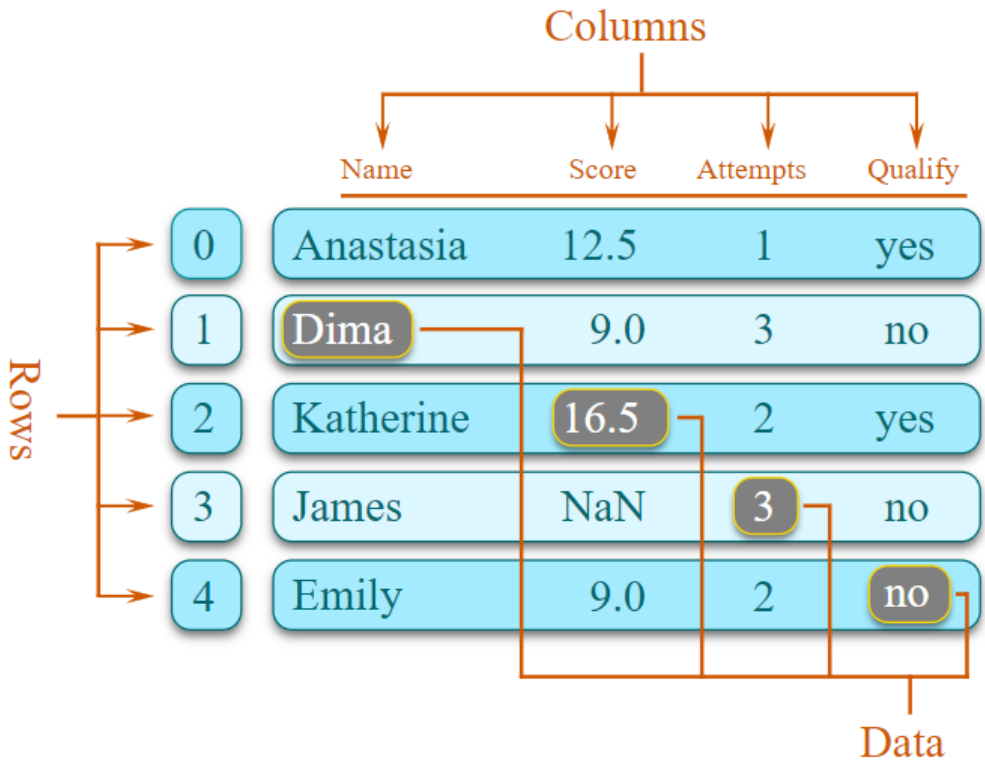
Pandas part - 02

What is DataFrame?

A Data frame is a two-dimensional data structure, i.e., data is aligned in a tabular fashion in rows and columns. Pandas DataFrame consists of three principal components, the data, rows, and columns.



Pandas DataFrame

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

Creating DataFrame

In [ ]:
```
#  using lists
student_data = [
    [100, 90, 10],
    [90, 70, 7],
    [120, 100, 14],
    [80, 50, 2]
]
pd.DataFrame(student_data, columns=['iq', 'marks', 'package', ])
```

Out[ ]:

	iq	marks	package
0	100	90	10
1	90	70	7
2	120	100	14
3	80	50	2

In [ ]:
```
# using dictionary
student_dict = {
    'iq': [100, 90, 80, 120, 0, 0],
    'marks': [80, 70, 100, 90, 0, 0],
    'package': [10, 7, 14, 2, 0, 0]
}

students = pd.DataFrame(student_dict)
students
```

Out[ ]:

