DataFrame-methods

December 26, 2022

```
[1]: import numpy as np
     import pandas as pd
```

```
[2]: # value_count(applicable in series & dataframe)
```

```
[3]: marks = pd.DataFrame([
         [100,80,10],
         [90,70,7],
         [120,100,14],
         [80,70,14],
         [80,70,14]
     ],columns=['iq','marks','package'])
```

```
[4]: marks
```

```
[4]:     iq  marks  package
     0  100     80       10
     1   90     70        7
     2  120    100       14
     3   80     70       14
     4   80     70       14
```

```
[5]: marks.value_counts()
```

```
[5]: iq   marks  package
     80   70     14         2
     90   70     7          1
     100  80     10         1
     120  100    14         1
     dtype: int64
```

```
[6]: ipl = pd.read_csv('ipl-matches.csv')
     ipl.head()
```

```
[6]:         ID       City        Date  Season  MatchNumber  \
     0  1312200  Ahmedabad  2022-05-29    2022        Final
     1  1312199  Ahmedabad  2022-05-27    2022  Qualifier 2
```

```
2  1312198   Kolkata   2022-05-25   2022    Eliminator
3  1312197   Kolkata   2022-05-24   2022    Qualifier 1
4  1304116    Mumbai   2022-05-22   2022            70


                        Team1                 Team2  \
0              Rajasthan Royals        Gujarat Titans
1  Royal Challengers Bangalore      Rajasthan Royals
2  Royal Challengers Bangalore  Lucknow Super Giants
3              Rajasthan Royals        Gujarat Titans
4            Sunrisers Hyderabad          Punjab Kings


                              Venue            TossWinner TossDecision  \
0  Narendra Modi Stadium, Ahmedabad      Rajasthan Royals          bat
1  Narendra Modi Stadium, Ahmedabad      Rajasthan Royals        field
2            Eden Gardens, Kolkata  Lucknow Super Giants        field
3            Eden Gardens, Kolkata         Gujarat Titans        field
4         Wankhede Stadium, Mumbai    Sunrisers Hyderabad          bat


   SuperOver                   WinningTeam    WonBy  Margin method  \
0          N                 Gujarat Titans  Wickets     7.0    NaN
1          N               Rajasthan Royals  Wickets     7.0    NaN
2          N  Royal Challengers Bangalore      Runs    14.0    NaN
3          N                 Gujarat Titans  Wickets     7.0    NaN
4          N                   Punjab Kings  Wickets     5.0    NaN


   Player_of_Match                                    Team1Players  \
0       HH Pandya  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
1      JC Buttler  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
2      RM Patidar  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
3        DA Miller  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
4    Harpreet Brar  ['PK Garg', 'Abhishek Sharma', 'RA Tripathi', …


                                Team2Players        Umpire1  \
0  ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…    CB Gaffaney
1  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …    CB Gaffaney
2  ['Q de Kock', 'KL Rahul', 'M Vohra', 'DJ Hooda…  J Madanagopal
3  ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…    BNJ Oxenford
4  ['JM Bairstow', 'S Dhawan', 'M Shahrukh Khan',…    AK Chaudhary


         Umpire2
0    Nitin Menon
1    Nitin Menon
2        MA Gough
3       VK Sharma
4  NA Patwardhan
```

[7]: *#find which player has won most potm -in finals and qualifier.*

```
[8]: ipl['MatchNumber']
```

```
[8]: 0              Final
     1        Qualifier 2
     2         Eliminator
     3        Qualifier 1
     4                 70
                  …
     945                4
     946                5
     947                3
     948                2
     949                1
     Name: MatchNumber, Length: 950, dtype: object
```

```
[9]: ipl[~ipl['MatchNumber'].str.isdigit()]
```

```
[9]:          ID           City        Date   Season        MatchNumber  \
     0     1312200      Ahmedabad  2022-05-29     2022              Final
     1     1312199      Ahmedabad  2022-05-27     2022        Qualifier 2
     2     1312198        Kolkata  2022-05-25     2022         Eliminator
     3     1312197        Kolkata  2022-05-24     2022        Qualifier 1
     74    1254117          Dubai  2021-10-15     2021              Final
     75    1254116        Sharjah  2021-10-13     2021        Qualifier 2
     76    1254115        Sharjah  2021-10-11     2021         Eliminator
     77    1254114          Dubai  2021-10-10     2021        Qualifier 1
     134   1237181            NaN  2020-11-10  2020/21              Final
     135   1237180      Abu Dhabi  2020-11-08  2020/21        Qualifier 2
     136   1237178      Abu Dhabi  2020-11-06  2020/21         Eliminator
     137   1237177            NaN  2020-11-05  2020/21        Qualifier 1
     194   1181768      Hyderabad  2019-05-12     2019              Final
     195   1181767  Visakhapatnam  2019-05-10     2019          Qualifier
     196   1181766  Visakhapatnam  2019-05-08     2019         Eliminator
     197   1181764        Chennai  2019-05-07     2019          Qualifier
     254   1136620         Mumbai  2018-05-27     2018              Final
     255   1136619        Kolkata  2018-05-25     2018          Qualifier
     256   1136618        Kolkata  2018-05-23     2018         Eliminator
     257   1136617         Mumbai  2018-05-22     2018          Qualifier
     314   1082650      Hyderabad  2017-05-21     2017              Final
     315   1082649      Bangalore  2017-05-19     2017        Qualifier 2
     316   1082648      Bangalore  2017-05-17     2017         Eliminator
     317   1082647         Mumbai  2017-05-16     2017        Qualifier 1
     373    981019      Bangalore  2016-05-29     2016              Final
     374    981017          Delhi  2016-05-27     2016        Qualifier 2
     375    981015          Delhi  2016-05-25     2016   Elimination Final
     376    981013      Bangalore  2016-05-24     2016        Qualifier 1
     433    829823        Kolkata  2015-05-24     2015              Final
```

```
434   829821         Ranchi  2015-05-22   2015        Qualifier 2
435   829819           Pune  2015-05-20   2015         Eliminator
436   829817         Mumbai  2015-05-19   2015        Qualifier 1
492   734049      Bangalore  2014-06-01   2014              Final
493   734047         Mumbai  2014-05-30   2014        Qualifier 2
494   734045         Mumbai  2014-05-28   2014         Eliminator
495   734043        Kolkata  2014-05-27   2014        Qualifier 1
552   598073        Kolkata  2013-05-26   2013              Final
553   598072        Kolkata  2013-05-24   2013        Qualifier 2
554   598071          Delhi  2013-05-22   2013         Eliminator
555   598070          Delhi  2013-05-21   2013        Qualifier 1
628   548381        Chennai  2012-05-27   2012              Final
629   548380        Chennai  2012-05-25   2012        Qualifier 2
630   548379      Bangalore  2012-05-23   2012   Elimination Final
631   548378           Pune  2012-05-22   2012        Qualifier 1
702   501271        Chennai  2011-05-28   2011              Final
703   501270        Chennai  2011-05-27   2011        Qualifier 2
704   501269         Mumbai  2011-05-25   2011   Elimination Final
705   501268         Mumbai  2011-05-24   2011        Qualifier 1
775   419165         Mumbai  2010-04-25  2009/10             Final
776   419164         Mumbai  2010-04-24  2009/10  3rd Place Play-Off
777   419163         Mumbai  2010-04-22  2009/10         Semi Final
778   419162         Mumbai  2010-04-21  2009/10         Semi Final
835   392239    Johannesburg 2009-05-24   2009              Final
836   392238    Johannesburg 2009-05-23   2009         Semi Final
837   392237      Centurion  2009-05-22   2009         Semi Final
892   336040         Mumbai  2008-06-01  2007/08             Final
893   336039         Mumbai  2008-05-31  2007/08        Semi Final
894   336038         Mumbai  2008-05-30  2007/08        Semi Final

                           Team1                       Team2  \
0              Rajasthan Royals              Gujarat Titans
1    Royal Challengers Bangalore            Rajasthan Royals
2    Royal Challengers Bangalore        Lucknow Super Giants
3              Rajasthan Royals              Gujarat Titans
74           Chennai Super Kings        Kolkata Knight Riders
75               Delhi Capitals        Kolkata Knight Riders
76   Royal Challengers Bangalore        Kolkata Knight Riders
77               Delhi Capitals          Chennai Super Kings
134              Delhi Capitals              Mumbai Indians
135              Delhi Capitals          Sunrisers Hyderabad
136  Royal Challengers Bangalore          Sunrisers Hyderabad
137              Mumbai Indians               Delhi Capitals
194              Mumbai Indians          Chennai Super Kings
195              Delhi Capitals          Chennai Super Kings
196          Sunrisers Hyderabad               Delhi Capitals
197          Chennai Super Kings              Mumbai Indians
```

```
254          Sunrisers Hyderabad        Chennai Super Kings
255          Sunrisers Hyderabad       Kolkata Knight Riders
256        Kolkata Knight Riders           Rajasthan Royals
257          Sunrisers Hyderabad        Chennai Super Kings
314               Mumbai Indians      Rising Pune Supergiant
315               Mumbai Indians       Kolkata Knight Riders
316          Sunrisers Hyderabad       Kolkata Knight Riders
317               Mumbai Indians      Rising Pune Supergiant
373  Royal Challengers Bangalore         Sunrisers Hyderabad
374                Gujarat Lions         Sunrisers Hyderabad
375          Sunrisers Hyderabad       Kolkata Knight Riders
376                Gujarat Lions  Royal Challengers Bangalore
433               Mumbai Indians         Chennai Super Kings
434          Chennai Super Kings  Royal Challengers Bangalore
435  Royal Challengers Bangalore            Rajasthan Royals
436          Chennai Super Kings              Mumbai Indians
492        Kolkata Knight Riders             Kings XI Punjab
493          Chennai Super Kings             Kings XI Punjab
494          Chennai Super Kings              Mumbai Indians
495              Kings XI Punjab       Kolkata Knight Riders
552          Chennai Super Kings              Mumbai Indians
553               Mumbai Indians            Rajasthan Royals
554             Rajasthan Royals         Sunrisers Hyderabad
555          Chennai Super Kings              Mumbai Indians
628        Kolkata Knight Riders         Chennai Super Kings
629             Delhi Daredevils         Chennai Super Kings
630          Chennai Super Kings              Mumbai Indians
631             Delhi Daredevils       Kolkata Knight Riders
702          Chennai Super Kings  Royal Challengers Bangalore
703  Royal Challengers Bangalore              Mumbai Indians
704               Mumbai Indians       Kolkata Knight Riders
705  Royal Challengers Bangalore         Chennai Super Kings
775          Chennai Super Kings              Mumbai Indians
776  Royal Challengers Bangalore             Deccan Chargers
777          Chennai Super Kings             Deccan Chargers
778  Royal Challengers Bangalore              Mumbai Indians
835  Royal Challengers Bangalore             Deccan Chargers
836  Royal Challengers Bangalore         Chennai Super Kings
837             Delhi Daredevils             Deccan Chargers
892          Chennai Super Kings            Rajasthan Royals
893          Chennai Super Kings             Kings XI Punjab
894             Delhi Daredevils            Rajasthan Royals

                                            Venue  \
0              Narendra Modi Stadium, Ahmedabad
1              Narendra Modi Stadium, Ahmedabad
2                        Eden Gardens, Kolkata
```

