

```
import pandas as pd
```

```
data=pd.read_csv("matches.csv")
```

```
data.head(10)
```

	id	Season	city	date	team1 \
0	1	IPL-2017	Hyderabad	05-04-2017	Sunrisers Hyderabad
1	2	IPL-2017	Pune	06-04-2017	Mumbai Indians
2	3	IPL-2017	Rajkot	07-04-2017	Gujarat Lions
3	4	IPL-2017	Indore	08-04-2017	Rising Pune Supergiant
4	5	IPL-2017	Bangalore	08-04-2017	Royal Challengers Bangalore
5	6	IPL-2017	Hyderabad	09-04-2017	Gujarat Lions
6	7	IPL-2017	Mumbai	09-04-2017	Kolkata Knight Riders
7	8	IPL-2017	Indore	10-04-2017	Royal Challengers Bangalore
8	9	IPL-2017	Pune	11-04-2017	Delhi Daredevils
9	10	IPL-2017	Mumbai	12-04-2017	Sunrisers Hyderabad

	team2	toss_winner
toss_decision \		
0	Royal Challengers Bangalore	Royal Challengers Bangalore
field		
1	Rising Pune Supergiant	Rising Pune Supergiant
field		
2	Kolkata Knight Riders	Kolkata Knight Riders
field		
3	Kings XI Punjab	Kings XI Punjab
field		
4	Delhi Daredevils	Royal Challengers Bangalore
bat		
5	Sunrisers Hyderabad	Sunrisers Hyderabad
field		
6	Mumbai Indians	Mumbai Indians
field		
7	Kings XI Punjab	Royal Challengers Bangalore
bat		
8	Rising Pune Supergiant	Rising Pune Supergiant
field		
9	Mumbai Indians	Mumbai Indians
field		

	result	dl_applied	winner	win_by_runs \
0	normal	0	Sunrisers Hyderabad	35
1	normal	0	Rising Pune Supergiant	0
2	normal	0	Kolkata Knight Riders	0
3	normal	0	Kings XI Punjab	0
4	normal	0	Royal Challengers Bangalore	15
5	normal	0	Sunrisers Hyderabad	0
6	normal	0	Mumbai Indians	0
7	normal	0	Kings XI Punjab	0

8	normal	0	Delhi Daredevils	97
9	normal	0	Mumbai Indians	0

win_by_wickets	player_of_match	venue
0	Yuvraj Singh	Rajiv Gandhi International Stadium, Uppal
7	SPD Smith	Maharashtra Cricket Association Stadium
10	CA Lynn	Saurashtra Cricket Association Stadium
6	GJ Maxwell	Holkar Cricket Stadium
0	KM Jadhav	M Chinnaswamy Stadium
9	Rashid Khan	Rajiv Gandhi International Stadium, Uppal
4	N Rana	Wankhede Stadium
8	AR Patel	Holkar Cricket Stadium
0	SV Samson	Maharashtra Cricket Association Stadium
4	JJ Bumrah	Wankhede Stadium

umpire1	umpire2	umpire3
AY Dandekar	NJ Llong	NaN
A Nand Kishore	S Ravi	NaN
Nitin Menon	CK Nandan	NaN
AK Chaudhary	C Shamshuddin	NaN
NaN	NaN	NaN
A Deshmukh	NJ Llong	NaN
Nitin Menon	CK Nandan	NaN
AK Chaudhary	C Shamshuddin	NaN
AY Dandekar	S Ravi	NaN
Nitin Menon	CK Nandan	NaN

data.tail(6)

id	Season	city	date	team1	
750	11346	IPL-2019	Mohali	05-05-2019	Chennai Super Kings
751	11347	IPL-2019	Mumbai	05-05-2019	Kolkata Knight Riders
752	11412	IPL-2019	Chennai	07-05-2019	Chennai Super Kings
753	11413	IPL-2019	Visakhapatnam	08-05-2019	Sunrisers Hyderabad