	iq	marks	package
0	100	80	10
1	90	70	7
2	80	100	14
3	120	90	2
4	0	0	0
5	0	0	0

Read CSV

In [ ]:
```
# using read_csv
movies = pd.read_csv('movies.csv')
movies.head()
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wik
1	Battalion	tt9472208	NaN	https://en.wikipedia.o

	609				
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...		https://en.wikipedia.org/wiki
3	Why Cheat India	tt8108208	https://upload.wikimedia.org/wikipedia/en/thum...		https://en.wikipedia.org/w
4	Evening Shadows	tt6028796		NaN	https://en.wikipedia.org/wi

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

Out[ ]:

	ID	City	Date	Season	MatchNumber	Team1	Team2	Venue
0	1312200	Ahmedabad	2022-05-29	2022	Final	Rajasthan Royals	Gujarat Titans	Narendra Modi Stadium, Ahmedabad
1	1312199	Ahmedabad	2022-05-27	2022	Qualifier 2	Royal Challengers Bangalore	Rajasthan Royals	Narendra Modi Stadium, Ahmedabad
2	1312198	Kolkata	2022-05-25	2022	Eliminator	Royal Challengers Bangalore	Lucknow Super Giants	Eden Gardens, Kolkata
3	1312197	Kolkata	2022-05-24	2022	Qualifier 1	Rajasthan Royals	Gujarat Titans	Eden Gardens, Kolkata
4	1304116	Mumbai	2022-05-22	2022	70	Sunrisers Hyderabad	Punjab Kings	Wankhede Stadium, Mumbai

Shape

In [ ]:
```
# shape
ipl.shape
```

Out[ ]:
```
(950, 20)
```

Column Data Types

In [ ]:
```
# dtypes
movies.dtypes
```

Out[ ]:
```
title_x              object
imdb_id              object
poster_path          object
wiki_link            object
title_y              object
original_title       object
is_adult              int64
year_of_release       int64
runtime              object
genres               object
imdb_rating         float64
imdb_votes            int64
story                object
summary              object
tagline              object
actors               object
wins_nominations     object
release_date         object
dtype: object
```

Index

In [ ]:
```
# index
movies.index
```

Out[ ]:
```
RangeIndex(start=0, stop=1629, step=1)
```

Column Names

In [ ]:
```
# columns
movies.columns
```

Out[ ]:
```
Index(['title_x', 'imdb_id', 'poster_path', 'wiki_link', 'title_y',
       'original_title', 'is_adult', 'year_of_release', 'runtime', 'genre
s',
       'imdb_rating', 'imdb_votes', 'story', 'summary', 'tagline', 'actor
s',
       'wins_nominations', 'release_date'],
      dtype='object')
```

In [ ]:
```
ipl.columns
```

Out[ ]:
```
Index(['ID', 'City', 'Date', 'Season', 'MatchNumber', 'Team1', 'Team2',
       'Venue', 'TossWinner', 'TossDecision', 'SuperOver', 'WinningTeam',
       'WonBy', 'Margin', 'method', 'Player_of_Match', 'Team1Players',
       'Team2Players', 'Umpire1', 'Umpire2'],
      dtype='object')
```

Values

In [ ]:
```
# values -> 2D numpy array
students.values
```

Out[ ]:
```
array([[100,  80,  10],
       [ 90,  70,   7],
       [ 80, 100,  14],
       [120,  90,   2],
       [  0,   0,   0],
       [  0,   0,   0]], dtype=int64)
```

```
ipl.values
```

In [ ]:

Out[ ]:
```
array([[1312200, 'Ahmedabad', '2022-05-29', ...,
        "['WP Saha', 'Shubman Gill', 'MS Wade', 'HH Pandya', 'DA Miller',
'R Tewatia', 'Rashid Khan', 'R Sai Kishore', 'LH Ferguson', 'Yash Dayal',
'Mohammed Shami']",
        'CB Gaffaney', 'Nitin Menon'],
       [1312199, 'Ahmedabad', '2022-05-27', ...,
        "['YBK Jaiswal', 'JC Buttler', 'SV Samson', 'D Padikkal', 'SO Het
myer', 'R Parag', 'R Ashwin', 'TA Boult', 'YS Chahal', 'M Prasidh Krishn
a', 'OC McCoy']",
        'CB Gaffaney', 'Nitin Menon'],
       [1312198, 'Kolkata', '2022-05-25', ...,
        "['Q de Kock', 'KL Rahul', 'M Vohra', 'DJ Hooda', 'MP Stoinis',
'E Lewis', 'KH Pandya', 'PVD Chameera', 'Mohsin Khan', 'Avesh Khan', 'Rav
i Bishnoi']",
        'J Madanagopal', 'MA Gough'],
       ...,
       [335984, 'Delhi', '2008-04-19', ...,
        "['T Kohli', 'YK Pathan', 'SR Watson', 'M Kaif', 'DS Lehmann', 'R
A Jadeja', 'M Rawat', 'D Salunkhe', 'SK Warne', 'SK Trivedi', 'MM Pate
l']",
        'Aleem Dar', 'GA Pratapkumar'],
       [335983, 'Chandigarh', '2008-04-19', ...,
        "['PA Patel', 'ML Hayden', 'MEK Hussey', 'MS Dhoni', 'SK Raina',
'JDP Oram', 'S Badrinath', 'Joginder Sharma', 'P Amarnath', 'MS Gony', 'M
Muralitharan']",
        'MR Benson', 'SL Shastri'],
       [335982, 'Bangalore', '2008-04-18', ...,
        "['SC Ganguly', 'BB McCullum', 'RT Ponting', 'DJ Hussey', 'Mohamm
ad Hafeez', 'LR Shukla', 'WP Saha', 'AB Agarkar', 'AB Dinda', 'M Kartik',
'I Sharma']",
        'Asad Rauf', 'RE Koertzen']], dtype=object)
```

head and tail

In [ ]:
```
# head and tail
movies.head(1)
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wiki/U

In [ ]:
```
movies.tail(3)
```

Out[ ]:

	title_x	imdb_id	poster_path	
1626	Sabse Bada Sukh	tt0069204	NaN	https://en.wikipedia.org
1627	Daaka	tt10833860	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.