3	Eden Gardens, Kolkata
74	Dubai International Cricket Stadium
75	Sharjah Cricket Stadium
76	Sharjah Cricket Stadium
77	Dubai International Cricket Stadium
134	Dubai International Cricket Stadium
135	Sheikh Zayed Stadium
136	Sheikh Zayed Stadium
137	Dubai International Cricket Stadium
194	Rajiv Gandhi International Stadium
195	Dr. Y.S. Rajasekhara Reddy ACA-VDCA Cricket St…
196	Dr. Y.S. Rajasekhara Reddy ACA-VDCA Cricket St…
197	MA Chidambaram Stadium
254	Wankhede Stadium
255	Eden Gardens
256	Eden Gardens
257	Wankhede Stadium
314	Rajiv Gandhi International Stadium, Uppal
315	M Chinnaswamy Stadium
316	M Chinnaswamy Stadium
317	Wankhede Stadium
373	M Chinnaswamy Stadium
374	Feroz Shah Kotla
375	Feroz Shah Kotla
376	M Chinnaswamy Stadium
433	Eden Gardens
434	JSCA International Stadium Complex
435	Maharashtra Cricket Association Stadium
436	Wankhede Stadium
492	M Chinnaswamy Stadium
493	Wankhede Stadium
494	Brabourne Stadium
495	Eden Gardens
552	Eden Gardens
553	Eden Gardens
554	Feroz Shah Kotla
555	Feroz Shah Kotla
628	MA Chidambaram Stadium, Chepauk
629	MA Chidambaram Stadium, Chepauk
630	M Chinnaswamy Stadium
631	Subrata Roy Sahara Stadium
702	MA Chidambaram Stadium, Chepauk
703	MA Chidambaram Stadium, Chepauk
704	Wankhede Stadium
705	Wankhede Stadium
775	Dr DY Patil Sports Academy
776	Dr DY Patil Sports Academy

```
777                    Dr DY Patil Sports Academy
778                    Dr DY Patil Sports Academy
835                       New Wanderers Stadium
836                       New Wanderers Stadium
837                           SuperSport Park
892                    Dr DY Patil Sports Academy
893                          Wankhede Stadium
894                          Wankhede Stadium

                     TossWinner TossDecision SuperOver  \
0                Rajasthan Royals          bat         N
1                Rajasthan Royals        field         N
2            Lucknow Super Giants        field         N
3                  Gujarat Titans        field         N
74          Kolkata Knight Riders        field         N
75          Kolkata Knight Riders        field         N
76    Royal Challengers Bangalore          bat         N
77            Chennai Super Kings        field         N
134                 Delhi Capitals          bat         N
135                 Delhi Capitals          bat         N
136            Sunrisers Hyderabad        field         N
137                 Delhi Capitals        field         N
194                 Mumbai Indians          bat         N
195            Chennai Super Kings        field         N
196                 Delhi Capitals        field         N
197            Chennai Super Kings          bat         N
254            Chennai Super Kings        field         N
255          Kolkata Knight Riders        field         N
256               Rajasthan Royals        field         N
257            Chennai Super Kings        field         N
314                 Mumbai Indians          bat         N
315                 Mumbai Indians        field         N
316          Kolkata Knight Riders        field         N
317                 Mumbai Indians        field         N
373            Sunrisers Hyderabad          bat         N
374            Sunrisers Hyderabad        field         N
375          Kolkata Knight Riders        field         N
376   Royal Challengers Bangalore        field         N
433            Chennai Super Kings        field         N
434            Chennai Super Kings        field         N
435   Royal Challengers Bangalore          bat         N
436                 Mumbai Indians          bat         N
492          Kolkata Knight Riders        field         N
493            Chennai Super Kings        field         N
494            Chennai Super Kings        field         N
495                Kings XI Punjab        field         N
552                 Mumbai Indians          bat         N
```

7

```
553              Rajasthan Royals      bat         N
554           Sunrisers Hyderabad      bat         N
555           Chennai Super Kings      bat         N
628           Chennai Super Kings      bat         N
629             Delhi Daredevils     field         N
630               Mumbai Indians     field         N
631          Kolkata Knight Riders     bat         N
702           Chennai Super Kings      bat         N
703               Mumbai Indians     field         N
704               Mumbai Indians     field         N
705           Chennai Super Kings    field         N
775           Chennai Super Kings      bat         N
776               Deccan Chargers      bat         N
777           Chennai Super Kings      bat         N
778               Mumbai Indians      bat         N
835     Royal Challengers Bangalore   field         N
836     Royal Challengers Bangalore   field         N
837               Deccan Chargers    field         N
892              Rajasthan Royals    field         N
893               Kings XI Punjab      bat         N
894             Delhi Daredevils     field         N


                    WinningTeam     WonBy   Margin method      Player_of_Match  \
0                 Gujarat Titans   Wickets     7.0   NaN           HH Pandya
1               Rajasthan Royals   Wickets     7.0   NaN           JC Buttler
2    Royal Challengers Bangalore      Runs    14.0   NaN           RM Patidar
3                 Gujarat Titans   Wickets     7.0   NaN           DA Miller
74            Chennai Super Kings      Runs    27.0   NaN         F du Plessis
75          Kolkata Knight Riders   Wickets     3.0   NaN              VR Iyer
76          Kolkata Knight Riders   Wickets     4.0   NaN            SP Narine
77            Chennai Super Kings   Wickets     4.0   NaN           RD Gaikwad
134               Mumbai Indians   Wickets     5.0   NaN             TA Boult
135               Delhi Capitals      Runs    17.0   NaN           MP Stoinis
136           Sunrisers Hyderabad   Wickets     6.0   NaN        KS Williamson
137               Mumbai Indians      Runs    57.0   NaN            JJ Bumrah
194               Mumbai Indians      Runs     1.0   NaN            JJ Bumrah
195           Chennai Super Kings   Wickets     6.0   NaN         F du Plessis
196               Delhi Capitals   Wickets     2.0   NaN              RR Pant
197               Mumbai Indians   Wickets     6.0   NaN             SA Yadav
254           Chennai Super Kings   Wickets     8.0   NaN            SR Watson
255           Sunrisers Hyderabad      Runs    14.0   NaN          Rashid Khan
256         Kolkata Knight Riders      Runs    25.0   NaN           AD Russell
257           Chennai Super Kings   Wickets     2.0   NaN         F du Plessis
314               Mumbai Indians      Runs     1.0   NaN            KH Pandya
315               Mumbai Indians   Wickets     6.0   NaN            KV Sharma
316         Kolkata Knight Riders   Wickets     7.0   D/L     NM Coulter-Nile
317         Rising Pune Supergiant     Runs    20.0   NaN    Washington Sundar
```