754	11414	IPL-2019	Visakhapatnam	10-05-2019	Delhi Capitals
755	11415	IPL-2019	Hyderabad	12-05-2019	Mumbai Indians

	team2	toss_winner	toss_decision	result	\
750	Kings XI Punjab	Kings XI Punjab	field	normal	
751	Mumbai Indians	Mumbai Indians	field	normal	
752	Mumbai Indians	Chennai Super Kings	bat	normal	
753	Delhi Capitals	Delhi Capitals	field	normal	
754	Chennai Super Kings	Chennai Super Kings	field	normal	
755	Chennai Super Kings	Mumbai Indians	bat	normal	

	dl_applied	winner	win_by_runs	win_by_wickets	\
750	0	Kings XI Punjab	0	6	
751	0	Mumbai Indians	0	9	
752	0	Mumbai Indians	0	6	
753	0	Delhi Capitals	0	2	
754	0	Chennai Super Kings	0	6	
755	0	Mumbai Indians	1	0	

	player_of_match	venue	\
750	KL Rahul	IS Bindra Stadium	
751	HH Pandya	Wankhede Stadium	
752	AS Yadav	M. A. Chidambaram Stadium	
753	RR Pant	ACA-VDCA Stadium	
754	F du Plessis	ACA-VDCA Stadium	
755	JJ Bumrah	Rajiv Gandhi Intl. Cricket Stadium	

	umpire1	umpire2	umpire3
750	KN Ananthapadmanabhan	C Shamshuddin	Bruce Oxenford
751	Nanda Kishore	O Nandan	S Ravi
752	Nigel Llong	Nitin Menon	Ian Gould
753	NaN	NaN	NaN
754	Sundaram Ravi	Bruce Oxenford	Chettithody Shamshuddin
755	Nitin Menon	Ian Gould	Nigel Llong

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 756 entries, 0 to 755
```

```
Data columns (total 18 columns):
```

#	Column	Non-Null Count	Dtype
---	-----	-----	-----
0	id	756 non-null	int64
1	Season	756 non-null	object
2	city	749 non-null	object
3	date	756 non-null	object
4	team1	756 non-null	object
5	team2	756 non-null	object

6	toss_winner	756	non-null	object
7	toss_decision	756	non-null	object
8	result	756	non-null	object
9	dl_applied	756	non-null	int64
10	winner	752	non-null	object
11	win_by_runs	756	non-null	int64
12	win_by_wickets	756	non-null	int64
13	player_of_match	752	non-null	object
14	venue	756	non-null	object
15	umpire1	754	non-null	object
16	umpire2	754	non-null	object
17	umpire3	119	non-null	object

dtypes: int64(4), object(14)

memory usage: 106.4+ KB

data.shape

(756, 18)

data.isnull().sum()

id	0
Season	0
city	7
date	0
team1	0
team2	0
toss_winner	0
toss_decision	0
result	0
dl_applied	0
winner	4
win_by_runs	0
win_by_wickets	0
player_of_match	4
venue	0
umpire1	2
umpire2	2
umpire3	637

dtype: int64

pd.isnull(data['city']).sum()

7

data.describe()

	id	dl_applied	win_by_runs	win_by_wickets
count	756.000000	756.000000	756.000000	756.000000
mean	1792.178571	0.025132	13.283069	3.350529
std	3464.478148	0.156630	23.471144	3.387963

min	1.000000	0.000000	0.000000	0.000000
25%	189.750000	0.000000	0.000000	0.000000
50%	378.500000	0.000000	0.000000	4.000000
75%	567.250000	0.000000	19.000000	6.000000
max	11415.000000	1.000000	146.000000	10.000000

```
data.min()
```

```
C:\Users\admin\AppData\Local\Temp\ipykernel_2304\927168777.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions
(with 'numeric_only=None') is deprecated; in a future version this
will raise TypeError. Select only valid columns before calling the
reduction.
```

```
data.min()
```

```
id          1
Season      IPL-2008
date        01-04-2010
team1       Chennai Super Kings
team2       Chennai Super Kings
toss_winner  Chennai Super Kings
toss_decision bat
result      no result
dl_applied  0
win_by_runs 0
win_by_wickets 0
venue       ACA-VDCA Stadium
dtype: object
```

```
data.max()
```

```
C:\Users\admin\AppData\Local\Temp\ipykernel_2304\2904433368.py:1:
FutureWarning: Dropping of nuisance columns in DataFrame reductions
(with 'numeric_only=None') is deprecated; in a future version this
will raise TypeError. Select only valid columns before calling the
reduction.
```

```
data.max()
```

```
id          11415
Season      IPL-2019
date        31-05-2008
team1       Sunrisers Hyderabad
team2       Sunrisers Hyderabad
toss_winner  Sunrisers Hyderabad
toss_decision field
result      tie
dl_applied  1
win_by_runs 146
win_by_wickets 10
venue       Wankhede Stadium
dtype: object
```