1628	Humsafar	tt2403201	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wik

sample - Random Data

In [ ]:
```
# sample -> random data
ipl.sample(5)
```

Out[ ]:

	ID	City	Date	Season	MatchNumber	Team1	Team2	V
39	1304081	Navi Mumbai	2022-04-23	2022	35	Gujarat Titans	Kolkata Knight Riders	Dr DY S Aca M
925	336006	Bangalore	2008-05-05	2007/08	25	Royal Challengers Bangalore	Kings XI Punjab	Chinnas St
820	419120	Cuttack	2010-03-21	2009/10	15	Deccan Chargers	Delhi Daredevils	Ba St
792	419148	Bangalore	2010-04-10	2009/10	43	Royal Challengers Bangalore	Kolkata Knight Riders	Chinnas St
696	548311	Visakhapatnam	2012-04-07	2012	6	Deccan Chargers	Chennai Super Kings	D Rajase Reddy VDCA C

info - information about columns

In [ ]:
```
# info
movies.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1629 entries, 0 to 1628
Data columns (total 18 columns):
 #   Column            Non-Null Count  Dtype 
---  ------            --------------  ----- 
 0   title_x           1629 non-null   object
 1   imdb_id           1629 non-null   object
 2   poster_path       1526 non-null   object
 3   wiki_link         1629 non-null   object
 4   title_y           1629 non-null   object
 5   original_title    1629 non-null   object
 6   is_adult          1629 non-null   int64 
 7   year_of_release   1629 non-null   int64 
 8   runtime           1629 non-null   object
 9   genres            1629 non-null   object
```

```
 10  imdb_rating        1629 non-null   float64
 11  imdb_votes         1629 non-null   int64
 12  story              1609 non-null   object
 13  summary            1629 non-null   object
 14  tagline            557 non-null    object
 15  actors             1624 non-null   object
 16  wins_nominations   707 non-null    object
 17  release_date       1522 non-null   object
dtypes: float64(1), int64(3), object(14)
memory usage: 229.2+ KB
```

describe

In [ ]:
```
# describe -> mathematical summary
movies.describe()
```

Out[ ]:

	is_adult	year_of_release	imdb_rating	imdb_votes
count	1629.0	1629.000000	1629.000000	1629.000000
mean	0.0	2010.263966	5.557459	5384.263352
std	0.0	5.381542	1.567609	14552.103231
min	0.0	2001.000000	0.000000	0.000000
25%	0.0	2005.000000	4.400000	233.000000
50%	0.0	2011.000000	5.600000	1000.000000
75%	0.0	2015.000000	6.800000	4287.000000
max	0.0	2019.000000	9.400000	310481.000000

isnull - Checking Null value

In [ ]:
```
# isnull
movies.isnull()
```

Out[ ]:

	title_x	imdb_id	poster_path	wiki_link	title_y	original_title	is_adult	year_of_release
0	False	False	False	False	False	False	False	False
1	False	False	True	False	False	False	False	False
2	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False
4	False	False	True	False	False	False	False	False
...	...	...	...	...	...	...	...	...
1624	False	False	False	False	False	False	False	False
1625	False	False	False	False	False	False	False	False
1626	False	False	True	False	False	False	False	False
1627	False	False	False	False	False	False	False	False
1628	False	False	False	False	False	False	False	False

1629 rows × 18 columns

Checking total null value using sum()

In [ ]:
```
movies.isnull().sum()
```

Out[ ]:
```
title_x                0
imdb_id                0
poster_path          103
wiki_link              0
title_y                0
original_title         0
is_adult               0
year_of_release        0
runtime                0
genres                 0
imdb_rating            0
imdb_votes             0
story                 20
summary                0
tagline             1072
actors                 5
wins_nominations     922
release_date         107
dtype: int64
```

duplicated

In [ ]:
```
movies.duplicated().sum()
```

Out[ ]:
```
0
```

In [ ]:
```
students.duplicated()
```

Out[ ]:
```
0    False
1    False
2    False
3    False
4    False
5     True
dtype: bool
```