373	Sunrisers Hyderabad	Runs	8.0	NaN	BCJ Cutting
374	Sunrisers Hyderabad	Wickets	4.0	NaN	DA Warner
375	Sunrisers Hyderabad	Runs	22.0	NaN	MC Henriques
376	Royal Challengers Bangalore	Wickets	4.0	NaN	AB de Villiers
433	Mumbai Indians	Runs	41.0	NaN	RG Sharma
434	Chennai Super Kings	Wickets	3.0	NaN	A Nehra
435	Royal Challengers Bangalore	Runs	71.0	NaN	AB de Villiers
436	Mumbai Indians	Runs	25.0	NaN	KA Pollard
492	Kolkata Knight Riders	Wickets	3.0	NaN	MK Pandey
493	Kings XI Punjab	Runs	24.0	NaN	V Sehwag
494	Chennai Super Kings	Wickets	7.0	NaN	SK Raina
495	Kolkata Knight Riders	Runs	28.0	NaN	UT Yadav
552	Mumbai Indians	Runs	23.0	NaN	KA Pollard
553	Mumbai Indians	Wickets	4.0	NaN	Harbhajan Singh
554	Rajasthan Royals	Wickets	4.0	NaN	BJ Hodge
555	Chennai Super Kings	Runs	48.0	NaN	MEK Hussey
628	Kolkata Knight Riders	Wickets	5.0	NaN	MS Bisla
629	Chennai Super Kings	Runs	86.0	NaN	M Vijay
630	Chennai Super Kings	Runs	38.0	NaN	MS Dhoni
631	Kolkata Knight Riders	Runs	18.0	NaN	YK Pathan
702	Chennai Super Kings	Runs	58.0	NaN	M Vijay
703	Royal Challengers Bangalore	Runs	43.0	NaN	CH Gayle
704	Mumbai Indians	Wickets	4.0	NaN	MM Patel
705	Chennai Super Kings	Wickets	6.0	NaN	SK Raina
775	Chennai Super Kings	Runs	22.0	NaN	SK Raina
776	Royal Challengers Bangalore	Wickets	9.0	NaN	A Kumble
777	Chennai Super Kings	Runs	38.0	NaN	DE Bollinger
778	Mumbai Indians	Runs	35.0	NaN	KA Pollard
835	Deccan Chargers	Runs	6.0	NaN	A Kumble
836	Royal Challengers Bangalore	Wickets	6.0	NaN	MK Pandey
837	Deccan Chargers	Wickets	6.0	NaN	AC Gilchrist
892	Rajasthan Royals	Wickets	3.0	NaN	YK Pathan
893	Chennai Super Kings	Wickets	9.0	NaN	M Ntini
894	Rajasthan Royals	Runs	105.0	NaN	SR Watson

```
                              Team1Players  \
0    ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
1    ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
2    ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
3    ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
74   ['RD Gaikwad', 'F du Plessis', 'RV Uthappa', '…
75   ['PP Shaw', 'S Dhawan', 'MP Stoinis', 'SS Iyer…
76   ['D Padikkal', 'V Kohli', 'KS Bharat', 'GJ Max…
77   ['PP Shaw', 'S Dhawan', 'SS Iyer', 'AR Patel',…
134  ['MP Stoinis', 'S Dhawan', 'AM Rahane', 'SS Iy…
135  ['MP Stoinis', 'S Dhawan', 'SS Iyer', 'SO Hetm…
136  ['V Kohli', 'D Padikkal', 'AJ Finch', 'AB de V…
```

```
137  ['Q de Kock', 'RG Sharma', 'SA Yadav', 'Ishan …
194  ['Q de Kock', 'RG Sharma', 'SA Yadav', 'Ishan …
195  ['PP Shaw', 'S Dhawan', 'C Munro', 'SS Iyer', …
196  ['WP Saha', 'MJ Guptill', 'MK Pandey', 'KS Wil…
197  ['F du Plessis', 'SR Watson', 'SK Raina', 'M V…
254  ['SP Goswami', 'S Dhawan', 'KS Williamson', 'S…
255  ['WP Saha', 'S Dhawan', 'KS Williamson', 'Shak…
256  ['SP Narine', 'CA Lynn', 'RV Uthappa', 'N Rana…
257  ['S Dhawan', 'SP Goswami', 'KS Williamson', 'M…
314  ['LMP Simmons', 'PA Patel', 'AT Rayudu', 'RG S…
315  ['LMP Simmons', 'PA Patel', 'AT Rayudu', 'RG S…
316  ['DA Warner', 'S Dhawan', 'KS Williamson', 'Yu…
317  ['LMP Simmons', 'PA Patel', 'RG Sharma', 'AT R…
373  ['CH Gayle', 'V Kohli', 'AB de Villiers', 'KL …
374  ['ER Dwivedi', 'BB McCullum', 'SK Raina', 'KD …
375  ['DA Warner', 'S Dhawan', 'MC Henriques', 'Yuv…
376  ['AJ Finch', 'BB McCullum', 'SK Raina', 'KD Ka…
433  ['LMP Simmons', 'PA Patel', 'RG Sharma', 'KA P…
434  ['DR Smith', 'MEK Hussey', 'F du Plessis', 'SK…
435  ['CH Gayle', 'V Kohli', 'AB de Villiers', 'Man…
436  ['DR Smith', 'MEK Hussey', 'F du Plessis', 'SK…
492  ['RV Uthappa', 'G Gambhir', 'MK Pandey', 'YK P…
493  ['DR Smith', 'F du Plessis', 'SK Raina', 'BB M…
494  ['DR Smith', 'F du Plessis', 'SK Raina', 'BB M…
495  ['V Sehwag', 'M Vohra', 'WP Saha', 'GJ Maxwell…
552  ['MEK Hussey', 'M Vijay', 'SK Raina', 'S Badri…
553  ['DR Smith', 'AP Tare', 'KD Karthik', 'RG Shar…
554  ['R Dravid', 'AM Rahane', 'SR Watson', 'DH Yag…
555  ['MEK Hussey', 'M Vijay', 'SK Raina', 'MS Dhon…
628  ['MS Bisla', 'G Gambhir', 'JH Kallis', 'LR Shu…
629  ['DPMD Jayawardene', 'DA Warner', 'V Sehwag', …
630  ['M Vijay', 'MEK Hussey', 'SK Raina', 'S Badri…
631  ['DA Warner', 'V Sehwag', 'NV Ojha', 'DPMD Jay…
702  ['MEK Hussey', 'M Vijay', 'MS Dhoni', 'SK Rain…
703  ['MA Agarwal', 'CH Gayle', 'V Kohli', 'AB de V…
704  ['AC Blizzard', 'SR Tendulkar', 'RG Sharma', '…
705  ['MA Agarwal', 'CH Gayle', 'V Kohli', 'AB de V…
775  ['M Vijay', 'ML Hayden', 'SK Raina', 'S Badrin…
776  ['JH Kallis', 'R Dravid', 'KP Pietersen', 'RV …
777  ['M Vijay', 'ML Hayden', 'SK Raina', 'S Badrin…
778  ['JH Kallis', 'R Dravid', 'KP Pietersen', 'RV …
835  ['JH Kallis', 'MK Pandey', 'RE van der Merwe',…
836  ['JH Kallis', 'MK Pandey', 'RE van der Merwe',…
837  ['G Gambhir', 'DA Warner', 'V Sehwag', 'TM Dil…
892  ['PA Patel', 'S Vidyut', 'SK Raina', 'JA Morke…
893  ['PA Patel', 'S Vidyut', 'SK Raina', 'MS Dhoni…
894  ['G Gambhir', 'V Sehwag', 'S Dhawan', 'MK Tiwa…
```

```
                                    Team2Players              Umpire1  \
0     ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…          CB Gaffaney
1     ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …          CB Gaffaney
2     ['Q de Kock', 'KL Rahul', 'M Vohra', 'DJ Hooda…       J Madanagopal
3     ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…         BNJ Oxenford
74    ['Shubman Gill', 'VR Iyer', 'N Rana', 'SP Nari…          Nitin Menon
75    ['Shubman Gill', 'VR Iyer', 'N Rana', 'RA Trip…  KN Ananthapadmanabhan
76    ['Shubman Gill', 'VR Iyer', 'RA Tripathi', 'N …          CB Gaffaney
77    ['RD Gaikwad', 'F du Plessis', 'RV Uthappa', '…          Nitin Menon
134   ['RG Sharma', 'Q de Kock', 'SA Yadav', 'Ishan …          CB Gaffaney
135   ['PK Garg', 'DA Warner', 'MK Pandey', 'KS Will…           PR Reiffel
136   ['DA Warner', 'SP Goswami', 'MK Pandey', 'KS W…           PR Reiffel
137   ['PP Shaw', 'S Dhawan', 'AM Rahane', 'SS Iyer'…          CB Gaffaney
194   ['F du Plessis', 'SR Watson', 'SK Raina', 'AT …             IJ Gould
195   ['F du Plessis', 'SR Watson', 'SK Raina', 'AT …         BNJ Oxenford
196   ['PP Shaw', 'S Dhawan', 'SS Iyer', 'RR Pant', …         BNJ Oxenford
197   ['RG Sharma', 'Q de Kock', 'SA Yadav', 'Ishan …             NJ Llong
254   ['SR Watson', 'F du Plessis', 'SK Raina', 'AT …            M Erasmus
255   ['CA Lynn', 'SP Narine', 'N Rana', 'RV Uthappa…      HDPK Dharmasena
256   ['AM Rahane', 'RA Tripathi', 'SV Samson', 'H K…          AK Chaudhary
257   ['SR Watson', 'F du Plessis', 'SK Raina', 'AT …        C Shamshuddin
314   ['AM Rahane', 'RA Tripathi', 'SPD Smith', 'MS …             NJ Llong
315   ['CA Lynn', 'SP Narine', 'G Gambhir', 'RV Utha…             NJ Llong
316   ['RV Uthappa', 'CA Lynn', 'YK Pathan', 'G Gamb…          AK Chaudhary
317   ['AM Rahane', 'RA Tripathi', 'SPD Smith', 'MK …              S Ravi
373   ['DA Warner', 'S Dhawan', 'MC Henriques', 'Yuv…      HDPK Dharmasena
374   ['DA Warner', 'S Dhawan', 'MC Henriques', 'Yuv…            M Erasmus
375   ['RV Uthappa', 'G Gambhir', 'C Munro', 'MK Pan…            M Erasmus
376   ['CH Gayle', 'V Kohli', 'AB de Villiers', 'KL …          AK Chaudhary
433   ['DR Smith', 'MEK Hussey', 'SK Raina', 'MS Dho…      HDPK Dharmasena
434   ['CH Gayle', 'V Kohli', 'AB de Villiers', 'Man…          AK Chaudhary
435   ['AM Rahane', 'SR Watson', 'SV Samson', 'SPD S…          AK Chaudhary
436   ['LMP Simmons', 'PA Patel', 'RG Sharma', 'KA P…      HDPK Dharmasena
492   ['V Sehwag', 'M Vohra', 'GJ Bailey', 'WP Saha'…      HDPK Dharmasena
493   ['V Sehwag', 'M Vohra', 'GJ Maxwell', 'DA Mill…      HDPK Dharmasena
494   ['LMP Simmons', 'MEK Hussey', 'CJ Anderson', '…          VA Kulkarni
495   ['RV Uthappa', 'G Gambhir', 'MK Pandey', 'Shak…             NJ Llong
552   ['DR Smith', 'AP Tare', 'KD Karthik', 'RG Shar…      HDPK Dharmasena
553   ['R Dravid', 'AM Rahane', 'SR Watson', 'SV Sam…        C Shamshuddin
554   ['PA Patel', 'S Dhawan', 'GH Vihari', 'CL Whit…              S Ravi
555   ['DR Smith', 'AP Tare', 'KD Karthik', 'RG Shar…             NJ Llong
628   ['MEK Hussey', 'M Vijay', 'SK Raina', 'MS Dhon…            BF Bowden
629   ['M Vijay', 'MEK Hussey', 'SK Raina', 'MS Dhon…          BR Doctrove
630   ['SR Tendulkar', 'DR Smith', 'RG Sharma', 'KD …            BF Bowden
631   ['BB McCullum', 'G Gambhir', 'JH Kallis', 'Sha…          BR Doctrove
702   ['MA Agarwal', 'CH Gayle', 'V Kohli', 'AB de V…             Asad Rauf
```

```
703  ['AC Blizzard', 'SR Tendulkar', 'Harbhajan Sin…        Asad Rauf
704  ['G Gambhir', 'JH Kallis', 'SP Goswami', 'MK T…        Asad Rauf
705  ['MEK Hussey', 'M Vijay', 'SK Raina', 'S Badri…        Asad Rauf
775  ['S Dhawan', 'SR Tendulkar', 'AM Nayar', 'Harb…       RE Koertzen
776  ['AC Gilchrist', 'MD Mishra', 'Anirudh Singh',…       RE Koertzen
777  ['AC Gilchrist', 'HH Gibbs', 'TL Suman', 'RG S…      BR Doctrove
778  ['S Dhawan', 'SR Tendulkar', 'AM Nayar', 'AT R…      BR Doctrove
835  ['AC Gilchrist', 'HH Gibbs', 'TL Suman', 'A Sy…       RE Koertzen
836  ['PA Patel', 'ML Hayden', 'MS Dhoni', 'SK Rain…       RE Koertzen
837  ['AC Gilchrist', 'HH Gibbs', 'AA Bilakhia', 'T…      BR Doctrove
892  ['NK Patel', 'SA Asnodkar', 'Kamran Akmal', 'S…        BF Bowden
893  ['SE Marsh', 'JR Hopes', 'KC Sangakkara', 'Yuv…        Asad Rauf
894  ['GC Smith', 'SA Asnodkar', 'Sohail Tanvir', '…        BF Bowden


         Umpire2
0       Nitin Menon
1       Nitin Menon
2         MA Gough
3        VK Sharma
74    RK Illingworth
75        MA Gough
76       VK Sharma
77    RK Illingworth
134     Nitin Menon
135         S Ravi
136         S Ravi
137     Nitin Menon
194     Nitin Menon
195         S Ravi
196         S Ravi
197     Nitin Menon
254         S Ravi
255     Nitin Menon
256     Nitin Menon
257       M Erasmus
314         S Ravi
315     Nitin Menon
316     Nitin Menon
317   C Shamshuddin
373    BNJ Oxenford
374       CK Nandan
375   C Shamshuddin
376  HDPK Dharmasena
433   RK Illingworth
434      CB Gaffaney
435   C Shamshuddin
436   RK Illingworth
```

```
492        BNJ Oxenford
493          RJ Tucker
494        BNJ Oxenford
495             S Ravi
552          SJA Taufel
553          SJA Taufel
554           RJ Tucker
555           RJ Tucker
628          SJA Taufel
629          SJA Taufel
630     HDPK Dharmasena
631          SJA Taufel
702          SJA Taufel
703          SJA Taufel
704          SJA Taufel
705          SJA Taufel
775          SJA Taufel
776          SJA Taufel
777           RB Tiffin
778           RB Tiffin
835          SJA Taufel
836          SJA Taufel
837           DJ Harper
892         RE Koertzen
893           DJ Harper
894         RE Koertzen
```