```
data.corr()
```

```
id      dl_applied  win_by_runs  win_by_wickets
id      1.000000    -0.011658    -0.039403     -0.012239
dl_applied -0.011658    1.000000    -0.016349     -0.011631
win_by_runs -0.039403   -0.016349    1.000000     -0.560420
win_by_wickets -0.012239  -0.011631   -0.560420     1.000000
```

```
data.value_counts()
```

```
id      Season  city      date      team1
team2      toss_winner      toss_decision  result
dl_applied  winner      win_by_runs  win_by_wickets
player_of_match  venue      umpire1
umpire2      umpire3
7894  IPL-2018  Mumbai      07-04-2018  Mumbai Indians
Chennai Super Kings      Chennai Super Kings      field      normal  0
Chennai Super Kings      0      1      DJ Bravo
Wankhede Stadium      Chris Gaffaney      A Nanda
Kishore Anil Chaudhary      1
11151  IPL-2019  Mumbai      03-04-2019  Mumbai Indians
Chennai Super Kings      Chennai Super Kings      field      normal  0
Mumbai Indians      37      0      HH Pandya
Wankhede Stadium      Bruce Oxenford      Rod
Tucker      Yeshwant Barde      1
11318  IPL-2019  Mumbai      13-04-2019  Mumbai Indians
Rajasthan Royals      Rajasthan Royals      field      normal  0
Rajasthan Royals      0      4      JC Buttler
Wankhede Stadium      Nitin Menon      Nanda
Kishore Marais Erasmus      1
11317  IPL-2019  Kolkata      12-04-2019  Kolkata Knight Riders
Delhi Capitals      Delhi Capitals      field      normal  0
Delhi Capitals      0      7      S Dhawan
Eden Gardens      Yeshwant Barde      0 Nandan
Rod Tucker      1
11316  IPL-2019  Jaipur      11-04-2019  Rajasthan Royals
Chennai Super Kings      Chennai Super Kings      field      normal  0
Chennai Super Kings      0      4      MS Dhoni
Sawai Mansingh Stadium      Bruce Oxenford      Ulhas
Gandhe      Chris Gaffaney      1
..
7929  IPL-2018  Hyderabad      05-05-2018  Delhi Daredevils
Sunrisers Hyderabad      Delhi Daredevils      bat      normal  0
Sunrisers Hyderabad      0      7      Rashid Khan
Rajiv Gandhi International Stadium, Uppal      Bruce Oxenford      0 Nandan
Virender Kumar Sharma      1
7928  IPL-2018  Pune      05-05-2018  Royal Challengers Bangalore
Chennai Super Kings      Chennai Super Kings      field      normal  0
Chennai Super Kings      0      6      RA Jadeja
```

```

Maharashtra Cricket Association Stadium      Nitin Menon      Yeshwant
Barde      Marais Erasmus      1
7927      IPL-2018      Indore      04-05-2018      Kings XI Punjab
Mumbai Indians      Mumbai Indians      field      normal      0
Mumbai Indians      0      6      AS Yadav
Holkar Cricket Stadium      S Ravi      Anil
Dandekar      C Shamshuddin      1
7926      IPL-2018      Kolkata      03-05-2018      Chennai Super Kings
Kolkata Knight Riders      Kolkata Knight Riders      field      normal      0
Kolkata Knight Riders      0      6      SP Narine
Eden Gardens      Kumar Dharmasena      A.D
Deshmukh      Anil Chaudhary      1
11415      IPL-2019      Hyderabad      12-05-2019      Mumbai Indians
Chennai Super Kings      Mumbai Indians      bat      normal      0
Mumbai Indians      1      0      JJ Bumrah
Rajiv Gandhi Intl. Cricket Stadium      Nitin Menon      Ian Gould
Nigel Llong      1
Length: 118, dtype: int64

```