In [ ]:
```
students.duplicated().sum()
```

Out[ ]:
```
1
```

rename - rename columns name

In [ ]:
```
# rename
students
```

Out[ ]:

	iq	marks	package
0	100	80	10
1	90	70	7
2	80	100	14
3	120	90	2
4	0	0	0
5	0	0	0

In [ ]:
```
students.rename(columns={'marks': 'percent', 'package': 'lpa'})
```

Out[ ]:

	iq	percent	lpa
0	100	80	10
1	90	70	7
2	80	100	14
3	120	90	2
4	0	0	0
5	0	0	0

For permanent change using inplace = True

In [ ]:
```
# for permanent change
students.rename(columns={'marks': 'percent', 'package': 'lpa'}, inplace=T
students
```

Out[ ]:

	iq	percent	lpa
0	100	80	10
1	90	70	7
2	80	100	14
3	120	90	2
4	0	0	0
5	0	0	0

Math Methods

In [ ]:
```
#  sum -> axis argument
movies.sum()  # concatinate the string and sum the integer and float
```

```
C:\Users\dhanr\AppData\Local\Temp\ipykernel_11868\2393232322.py:2: Future
Warning: Dropping of nuisance columns in DataFrame reductions (with 'nume
ric_only=None') is deprecated; in a future version this will raise TypeEr
ror.  Select only valid columns before calling the reduction.
  movies.sum()  # concatinate the string and sum the integer and float
```

Out[ ]:
```
title_x            Uri: The Surgical StrikeBattalion 609The Accid...
imdb_id            tt8291224tt9472208tt6986710tt8108208tt6028796t...
wiki_link          https://en.wikipedia.org/wiki/Uri:_The_Surgica...
title_y            Uri: The Surgical StrikeBattalion 609The Accid...
original_title     Uri: The Surgical StrikeBattalion 609The Accid...
is_adult                                                           0
year_of_release                                              3274720
runtime            138131112121102971091041481201341531431301431 1...
genres             Action|Drama|WarWarBiography|DramaCrime|DramaD...
imdb_rating                                                   9053.1
imdb_votes                                                   8770965
summary            Indian army special forces execute a covert op...
dtype: object
```

In [ ]:
```
students
```

Out[ ]:

	iq	percent	lpa
0	100	80	10
1	90	70	7
2	80	100	14
3	120	90	2
4	0	0	0
5	0	0	0

sum of columns

In [ ]:
```
# sum of columns
students.sum()
```

Out[ ]:
```
iq          390
percent     340
lpa          33
dtype: int64
```

Sum of rows

In [ ]:
```
# sum of rows
students.sum(axis=1)
```

Out[ ]:
```
0    190
1    167
2    194
3    212
4      0
5      0
dtype: int64
```

Mean

In [ ]:
```
# mean of cols
students.mean()
```

Out[ ]:
```
iq          65.000000
percent     56.666667
lpa          5.500000
dtype: float64
```

In [ ]:
```
# mean of rows
students.mean(axis=1)
```

Out[ ]:
```
0    63.333333
1    55.666667
2    64.666667
3    70.666667
4     0.000000
5     0.000000
dtype: float64
```

min = minimum

In [ ]:
```
# min of cols
```

```
students.min()
```

Out[ ]:
```
iq         0
percent    0
lpa        0
dtype: int64
```

In [ ]:
```
# min of rows
students.min(axis=1)
```

Out[ ]:
```
0    10
1     7
2    14
3     2
4     0
5     0
dtype: int64
```

Selecting cols from a DataFrame

In [ ]:
```
# single cols
movies['title_x']
```

Out[ ]:
```
0                    Uri: The Surgical Strike
1                                Battalion 609
2       The Accidental Prime Minister (film)
3                            Why Cheat India
4                            Evening Shadows
                         ...
1624                    Tera Mera Saath Rahen
1625                     Yeh Zindagi Ka Safar
1626                          Sabse Bada Sukh
1627                                   Daaka
1628                                Humsafar
Name: title_x, Length: 1629, dtype: object
```

In [ ]:
```
movies.columns
```

Out[ ]:
```
Index(['title_x', 'imdb_id', 'poster_path', 'wiki_link', 'title_y',
       'original_title', 'is_adult', 'year_of_release', 'runtime', 'genre
s',
       'imdb_rating', 'imdb_votes', 'story', 'summary', 'tagline', 'actor
s',
       'wins_nominations', 'release_date'],
      dtype='object')
```