[10]: `ipl[~ipl['MatchNumber'].str.isdigit()]['Player_of_Match'].value_counts()`

[10]:
```
KA Pollard         3
F du Plessis       3
SK Raina           3
A Kumble           2
MK Pandey          2
YK Pathan          2
M Vijay            2
JJ Bumrah          2
AB de Villiers     2
SR Watson          2
HH Pandya          1
Harbhajan Singh    1
A Nehra            1
V Sehwag           1
UT Yadav           1
MS Bisla           1
BJ Hodge           1
MEK Hussey         1
```

```
MS Dhoni              1
CH Gayle              1
MM Patel              1
DE Bollinger          1
AC Gilchrist          1
RG Sharma             1
DA Warner             1
MC Henriques          1
JC Buttler            1
RM Patidar            1
DA Miller             1
VR Iyer               1
SP Narine             1
RD Gaikwad            1
TA Boult              1
MP Stoinis            1
KS Williamson         1
RR Pant               1
SA Yadav              1
Rashid Khan           1
AD Russell            1
KH Pandya             1
KV Sharma             1
NM Coulter-Nile       1
Washington Sundar     1
BCJ Cutting           1
M Ntini               1
Name: Player_of_Match, dtype: int64
```

[11]: `#Toss decision plot`

[12]: `ipl['TossDecision'].value_counts()`

[12]:
```
field    599
bat      351
Name: TossDecision, dtype: int64
```

[13]: `ipl['TossDecision'].value_counts().plot(kind='pie')`

[13]: `<AxesSubplot: ylabel='TossDecision'>`
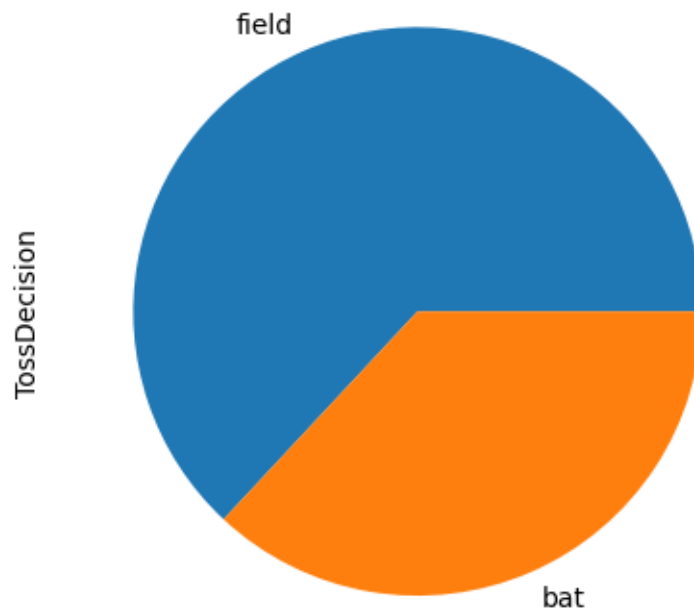
```
[14]: #how many matches each team has played
```

```
[15]: ipl.head(2)
```

```
[15]:         ID       City        Date  Season  MatchNumber  \
      0  1312200  Ahmedabad  2022-05-29    2022        Final
      1  1312199  Ahmedabad  2022-05-27    2022  Qualifier 2

                            Team1           Team2  \
      0            Rajasthan Royals   Gujarat Titans
      1  Royal Challengers Bangalore  Rajasthan Royals

                               Venue        TossWinner TossDecision SuperOver  \
      0  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals          bat         N
      1  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals        field         N

             WinningTeam    WonBy  Margin method Player_of_Match  \
      0    Gujarat Titans  Wickets     7.0    NaN       HH Pandya
      1  Rajasthan Royals  Wickets     7.0    NaN       JC Buttler

                                   Team1Players  \
      0  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
      1  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
```

```
                                   Team2Players      Umpire1       Umpire2
    0  ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…  CB Gaffaney  Nitin Menon
    1  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …  CB Gaffaney  Nitin Menon
```

