.449614	242.000000	102.000000	

	cspm	goldat10	oppgoldat10	gdat10	goldat15 \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	32.859738	15570.701524	15570.701524	0.000000	24571.525623
std	2.665292	844.650777	844.650777	1323.296478	1691.748309
min	22.397476	13008.000000	13008.000000	-6159.000000	20189.000000
25%	31.101438	14999.750000	14999.750000	-791.500000	23391.750000
50%	32.769801	15479.000000	15479.000000	0.000000	24355.000000
75%	34.583930	16052.000000	16052.000000	791.500000	25568.000000
max	42.779126	21281.000000	21281.000000	6159.000000	33657.000000

	oppgoldat15	gdat15	xpat10	oppxpat10	xpat10 \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	24571.525623	0.000000	18574.943906	18574.943906	0.000000
std	1691.748309	2750.495215	735.011098	735.011098	945.628408
min	20189.000000	-12230.000000	14966.000000	14966.000000	-3365.000000
25%	23391.750000	-1735.750000	18126.750000	18126.750000	-624.250000
50%	24355.000000	0.000000	18627.500000	18627.500000	0.000000
75%	25568.000000	1735.750000	19064.250000	19064.250000	624.250000
max	33657.000000	12230.000000	20490.000000	20490.000000	3365.000000

	csat10	oppcsat10	csdat10	csat15	oppcsat15 \
count	1444.000000	1444.000000	1444.000000	1444.000000	1444.000000
mean	318.845568	318.845568	0.000000	503.474377	503.474377
std	22.936390	22.936390	26.581247	35.823159	35.823159
min	204.000000	204.000000	-83.000000	368.000000	368.000000
25%	305.000000	305.000000	-18.250000	481.000000	481.000000
50%	320.000000	320.000000	0.000000	504.000000	504.000000
75%	334.000000	334.000000	18.250000	527.250000	527.250000
max	385.000000	385.000000	83.000000	611.000000	611.000000

	csdat15
count	1444.000000
mean	0.000000
std	40.607087
min	-163.000000
25%	-28.000000
50%	0.000000
75%	28.000000
max	163.000000