In [ ]:
```
# multiple cols
movies[['title_x', 'year_of_release', 'actors']]
```

Out[ ]:

	title_x	year_of_release	actors
0	Uri: The Surgical Strike	2019	Vicky Kaushal|Paresh Rawal|Mohit Raina|Yami Ga...
1	Battalion 609	2019	Vicky Ahuja|Shoaib Ibrahim|Shrikant Kamat|Elen...
2	The Accidental Prime Minister (film)	2019	Anupam Kher|Akshaye Khanna|Aahana Kumra|Atul S...
3	Why Cheat India	2019	Emraan Hashmi|Shreya Dhanwanthary|Snighdadeep ...
4	Evening Shadows	2018	Mona Ambegaonkar|Ananth Narayan Mahadevan|Deva...

...	...	...	...
1624	Tera Mera Saath Rahen	2001	Ajay Devgn|Sonali Bendre|Namrata Shirodkar|Pre...
1625	Yeh Zindagi Ka Safar	2001	Ameesha Patel|Jimmy Sheirgill|Nafisa Ali|Gulsh...
1626	Sabse Bada Sukh	2018	Vijay Arora|Asrani|Rajni Bala|Kumud Damle|Utpa...
1627	Daaka	2019	Gippy Grewal|Zareen Khan|
1628	Humsafar	2011	Fawad Khan|

1629 rows × 3 columns

Selecting rows from a DataFrame

- **iloc** - searches using index position
- **loc** - searches using index labels

In [ ]:
```
student_dict = {
    'name': ['nitish', 'rupesh', 'rishabh', 'amit', 'ankita', 'suresh'],
    'iq': [100, 90, 80, 120, 0, 0],
    'marks': [80, 70, 100, 90, 0, 0],
    'package': [10, 7, 14, 2, 0, 0]
}

students = pd.DataFrame(student_dict)
students.set_index('name', inplace=True)
students
```

Out[ ]:

name	iq	marks	package
nitish	100	80	10
rupesh	90	70	7
rishabh	80	100	14
amit	120	90	2
ankita	0	0	0
suresh	0	0	0

In [ ]:
```
# single row
movies.iloc[0]
```

Out[ ]:
```
title_x                                    Uri: The Surgical Strike
imdb_id                                                  tt8291224
poster_path          https://upload.wikimedia.org/wikipedia/en/thum...
wiki_link            https://en.wikipedia.org/wiki/Uri:_The_Surgica...
title_y                                    Uri: The Surgical Strike
original_title                             Uri: The Surgical Strike
is_adult                                                          0
year_of_release                                                2019
runtime                                                         138
genres                                                Action|Drama|War
imdb_rating                                                     8.4
imdb_votes                                                    35112
story                Divided over five chapters  the film chronicle...
```

```
summary             Indian army special forces execute a covert op...
tagline                                                           NaN
actors              Vicky Kaushal|Paresh Rawal|Mohit Raina|Yami Ga...
wins_nominations                                              4 wins
release_date                                     11 January 2019 (USA)
Name: 0, dtype: object
```

In [ ]:
```
# multiple row
movies.iloc[0:5]
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wik
1	Battalion 609	tt9472208	NaN	https://en.wikipedia.o
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wiki
3	Why Cheat India	tt8108208	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/w
4	Evening Shadows	tt6028796	NaN	https://en.wikipedia.org/wi

In [ ]:
```
movies.iloc[0:10:2]
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/v
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/w
4	Evening Shadows	tt6028796	NaN	https://en.wikipedia.org/
6	Fraud Saiyaan	tt5013008	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.(

8	Manikarnika: The Queen of Jhansi	tt6903440	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/w

In [ ]:
```
students.loc['nitish']
```

Out[ ]:
```
iq          100
marks        80
package      10
Name: nitish, dtype: int64
```

In [ ]:
```
students.loc['nitish':'rishabh']
```

Out[ ]:

name	iq	marks	package
nitish	100	80	10
rupesh	90	70	7
rishabh	80	100	14

In [ ]:
```
# slicing row and columns using iloc
movies.iloc[0:3, 0:3]
```

Out[ ]:

	title_x	imdb_id	poster_path
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...
1	Battalion 609	tt9472208	NaN
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...

In [ ]:
```
# slicing row and columns using loc
movies.loc[0:3, 'title_x': 'poster_path']
```

Out[ ]:

	title_x	imdb_id	poster_path
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...
1	Battalion 609	tt9472208	NaN
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...
3	Why Cheat India	tt8108208	https://upload.wikimedia.org/wikipedia/en/thum...