[16]: `ipl['Team1'].value_counts()`

```
[16]: Royal Challengers Bangalore    126
      Mumbai Indians                 112
      Chennai Super Kings            111
      Kolkata Knight Riders          105
      Kings XI Punjab                 92
      Rajasthan Royals                89
      Delhi Daredevils                85
      Sunrisers Hyderabad             69
      Deccan Chargers                 39
      Delhi Capitals                  29
      Pune Warriors                   23
      Punjab Kings                    18
      Gujarat Lions                   16
      Lucknow Super Giants             8
      Gujarat Titans                   7
      Rising Pune Supergiant           7
      Rising Pune Supergiants          7
      Kochi Tuskers Kerala             7
      Name: Team1, dtype: int64
```

[17]: `ipl['Team2'].value_counts()`

```
[17]: Mumbai Indians                 119
      Kolkata Knight Riders          118
      Rajasthan Royals               103
      Royal Challengers Bangalore    100
      Kings XI Punjab                 98
      Chennai Super Kings             97
      Sunrisers Hyderabad             83
      Delhi Daredevils                76
      Deccan Chargers                 36
      Delhi Capitals                  34
      Pune Warriors                   23
      Gujarat Lions                   14
      Punjab Kings                    10
      Gujarat Titans                   9
      Rising Pune Supergiant           9
      Rising Pune Supergiants          7
      Lucknow Super Giants             7
      Kochi Tuskers Kerala             7
```

```
Name: Team2, dtype: int64
```

[18]:
```python
## add beacuse index values of series is same
ipl['Team1'].value_counts() + ipl['Team2'].value_counts()
```

[18]:
```
Chennai Super Kings          208
Deccan Chargers               75
Delhi Capitals                63
Delhi Daredevils             161
Gujarat Lions                 30
Gujarat Titans                16
Kings XI Punjab              190
Kochi Tuskers Kerala          14
Kolkata Knight Riders        223
Lucknow Super Giants          15
Mumbai Indians               231
Pune Warriors                 46
Punjab Kings                  28
Rajasthan Royals             192
Rising Pune Supergiant        16
Rising Pune Supergiants       14
Royal Challengers Bangalore  226
Sunrisers Hyderabad          152
dtype: int64
```

[19]:
```python
# sort_values() -sort the values of the series
```

[20]:
```python
(ipl['Team1'].value_counts() + ipl['Team2'].value_counts()).
    sort_values(ascending=False)
```

[20]:
```
Mumbai Indians               231
Royal Challengers Bangalore  226
Kolkata Knight Riders        223
Chennai Super Kings          208
Rajasthan Royals             192
Kings XI Punjab              190
Delhi Daredevils             161
Sunrisers Hyderabad          152
Deccan Chargers               75
Delhi Capitals                63
Pune Warriors                 46
Gujarat Lions                 30
Punjab Kings                  28
Gujarat Titans                16
Rising Pune Supergiant        16
Lucknow Super Giants          15
Kochi Tuskers Kerala          14
```

```
           Rising Pune Supergiants          14
           dtype: int64
```

[21]: `ipl.shape`

[21]: `(950, 20)`

[22]: `# sort_values(applicable in series & dataframe both)`

[23]:
```
x=pd.Series([12,3,122,34,56,4])
x
```

[23]:
```
0     12
1      3
2    122
3     34
4     56
5      4
dtype: int64
```

[24]: `x.sort_values()`

[24]:
```
1      3
5      4
0     12
3     34
4     56
2    122
dtype: int64
```

[25]: `ipl.head(2)`

[25]:
```
        ID       City        Date Season  MatchNumber  \
0  1312200  Ahmedabad  2022-05-29   2022        Final
1  1312199  Ahmedabad  2022-05-27   2022  Qualifier 2

                        Team1           Team2  \
0            Rajasthan Royals   Gujarat Titans
1  Royal Challengers Bangalore  Rajasthan Royals

                             Venue         TossWinner TossDecision SuperOver  \
0  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals          bat         N
1  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals        field         N

         WinningTeam    WonBy  Margin method Player_of_Match  \
0    Gujarat Titans  Wickets     7.0    NaN       HH Pandya
1  Rajasthan Royals  Wickets     7.0    NaN       JC Buttler
```

```
                                        Team1Players  \
0  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
1  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …


                                        Team2Players        Umpire1        Umpire2
0  ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…  CB Gaffaney  Nitin Menon
1  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …  CB Gaffaney  Nitin Menon
```

[26]:
```python
# in single column
# suppose i want to sort this data on the basis of one single column
ipl.sort_values(['ID'])
```

[26]:
```
          ID        City        Date   Season  MatchNumber  \
949    335982   Bangalore  2008-04-18  2007/08            1
948    335983  Chandigarh  2008-04-19  2007/08            2
947    335984       Delhi  2008-04-19  2007/08            3
946    335985      Mumbai  2008-04-20  2007/08            5
945    335986     Kolkata  2008-04-20  2007/08            4
..        …          …          …         …           …
4     1304116      Mumbai  2022-05-22     2022           70
3     1312197     Kolkata  2022-05-24     2022  Qualifier 1
2     1312198     Kolkata  2022-05-25     2022    Eliminator
1     1312199   Ahmedabad  2022-05-27     2022  Qualifier 2
0     1312200   Ahmedabad  2022-05-29     2022        Final

                           Team1                         Team2  \
949  Royal Challengers Bangalore          Kolkata Knight Riders
948              Kings XI Punjab            Chennai Super Kings
947              Delhi Daredevils              Rajasthan Royals
946                Mumbai Indians  Royal Challengers Bangalore
945         Kolkata Knight Riders                Deccan Chargers
..                      …                              …
4            Sunrisers Hyderabad                  Punjab Kings
3               Rajasthan Royals                 Gujarat Titans
2    Royal Challengers Bangalore           Lucknow Super Giants
1    Royal Challengers Bangalore               Rajasthan Royals
0               Rajasthan Royals                 Gujarat Titans

                                        Venue                 TossWinner  \
949                    M Chinnaswamy Stadium  Royal Challengers Bangalore
948  Punjab Cricket Association Stadium, Mohali        Chennai Super Kings
947                         Feroz Shah Kotla             Rajasthan Royals
946                         Wankhede Stadium               Mumbai Indians
945                            Eden Gardens               Deccan Chargers
..                            …                              …
4               Wankhede Stadium, Mumbai          Sunrisers Hyderabad
```

```
3                        Eden Gardens, Kolkata                 Gujarat Titans
2                        Eden Gardens, Kolkata           Lucknow Super Giants
1            Narendra Modi Stadium, Ahmedabad               Rajasthan Royals
0            Narendra Modi Stadium, Ahmedabad               Rajasthan Royals


     TossDecision SuperOver                  WinningTeam     WonBy   Margin  \
949         field         N       Kolkata Knight Riders      Runs    140.0
948           bat         N         Chennai Super Kings      Runs     33.0
947           bat         N             Delhi Daredevils   Wickets      9.0
946           bat         N   Royal Challengers Bangalore  Wickets      5.0
945           bat         N       Kolkata Knight Riders    Wickets      5.0
..            ...       ...                          ...       ...      ...
4             bat         N                 Punjab Kings   Wickets      5.0
3           field         N                Gujarat Titans  Wickets      7.0
2           field         N   Royal Challengers Bangalore     Runs     14.0
1           field         N             Rajasthan Royals   Wickets      7.0
0             bat         N                Gujarat Titans  Wickets      7.0


     method Player_of_Match                              Team1Players  \
949     NaN      BB McCullum  ['R Dravid', 'W Jaffer', 'V Kohli', 'JH Kallis…
948     NaN       MEK Hussey  ['K Goel', 'JR Hopes', 'KC Sangakkara', 'Yuvra…
947     NaN       MF Maharoof  ['G Gambhir', 'V Sehwag', 'S Dhawan', 'MK Tiwa…
946     NaN       MV Boucher  ['L Ronchi', 'ST Jayasuriya', 'DJ Thornely', '…
945     NaN        DJ Hussey  ['WP Saha', 'BB McCullum', 'RT Ponting', 'SC G…
..      …            …                                               …
4       NaN     Harpreet Brar  ['PK Garg', 'Abhishek Sharma', 'RA Tripathi', …
3       NaN        DA Miller  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
2       NaN       RM Patidar  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
1       NaN       JC Buttler  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
0       NaN        HH Pandya  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …


                                  Team2Players        Umpire1  \
949  ['SC Ganguly', 'BB McCullum', 'RT Ponting', 'D…      Asad Rauf
948  ['PA Patel', 'ML Hayden', 'MEK Hussey', 'MS Dh…      MR Benson
947  ['T Kohli', 'YK Pathan', 'SR Watson', 'M Kaif'…      Aleem Dar
946  ['S Chanderpaul', 'R Dravid', 'LRPL Taylor', '…       SJ Davis
945  ['AC Gilchrist', 'Y Venugopal Rao', 'VVS Laxma…      BF Bowden
..                                             …              …
4    ['JM Bairstow', 'S Dhawan', 'M Shahrukh Khan',…   AK Chaudhary
3    ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…   BNJ Oxenford
2    ['Q de Kock', 'KL Rahul', 'M Vohra', 'DJ Hooda…  J Madanagopal
1    ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …    CB Gaffaney
0    ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…    CB Gaffaney


           Umpire2
949     RE Koertzen
948      SL Shastri
```

```
947  GA Pratapkumar
946        DJ Harper
945       K Hariharan
..              …
4     NA Patwardhan
3          VK Sharma
2            MA Gough
1          Nitin Menon
0          Nitin Menon

[950 rows x 20 columns]
```