```
data.sort_values(by="date",ascending=True)
```

```

      id      Season      city      date
team1 \
203      204      IPL-2010      Kolkata      01-04-2010      Kolkata Knight
Riders
708      11149      IPL-2019      Mohali      01-04-2019      Kings XI
Punjab
77      78      IPL-2008      Jaipur      01-05-2008      Rajasthan
Royals
76      77      IPL-2008      Hyderabad      01-05-2008      Deccan
Chargers
138      139      IPL-2009      Durban      01-05-2009      Royal Challengers
Bangalore
..      ...      ...      ...      ...
..
202      203      IPL-2010      Delhi      31-03-2010      Delhi
Daredevils
201      202      IPL-2010      Chennai      31-03-2010      Royal Challengers
Bangalore
707      11148      IPL-2019      Chennai      31-03-2019      Chennai Super
Kings
706      11147      IPL-2019      Hyderabad      31-03-2019      Sunrisers
Hyderabad
115      116      IPL-2008      Mumbai      31-05-2008      Kings XI
Punjab

      team2      toss_winner
toss_decision \
203      Deccan Chargers      Kolkata Knight Riders
bat

```

708	Delhi Capitals		Delhi Capitals
field			
77	Kolkata Knight Riders		Rajasthan Royals
bat			
76	Kings XI Punjab		Kings XI Punjab
field			
138	Kings XI Punjab		Royal Challengers Bangalore
bat			
..	...		...
...			
202	Rajasthan Royals		Delhi Daredevils
bat			
201	Chennai Super Kings		Royal Challengers Bangalore
bat			
707	Rajasthan Royals		Rajasthan Royals
field			
706	Royal Challengers Bangalore		Royal Challengers Bangalore
field			
115	Chennai Super Kings		Kings XI Punjab
bat			
	result	dl_applied	winner win_by_runs \
203	normal	0	Kolkata Knight Riders 24
708	normal	0	Kings XI Punjab 14
77	normal	0	Rajasthan Royals 45
76	normal	0	Kings XI Punjab 0
138	normal	0	Royal Challengers Bangalore 8
..	...	...	...
202	normal	0	Delhi Daredevils 67
201	normal	0	Chennai Super Kings 0
707	normal	0	Chennai Super Kings 8
706	normal	0	Sunrisers Hyderabad 118
115	normal	0	Chennai Super Kings 0
	win_by_wickets	player_of_match	\
203	0	SC Ganguly	
708	0	S Curran	
77	0	SA Asnodkar	
76	7	SE Marsh	
138	0	Yuvraj Singh	
..	...	...	
202	0	KD Karthik	
201	5	M Vijay	
707	0	MS Dhoni	
706	0	J Bairstow	
115	9	M Ntini	
		venue	umpire1 \
203		Eden Gardens	K Hariharan
708		IS Bindra Stadium	Anil Chaudhary



77	Sawai Mansingh Stadium	RE Koertzen
76	Rajiv Gandhi International Stadium, Uppal	BR Doctrove
138	Kingsmead	HDPK Dharmasena
..	...	...
202	Feroz Shah Kotla	HDPK Dharmasena
201	MA Chidambaram Stadium, Chepauk	BG Jerling
707	M. A. Chidambaram Stadium	O Nandan
706	Rajiv Gandhi Intl. Cricket Stadium	S Ravi
115	Wankhede Stadium	Asad Rauf

	umpire2	umpire3
203	DJ Harper	NaN
708	Chris Gaffaney	Vineet Kulkarni
77	GA Pratapkumar	NaN
76	RB Tiffin	NaN
138	S Ravi	NaN
..	...	...
202	SJA Taufel	NaN
201	RE Koertzen	NaN
707	Yeshwant Barde	Bruce Oxenford
706	KN Anantapadmanabhan	C Shamshuddin
115	DJ Harper	NaN

[756 rows x 18 columns]

data.groupby('Season').mean()

	id	dl_applied	win_by_runs	win_by_wickets
Season				
IPL-2008	88.50	0.034483	12.155172	3.810345
IPL-2009	146.00	0.052632	13.403509	3.157895
IPL-2010	204.50	0.000000	16.266667	3.166667
IPL-2011	271.00	0.041096	15.041096	3.630137
IPL-2012	344.50	0.000000	12.972973	3.256757
IPL-2013	419.50	0.000000	16.328947	2.986842
IPL-2014	487.50	0.016667	10.733333	3.750000
IPL-2015	547.00	0.033898	14.406780	2.508475
IPL-2016	606.50	0.066667	11.266667	4.066667
IPL-2017	30.00	0.016949	13.355932	3.457627
IPL-2018	7923.50	0.050000	11.250000	3.100000
IPL-2019	11281.85	0.000000	11.083333	3.366667