Task

In [ ]:
```
ipl.head()
```

Out[ ]:

	ID	City	Date	Season	MatchNumber	Team1	Team2	Venue
0	1312200	Ahmedabad	2022-05-29	2022	Final	Rajasthan Royals	Gujarat Titans	Narendra Modi Stadium, Ahmedabad

1	1312199	Ahmedabad	2022-05-27	2022	Qualifier 2	Royal Challengers Bangalore	Rajasthan Royals	Narendra Modi Stadium, Ahmedabad
2	1312198	Kolkata	2022-05-25	2022	Eliminator	Royal Challengers Bangalore	Lucknow Super Giants	Eden Gardens, Kolkata
3	1312197	Kolkata	2022-05-24	2022	Qualifier 1	Rajasthan Royals	Gujarat Titans	Eden Gardens, Kolkata
4	1304116	Mumbai	2022-05-22	2022	70	Sunrisers Hyderabad	Punjab Kings	Wankhede Stadium, Mumbai

In [ ]:
```
# find all the final winners
ipl[ipl['MatchNumber'] == 'Final'][['WinningTeam', 'Season']]
```

Out[ ]:

	WinningTeam	Season
0	Gujarat Titans	2022
74	Chennai Super Kings	2021
134	Mumbai Indians	2020/21
194	Mumbai Indians	2019
254	Chennai Super Kings	2018
314	Mumbai Indians	2017
373	Sunrisers Hyderabad	2016
433	Mumbai Indians	2015
492	Kolkata Knight Riders	2014
552	Mumbai Indians	2013
628	Kolkata Knight Riders	2012
702	Chennai Super Kings	2011
775	Chennai Super Kings	2009/10
835	Deccan Chargers	2009
892	Rajasthan Royals	2007/08

In [ ]:
```
# how many super over finishes have occures
ipl[ipl['SuperOver'] == 'Y'].shape[0]
```

Out[ ]:
```
14
```

In [ ]:
```
# how many matches csk won in kolkata
ipl[(ipl['City'] == 'Kolkata') & (
    ipl['WinningTeam'] == 'Chennai Super Kings')].shape[0]
```

Out[ ]:
```
5
```

In [ ]:
```
# toss winner is match winner in percentage
ipl[ipl['TossWinner'] == ipl['WinningTeam']].shape[0]
```

Out[ ]:
```
489
```

In [ ]:
```
((ipl[ipl['TossWinner'] ==
      ipl['WinningTeam']].shape[0])/(ipl.shape[0])) * 100
```

Out[ ]:
```
51.473684210526315
```

In [ ]:
```
movies.head(2)
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wiki/U
1	Battalion 609	tt9472208	NaN	https://en.wikipedia.org/

In [ ]:
```
# movies with rating higher than 8 and votes > 10000
movies[(movies['imdb_rating'] > 8) & (movies['imdb_votes'] > 10000)
       ][['title_x', 'imdb_votes', 'imdb_rating']]
```

Out[ ]:

	title_x	imdb_votes	imdb_rating
0	Uri: The Surgical Strike	35112	8.4
11	Gully Boy	22440	8.2
37	Article 15 (film)	13417	8.3
40	Super 30 (film)	13972	8.2
143	Tumbbad	16535	8.2
146	Andhadhun	51615	8.4
325	Pink (2016 film)	33902	8.2
354	Dangal (film)	131338	8.4
418	Masaan	19904	8.1
426	Drishyam (2015 film)	58340	8.2
436	Talvar (film)	26612	8.2
469	Queen (2014 film)	56406	8.2
536	Haider (film)	46912	8.1
566	Ugly (film)	17483	8.1
567	PK (film)	143605	8.1
589	Vishwaroopam	38016	8.2
612	Bhaag Milkha Bhaag	56205	8.2
638	Shahid (film)	13537	8.3
668	Paan Singh Tomar (film)	29994	8.2

669	Kahaani	53181	8.1
693	Gangs of Wasseypur	71636	8.2
694	Gangs of Wasseypur – Part 2	71636	8.2
709	Barfi!	70443	8.1
714	OMG – Oh My God!	46072	8.2
778	Zindagi Na Milegi Dobara	60826	8.1
869	Udaan (2010 film)	39567	8.2
912	3 Idiots	310481	8.4
930	Gulaal (film)	12799	8.1
1058	Black Friday (2007 film)	16761	8.5
1066	Chak De! India	68421	8.2
1127	Taare Zameen Par	148498	8.4
1180	Khosla Ka Ghosla	20538	8.3
1183	Lage Raho Munna Bhai	39486	8.1
1188	Omkara (2006 film)	17594	8.1
1195	Rang De Basanti	103071	8.2
1223	Black (2005 film)	31658	8.2
1252	Iqbal (film)	14864	8.1
1384	Swades	76737	8.2
1403	Munna Bhai M.B.B.S.	67148	8.1
1554	The Legend of Bhagat Singh	13455	8.1
1567	Lagaan	95686	8.1
1568	Lagaan	95686	8.1
1571	Dil Chahta Hai	62313	8.1

In [ ]:
```
# Action movies with rating higher than 7.5
mask1 = movies[movies['genres'].str.split('|').apply(lambda x: 'Action' i
mask1[mask1['imdb_rating'] > 7.5]
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipe
41	Family of Thakurganj	tt8897986	https://upload.wikimedia.org/wikipedia/en/9/99...	https://en.wikipe
84	Mukkabaaz	tt7180544	https://upload.wikimedia.org/wikipedia/en/thum...	https://e
106	Raazi	tt7098658	https://upload.wikimedia.org/wikipedia/en/thum...	htt