[27]:
```python
students = pd.DataFrame(
    {
        'name':['nitish','ankit','rupesh',np.nan,'mrityunjay',np.
  ↪nan,'rishabh',np.nan,'aditya',np.nan],
        'college':['bit','iit','vit',np.nan,np.nan,'vlsi','ssit',np.
  ↪nan,'git'],
        'branch':['eee','it','cse',np.nan,'me','ce','civ','cse','bio',np.nan],
        'cgpa':[6.66,8.25,6.41,np.nan,5.6,9.0,7.4,10,7.4,np.nan],
        'package':[4,5,6,np.nan,6,7,8,9,np.nan,np.nan]

    }
)
students
```

[27]:

	name	college	branch	cgpa	package
0	nitish	bit	eee	6.66	4.0
1	ankit	iit	it	8.25	5.0
2	rupesh	vit	cse	6.41	6.0
3	NaN	NaN	NaN	NaN	NaN
4	mrityunjay	NaN	me	5.60	6.0
5	NaN	vlsi	ce	9.00	7.0
6	rishabh	ssit	civ	7.40	8.0
7	NaN	NaN	cse	10.00	9.0
8	aditya	NaN	bio	7.40	NaN
9	NaN	git	NaN	NaN	NaN

[28]:
```python
students.sort_values('name')
```

[28]:

	name	college	branch	cgpa	package
8	aditya	NaN	bio	7.40	NaN
1	ankit	iit	it	8.25	5.0
4	mrityunjay	NaN	me	5.60	6.0
0	nitish	bit	eee	6.66	4.0
6	rishabh	ssit	civ	7.40	8.0
2	rupesh	vit	cse	6.41	6.0

```
3        NaN    NaN    NaN    NaN      NaN
5        NaN   vlsi     ce   9.00      7.0
7        NaN    NaN    cse  10.00      9.0
9        NaN    git    NaN    NaN      NaN
```

[29]: `students.sort_values('name',na_position='first')`

[29]:
```
        name college branch   cgpa  package
3        NaN    NaN    NaN    NaN      NaN
5        NaN   vlsi     ce   9.00      7.0
7        NaN    NaN    cse  10.00      9.0
9        NaN    git    NaN    NaN      NaN
8     aditya    NaN    bio   7.40      NaN
1      ankit    iit     it   8.25      5.0
4  mrityunjay    NaN     me   5.60      6.0
0     nitish    bit    eee   6.66      4.0
6    rishabh   ssit    civ   7.40      8.0
2     rupesh    vit    cse   6.41      6.0
```

[30]: `students.sort_values('name',na_position='first',inplace=True)`

[31]:
```python
students = pd.DataFrame(
    {
        'name':['nitish','ankit','rupesh',np.nan,'mrityunjay',np.
 nan,'rishabh',np.nan,'aditya',np.nan],
        'college':['bit','iit','vit',np.nan,np.nan,'vlsi','ssit',np.nan,np.
 nan,'git'],
        'branch':['eee','it','cse',np.nan,'me','ce','civ','cse','bio',np.nan],
        'cgpa':[6.66,8.25,6.41,np.nan,5.6,9.0,7.4,10,7.4,np.nan],
        'package':[4,5,6,np.nan,6,7,8,9,np.nan,np.nan]

    }
)
students
```

[31]:
```
        name college branch   cgpa  package
0     nitish    bit    eee   6.66      4.0
1      ankit    iit     it   8.25      5.0
2     rupesh    vit    cse   6.41      6.0
3        NaN    NaN    NaN    NaN      NaN
4  mrityunjay    NaN     me   5.60      6.0
5        NaN   vlsi     ce   9.00      7.0
6    rishabh   ssit    civ   7.40      8.0
7        NaN    NaN    cse  10.00      9.0
8     aditya    NaN    bio   7.40      NaN
9        NaN    git    NaN    NaN      NaN
```

```
[32]: ipl.head(2)
```

```
[32]:        ID      City        Date Season  MatchNumber  \
      0  1312200  Ahmedabad  2022-05-29   2022        Final
      1  1312199  Ahmedabad  2022-05-27   2022  Qualifier 2

                             Team1            Team2  \
      0          Rajasthan Royals     Gujarat Titans
      1  Royal Challengers Bangalore  Rajasthan Royals

                                 Venue        TossWinner TossDecision SuperOver  \
      0  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals          bat         N
      1  Narendra Modi Stadium, Ahmedabad  Rajasthan Royals        field         N

            WinningTeam     WonBy  Margin method Player_of_Match  \
      0    Gujarat Titans  Wickets     7.0    NaN       HH Pandya
      1  Rajasthan Royals  Wickets     7.0    NaN       JC Buttler

                                         Team1Players  \
      0  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
      1  ['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …

                                         Team2Players       Umpire1       Umpire2
      0  ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…  CB Gaffaney  Nitin Menon
      1  ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …  CB Gaffaney  Nitin Menon
```

```
[33]: #sorting on two columns
```

```
[34]: ipl.sort_values(['Season','Date'])
```

```
[34]:           ID       City        Date   Season  MatchNumber  \
      949  335982  Bangalore  2008-04-18  2007/08            1
      947  335984      Delhi  2008-04-19  2007/08            3
      948  335983  Chandigarh  2008-04-19  2007/08           2
      945  335986    Kolkata  2008-04-20  2007/08            4
      946  335985     Mumbai  2008-04-20  2007/08            5
      ..     …          …          …         …              …
      4   1304116     Mumbai  2022-05-22     2022           70
      3   1312197    Kolkata  2022-05-24     2022  Qualifier 1
      2   1312198    Kolkata  2022-05-25     2022   Eliminator
      1   1312199  Ahmedabad  2022-05-27     2022  Qualifier 2
      0   1312200  Ahmedabad  2022-05-29     2022        Final

                             Team1                     Team2  \
      949  Royal Challengers Bangalore      Kolkata Knight Riders
      947              Delhi Daredevils          Rajasthan Royals
      948              Kings XI Punjab       Chennai Super Kings
```

945	Kolkata Knight Riders	Deccan Chargers
946	Mumbai Indians	Royal Challengers Bangalore
..	…	…
4	Sunrisers Hyderabad	Punjab Kings
3	Rajasthan Royals	Gujarat Titans
2	Royal Challengers Bangalore	Lucknow Super Giants
1	Royal Challengers Bangalore	Rajasthan Royals
0	Rajasthan Royals	Gujarat Titans

	Venue	TossWinner \
949	M Chinnaswamy Stadium	Royal Challengers Bangalore
947	Feroz Shah Kotla	Rajasthan Royals
948	Punjab Cricket Association Stadium, Mohali	Chennai Super Kings
945	Eden Gardens	Deccan Chargers
946	Wankhede Stadium	Mumbai Indians
..	…	…
4	Wankhede Stadium, Mumbai	Sunrisers Hyderabad
3	Eden Gardens, Kolkata	Gujarat Titans
2	Eden Gardens, Kolkata	Lucknow Super Giants
1	Narendra Modi Stadium, Ahmedabad	Rajasthan Royals
0	Narendra Modi Stadium, Ahmedabad	Rajasthan Royals

	TossDecision	SuperOver	WinningTeam	WonBy	Margin \
949	field	N	Kolkata Knight Riders	Runs	140.0
947	bat	N	Delhi Daredevils	Wickets	9.0
948	bat	N	Chennai Super Kings	Runs	33.0
945	bat	N	Kolkata Knight Riders	Wickets	5.0
946	bat	N	Royal Challengers Bangalore	Wickets	5.0
..	…	…	…	…	…
4	bat	N	Punjab Kings	Wickets	5.0
3	field	N	Gujarat Titans	Wickets	7.0
2	field	N	Royal Challengers Bangalore	Runs	14.0
1	field	N	Rajasthan Royals	Wickets	7.0
0	bat	N	Gujarat Titans	Wickets	7.0

	method	Player_of_Match	Team1Players \
949	NaN	BB McCullum	['R Dravid', 'W Jaffer', 'V Kohli', 'JH Kallis…
947	NaN	MF Maharoof	['G Gambhir', 'V Sehwag', 'S Dhawan', 'MK Tiwa…
948	NaN	MEK Hussey	['K Goel', 'JR Hopes', 'KC Sangakkara', 'Yuvra…
945	NaN	DJ Hussey	['WP Saha', 'BB McCullum', 'RT Ponting', 'SC G…
946	NaN	MV Boucher	['L Ronchi', 'ST Jayasuriya', 'DJ Thornely', '…
..	…	…	…
4	NaN	Harpreet Brar	['PK Garg', 'Abhishek Sharma', 'RA Tripathi', …
3	NaN	DA Miller	['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …
2	NaN	RM Patidar	['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
1	NaN	JC Buttler	['V Kohli', 'F du Plessis', 'RM Patidar', 'GJ …
0	NaN	HH Pandya	['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …

```
                                      Team2Players        Umpire1  \
949    ['SC Ganguly', 'BB McCullum', 'RT Ponting', 'D…         Asad Rauf
947    ['T Kohli', 'YK Pathan', 'SR Watson', 'M Kaif'…         Aleem Dar
948    ['PA Patel', 'ML Hayden', 'MEK Hussey', 'MS Dh…         MR Benson
945    ['AC Gilchrist', 'Y Venugopal Rao', 'VVS Laxma…         BF Bowden
946    ['S Chanderpaul', 'R Dravid', 'LRPL Taylor', '…          SJ Davis
..                                                 …                  …
4      ['JM Bairstow', 'S Dhawan', 'M Shahrukh Khan',…     AK Chaudhary
3      ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…     BNJ Oxenford
2      ['Q de Kock', 'KL Rahul', 'M Vohra', 'DJ Hooda…   J Madanagopal
1      ['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D …       CB Gaffaney
0      ['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pan…       CB Gaffaney


             Umpire2
949       RE Koertzen
947   GA Pratapkumar
948        SL Shastri
945       K Hariharan
946         DJ Harper
..               …
4       NA Patwardhan
3           VK Sharma
2            MA Gough
1         Nitin Menon
0         Nitin Menon

[950 rows x 20 columns]
```

```
[35]: batsman = pd.read_csv('batsman_runs_ipl.csv')
      batsman.head(10)
```

```
[35]:           batter  batsman_run
      0  A Ashish Reddy          280
      1         A Badoni          161
      2       A Chandila            4
      3         A Chopra           53
      4      A Choudhary           25
      5      A Dananjaya            4
      6       A Flintoff           62
      7         A Kumble           35
      8        A Manohar          108
      9          A Mishra          362
```

```
[36]: # rank(Series) - find the rank of the batsman on the basis of runs or assign
      ↪the rank to the batsman according to the runs
```

```
[37]: # batsman[on_what_column_basis].rank()
```

```
[38]: batsman['batsman_run'].rank(ascending=False)
```

```
[38]: 0        166.5
      1        226.0
      2        535.0
      3        329.0
      4        402.5
               …
      600      594.0
      601      343.0
      602      547.5
      603       27.0
      604      256.0
      Name: batsman_run, Length: 605, dtype: float64
```

```
[39]: batsman['batting_rank'] = batsman['batsman_run'].rank(ascending=False)
```

```
[40]: batsman.head()
```

```
[40]:            batter  batsman_run  batting_rank
      0  A Ashish Reddy          280         166.5
      1        A Badoni          161         226.0
      2      A Chandila            4         535.0
      3        A Chopra           53         329.0
      4     A Choudhary           25         402.5
```

```
[41]: batsman.sort_values('batting_rank')
```

```
[41]:            batter  batsman_run  batting_rank
      569        V Kohli         6634           1.0
      462       S Dhawan         6244           2.0
      130       DA Warner        5883           3.0
      430       RG Sharma        5881           4.0
      493        SK Raina        5536           5.0
      ..             …            …             …
      512     SS Cottrell           0         594.0
      466       S Kaushik           0         594.0
      203       IC Pandey           0         594.0
      467         S Ladda           0         594.0
      468    S Lamichhane           0         594.0

      [605 rows x 3 columns]
```

```
[42]: # sort_index(series& dataframe)
```

```
marks = {
    'english':60,
    'Hindi':93,
    'Science':89,
    'Maths':89
}
ms = pd.Series(marks)
ms
```

```
[43]: english    60
      Hindi      93
      Science    89
      Maths      89
      dtype: int64
```

```
[44]: ms.sort_index()
```

```
[44]: Hindi      93
      Maths      89
      Science    89
      english    60
      dtype: int64
```

```
[45]: # set_index(dataframe) -> inplace
      batsman
```

```
[45]:            batter  batsman_run  batting_rank
      0    A Ashish Reddy          280         166.5
      1          A Badoni          161         226.0
      2        A Chandila            4         535.0
      3          A Chopra           53         329.0
      4        A Choudhary           25         402.5
      ..              …            …             …
      600       Yash Dayal            0         594.0
      601    Yashpal Singh           47         343.0
      602      Younis Khan            3         547.5
      603     Yuvraj Singh         2754          27.0
      604           Z Khan          117         256.0

      [605 rows x 3 columns]
```

```
[46]: batsman.set_index('batter')
```

```
[46]:                  batsman_run  batting_rank
      batter
      A Ashish Reddy          280         166.5
      A Badoni                161         226.0
```

```
A Chandila            4         535.0
A Chopra             53         329.0
A Choudhary          25         402.5
...                 ...          ...
Yash Dayal            0         594.0
Yashpal Singh        47         343.0
Younis Khan           3         547.5
Yuvraj Singh       2754          27.0
Z Khan              117         256.0

[605 rows x 2 columns]
```

[47]: `batsman.set_index('batter',inplace=True)`

[48]: `batsman.head()`

[48]:
```
                  batsman_run  batting_rank
batter
A Ashish Reddy            280         166.5
A Badoni                 161         226.0
A Chandila                 4         535.0
A Chopra                  53         329.0
A Choudhary               25         402.5
```

[49]: `# reset_index(series & dataframe)`

[50]: `batsman.reset_index()`

[50]:
```
            batter  batsman_run  batting_rank
0    A Ashish Reddy          280         166.5
1          A Badoni          161         226.0
2        A Chandila            4         535.0
3          A Chopra           53         329.0
4       A Choudhary           25         402.5
..              ...          ...           ...
600      Yash Dayal            0         594.0
601   Yashpal Singh           47         343.0
602     Younis Khan            3         547.5
603    Yuvraj Singh         2754          27.0
604          Z Khan          117         256.0

[605 rows x 3 columns]
```

[51]: `# how to replace the index column with another column without loose any column`

[52]: `batsman.reset_index().set_index('batting_rank')`

```
[52]:                         batter  batsman_run
      batting_rank
      166.5        A Ashish Reddy          280
      226.0              A Badoni          161
      535.0            A Chandila            4
      329.0              A Chopra           53
      402.5           A Choudhary           25
      ...                     ...          ...
      594.0            Yash Dayal            0
      343.0        Yashpal Singh           47
      547.5           Younis Khan            3
      27.0          Yuvraj Singh         2754
      256.0                Z Khan          117

      [605 rows x 2 columns]
```

```
[53]:  # apply rest_index to series - applying rest_index to the series it will become
       the dataframe
```

```
[54]:  ms
```

```
[54]:  english    60
       Hindi      93
       Science    89
       Maths      89
       dtype: int64
```

```
[55]:  ms.reset_index()
```

```
[55]:      index   0
       0  english  60
       1    Hindi  93
       2  Science  89
       3    Maths  89
```

```
[56]:  #rename(dataframe) -> renamesthe column & index also
```

```
[57]:  batsman
```

```
[57]:                   batsman_run  batting_rank
       batter
       A Ashish Reddy          280         166.5
       A Badoni                161         226.0
       A Chandila                4         535.0
       A Chopra                 53         329.0
       A Choudhary              25         402.5
       ...                     ...           ...
```

```
Yash Dayal              0        594.0
Yashpal Singh          47        343.0
Younis Khan             3        547.5
Yuvraj Singh         2754         27.0
Z Khan                117        256.0

[605 rows x 2 columns]
```

[58]: `batsman.rename(columns={'batsman_run':'run'},inplace=True)`

[59]:
```
# unique(series) - it ives unique values from series or say column
temp = pd.Series([1,2,3,4,1,2,3,4,5,6,7,5,4,np.nan,np.nan])
```

[60]: `temp.unique()`

[60]: `array([ 1.,  2.,  3.,  4.,  5.,  6.,  7., nan])`

[ ]:

[61]: `ipl['Season'].unique()`

[61]:
```
array(['2022', '2021', '2020/21', '2019', '2018', '2017', '2016', '2015',
       '2014', '2013', '2012', '2011', '2009/10', '2009', '2007/08'],
      dtype=object)
```

[62]: `len(ipl['Season'].unique())`

[62]: 15

[63]: `# isnull(dataframe,series)`

[64]: `students`

[64]:
```
          name college branch   cgpa  package
0       nitish     bit    eee   6.66      4.0
1        ankit     iit     it   8.25      5.0
2       rupesh     vit    cse   6.41      6.0
3          NaN     NaN    NaN    NaN      NaN
4   mrityunjay     NaN     me   5.60      6.0
5          NaN    vlsi     ce   9.00      7.0
6      rishabh    ssit    civ   7.40      8.0
7          NaN     NaN    cse  10.00      9.0
8       aditya     NaN    bio   7.40      NaN
9          NaN     git    NaN    NaN      NaN
```

[65]: `students.isnull().sum()`

```
[65]: name        4
      college     4
      branch      2
      cgpa        2
      package     3
      dtype: int64
```

```
[66]: # hasnan(series & dataframe) - it will tell us isthere any missing value in the
      ↪column or the dataframe
```

```
[68]: students['name'].hasnans
```

```
[68]: True
```

```
[70]: # dropna( series & dataframe) - it remove the nan values
```

```
[71]: students['name'].dropna()
```

```
[71]: 0         nitish
      1          ankit
      2         rupesh
      4     mrityunjay
      6        rishabh
      8         aditya
      Name: name, dtype: object
```

```
[74]: students.dropna(how = 'any') #all is a parameter value
```

```
[74]:       name college branch  cgpa  package
      0   nitish     bit    eee  6.66      4.0
      1    ankit     iit     it  8.25      5.0
      2   rupesh     vit    cse  6.41      6.0
      6  rishabh    ssit    civ  7.40      8.0
```

```
[75]: students
```

```
[75]:         name college branch   cgpa  package
      0      nitish     bit    eee   6.66      4.0
      1       ankit     iit     it   8.25      5.0
      2      rupesh     vit    cse   6.41      6.0
      3         NaN     NaN    NaN    NaN      NaN
      4   mrityunjay     NaN     me   5.60      6.0
      5         NaN    vlsi     ce   9.00      7.0
      6     rishabh    ssit    civ   7.40      8.0
      7         NaN     NaN    cse  10.00      9.0
      8      aditya     NaN    bio   7.40      NaN
      9         NaN     git    NaN    NaN      NaN
```

```
[77]: students.dropna(subset=['name']) #remove that row where value of name is missing
```

```
[77]:          name college branch  cgpa  package
      0       nitish     bit    eee  6.66      4.0
      1        ankit     iit     it  8.25      5.0
      2       rupesh     vit    cse  6.41      6.0
      4   mrityunjay     NaN     me  5.60      6.0
      6      rishabh    ssit    civ  7.40      8.0
      8       aditya     NaN    bio  7.40      NaN
```

```
[78]: students.dropna(subset=['name','college']) #remove that row where value of name
      ↪ or college is missing
```

```
[78]:       name college branch  cgpa  package
      0    nitish     bit    eee  6.66      4.0
      1     ankit     iit     it  8.25      5.0
      2    rupesh     vit    cse  6.41      6.0
      6   rishabh    ssit    civ  7.40      8.0
```

```
[79]: #fillna(series + dataframe) - it fills the data in missing place
```

```
[80]: students
```

```
[80]:          name college branch   cgpa  package
      0       nitish     bit    eee   6.66      4.0
      1        ankit     iit     it   8.25      5.0
      2       rupesh     vit    cse   6.41      6.0
      3          NaN     NaN    NaN    NaN      NaN
      4   mrityunjay     NaN     me   5.60      6.0
      5          NaN    vlsi     ce   9.00      7.0
      6      rishabh    ssit    civ   7.40      8.0
      7          NaN     NaN    cse  10.00      9.0
      8       aditya     NaN    bio   7.40      NaN
      9          NaN     git    NaN    NaN      NaN
```

```
[81]: students['name']
```

```
[81]: 0        nitish
      1         ankit
      2        rupesh
      3           NaN
      4    mrityunjay
      5           NaN
      6       rishabh
      7           NaN
      8        aditya
      9           NaN
```

```
Name: name, dtype: object
```

[82]: `students['name'].fillna('unknown')`

[82]:
```
0          nitish
1           ankit
2          rupesh
3         unknown
4      mrityunjay
5         unknown
6         rishabh
7         unknown
8          aditya
9         unknown
Name: name, dtype: object
```

[84]: `students.fillna(0)# not a good idea  to apply on data frame`

[84]:
```
         name college branch   cgpa  package
0      nitish     bit    eee   6.66      4.0
1       ankit     iit     it   8.25      5.0
2      rupesh     vit    cse   6.41      6.0
3           0       0      0   0.00      0.0
4  mrityunjay       0     me   5.60      6.0
5           0    vlsi     ce   9.00      7.0
6     rishabh    ssit    civ   7.40      8.0
7           0       0    cse  10.00      9.0
8      aditya       0    bio   7.40      0.0
9           0     git      0   0.00      0.0
```

[89]: `# drop_duplicates(series + dataframe) - help to delete the duplicated row`

[90]: `marks`

[90]:
```
    iq  marks  package
0  100     80       10
1   90     70        7
2  120    100       14
3   80     70       14
4   80     70       14
```

[91]:
```
marks = pd.DataFrame([
    [100,80,10],
    [90,70,7],
    [120,100,14],
    [80,70,14],
    [80,70,14]
```

```
],columns=['iq','marks','package'])
```

[92]:
```
marks
```

[92]:
```
    iq  marks  package
0  100     80       10
1   90     70        7
2  120    100       14
3   80     70       14
4   80     70       14
```

[94]:
```
marks.duplicated().sum()
```

[94]: 1

[96]:
```
marks.drop_duplicates()
```

[96]:
```
    iq  marks  package
0  100     80       10
1   90     70        7
2  120    100       14
3   80     70       14
```

[97]:
```
# drop(series & dataframe) -it delete rows as well as column
```

[98]:
```
temp = pd.Series([1,2,3,4,5,3,4,5])
temp
```

[98]:
```
0    1
1    2
2    3
3    4
4    5
5    3
6    4
7    5
dtype: int64
```

[99]:
```
temp.drop(index=[4,7])
```

[99]:
```
0    1
1    2
2    3
3    4
5    3
6    4
dtype: int64
```

```
[100]: students
```

```
[100]:          name college branch    cgpa  package
       0      nitish     bit    eee    6.66      4.0
       1       ankit     iit     it    8.25      5.0
       2      rupesh     vit    cse    6.41      6.0
       3         NaN     NaN    NaN     NaN      NaN
       4  mrityunjay     NaN     me    5.60      6.0
       5         NaN    vlsi     ce    9.00      7.0
       6     rishabh    ssit    civ    7.40      8.0
       7         NaN     NaN    cse   10.00      9.0
       8      aditya     NaN    bio    7.40      NaN
       9         NaN     git    NaN     NaN      NaN
```

```
[101]: # drop cgpa and branch column
```

```
[102]: students.drop(columns=['branch','cgpa'])
```

```
[102]:          name college  package
       0      nitish     bit      4.0
       1       ankit     iit      5.0
       2      rupesh     vit      6.0
       3         NaN     NaN      NaN
       4  mrityunjay     NaN      6.0
       5         NaN    vlsi      7.0
       6     rishabh    ssit      8.0
       7         NaN     NaN      9.0
       8      aditya     NaN      NaN
       9         NaN     git      NaN
```

```
[104]: # drop() - delete rows also
```

```
[105]: students.drop(index=[0,8])
```

```
[105]:          name college branch    cgpa  package
       1       ankit     iit     it    8.25      5.0
       2      rupesh     vit    cse    6.41      6.0
       3         NaN     NaN    NaN     NaN      NaN
       4  mrityunjay     NaN     me    5.60      6.0
       5         NaN    vlsi     ce    9.00      7.0
       6     rishabh    ssit    civ    7.40      8.0
       7         NaN     NaN    cse   10.00      9.0
       9         NaN     git    NaN     NaN      NaN
```

```
[106]: # apply(series + dataframe)
```

```
[108]: pdf = pd.DataFrame(
       {
           '1p':[(1,2),(3,4),(5,6)],
           '2p':[(11,22),(33,44),(33,44)]
       })
```

```
[109]: pdf
```

```
[109]:        1p        2p
       0  (1, 2)  (11, 22)
       1  (3, 4)  (33, 44)
       2  (5, 6)  (33, 44)
```

```
[110]: def sigmoid(value):
           return 1/1+np.exp(-value)
```

```
[112]: temp.apply(sigmoid) # it is  series
```

```
[112]: 0    1.367879
       1    1.135335
       2    1.049787
       3    1.018316
       4    1.006738
       5    1.049787
       6    1.018316
       7    1.006738
       dtype: float64
```

```
[ ]:
```