110	Parmanu: The Story of Pokhran	tt6826438	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi
112	Bhavesh Joshi Superhero	tt6129302	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi
169	The Ghazi Attack	tt6299040	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikiped
219	Raag Desh (film)	tt6080746	https://upload.wikimedia.org/wikipedia/en/thum...	https://
258	Irudhi Suttru	tt5310090	https://upload.wikimedia.org/wikipedia/en/f/fe...	https://en.wik
280	Laal Rang	tt5600714	NaN	https://e
297	Udta Punjab	tt4434004	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
354	Dangal (film)	tt5074352	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
362	Bajrangi Bhaijaan	tt3863552	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikip
365	Baby (2015 Hindi film)	tt3848892	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikiped
393	Detective Byomkesh Bakshy!	tt3447364	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikiped
449	Titli (2014 film)	tt3019620	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wik
536	Haider (film)	tt3390572	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.

589	Vishwaroopam	tt2199711	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipec
625	Madras Cafe	tt2855648	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.v
668	Paan Singh Tomar (film)	tt1620933	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi
693	Gangs of Wasseypur	tt1954470	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
694	Gangs of Wasseypur – Part 2	tt1954470	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
982	Jodhaa Akbar	tt0449994	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.w
1039	1971 (2007 film)	tt0983990	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wiki
1058	Black Friday (2007 film)	tt0400234	https://upload.wikimedia.org/wikipedia/en/5/58...	https://en.wikipe
1188	Omkara (2006 film)	tt0488414	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wiped
1293	Sarkar (2005 film)	tt0432047	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipe
1294	Sehar	tt0477857	https://upload.wikimedia.org/wikipedia/en/thum...	htt
1361	Lakshya (film)	tt0323013	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.w
1432	Gangaajal	tt0373856	https://upload.wikimedia.org/wikipedia/en/thum...	https://e

1495	Company (film)	tt0296574	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wik
1554	The Legend of Bhagat Singh	tt0319736	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
1607	Nayak (2001 Hindi film)	tt0291376	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi

In [ ]:
```
# another method
mask1 = movies['genres'].str.contains('Action')
mask2 = movies['imdb_rating'] > 7.5
movies[mask1 & mask2]
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipe
41	Family of Thakurganj	tt8897986	https://upload.wikimedia.org/wikipedia/en/9/99...	https://en.wikipe
84	Mukkabaaz	tt7180544	https://upload.wikimedia.org/wikipedia/en/thum...	https://e
106	Raazi	tt7098658	https://upload.wikimedia.org/wikipedia/en/thum...	htt
110	Parmanu: The Story of Pokhran	tt6826438	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
112	Bhavesh Joshi Superhero	tt6129302	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi
169	The Ghazi Attack	tt6299040	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikiped
219	Raag Desh (film)	tt6080746	https://upload.wikimedia.org/wikipedia/en/thum...	https://(
258	Irudhi Suttru	tt5310090	https://upload.wikimedia.org/wikipedia/en/f/fe...	https://en.wik

280	Laal Rang	tt5600714	NaN	https://e
297	Udta Punjab	tt4434004	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
354	Dangal (film)	tt5074352	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
362	Bajrangi Bhaijaan	tt3863552	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikip
365	Baby (2015 Hindi film)	tt3848892	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wiped
393	Detective Byomkesh Bakshy!	tt3447364	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wiped
449	Titli (2014 film)	tt3019620	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wik
536	Haider (film)	tt3390572	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
589	Vishwaroopam	tt2199711	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wiped
625	Madras Cafe	tt2855648	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.
668	Paan Singh Tomar (film)	tt1620933	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wipedia
693	Gangs of Wasseypur	tt1954470	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wipedia

694	Gangs of Wasseypur – Part 2	tt1954470	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
982	Jodhaa Akbar	tt0449994	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.w
1039	1971 (2007 film)	tt0983990	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikip
1058	Black Friday (2007 film)	tt0400234	https://upload.wikimedia.org/wikipedia/en/5/58...	https://en.wikipe
1188	Omkara (2006 film)	tt0488414	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikiped
1293	Sarkar (2005 film)	tt0432047	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipe
1294	Sehar	tt0477857	https://upload.wikimedia.org/wikipedia/en/thum...	htt
1361	Lakshya (film)	tt0323013	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.w
1432	Gangaajal	tt0373856	https://upload.wikimedia.org/wikipedia/en/thum...	https://
1495	Company (film)	tt0296574	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wik
1554	The Legend of Bhagat Singh	tt0319736	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia
1607	Nayak (2001 Hindi film)	tt0291376	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi

Adding new cols

In [ ]:
```
# completely new
movies['country'] = 'India'
movies.head()
```

Out[ ]:

	title_x	imdb_id	poster_path	
0	Uri: The Surgical Strike	tt8291224	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wik
1	Battalion 609	tt9472208	NaN	https://en.wikipedia.o
2	The Accidental Prime Minister (film)	tt6986710	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wiki
3	Why Cheat India	tt8108208	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/w
4	Evening Shadows	tt6028796	NaN	https://en.wikipedia.org/wi

In [ ]:
```
# from existing col
movies.isnull().sum()
```

Out[ ]:
```
title_x                0
imdb_id                0
poster_path          103
wiki_link              0
title_y                0
original_title         0
is_adult               0
year_of_release        0
runtime                0
genres                 0
imdb_rating            0
imdb_votes             0
story                 20
summary                0
tagline             1072
actors                 5
wins_nominations     922
release_date         107
country                0
dtype: int64
```

In [ ]:
```
movies.dropna(inplace=True)
```

In [ ]:
```
movies['lead actor'] = movies['actors'].str.split('|').apply(lambda x: x[
movies.head()
```

Out[ ]:

	title_x	imdb_id	poster_path	
11	Gully Boy	tt2395469	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.c
34	Yeh Hai India	tt5525846	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/w
37	Article 15 (film)	tt10324144	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wik
87	Aiyaary	tt6774212	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedi
96	Raid (2018 film)	tt7363076	https://upload.wikimedia.org/wikipedia/en/thum...	https://en.wikipedia.org/wiki

astype - change column type

In [ ]:
```
# astype
ipl.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 950 entries, 0 to 949
Data columns (total 20 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   ID               950 non-null    int64  
 1   City             899 non-null    object 
 2   Date             950 non-null    object 
 3   Season           950 non-null    object 
 4   MatchNumber      950 non-null    object 
 5   Team1            950 non-null    object 
 6   Team2            950 non-null    object 
 7   Venue            950 non-null    object 
 8   TossWinner       950 non-null    object 
 9   TossDecision     950 non-null    object 
 10  SuperOver        946 non-null    object 
 11  WinningTeam      946 non-null    object 
 12  WonBy            950 non-null    object 
 13  Margin           932 non-null    float64
 14  method           19 non-null     object 
 15  Player_of_Match  946 non-null    object 
 16  Team1Players     950 non-null    object 
 17  Team2Players     950 non-null    object 
 18  Umpire1          950 non-null    object 
 19  Umpire2          950 non-null    object 
```

```
dtypes: float64(1), int64(1), object(18)
memory usage: 148.6+ KB
```

In [ ]:
```
ipl['ID'] = ipl['ID'].astype('Int32')
ipl.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 950 entries, 0 to 949
Data columns (total 20 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   ID               950 non-null    Int32
 1   City             899 non-null    object
 2   Date             950 non-null    object
 3   Season           950 non-null    object
 4   MatchNumber      950 non-null    object
 5   Team1            950 non-null    object
 6   Team2            950 non-null    object
 7   Venue            950 non-null    object
 8   TossWinner       950 non-null    object
 9   TossDecision     950 non-null    object
 10  SuperOver        946 non-null    object
 11  WinningTeam      946 non-null    object
 12  WonBy            950 non-null    object
 13  Margin           932 non-null    float64
 14  method           19 non-null     object
 15  Player_of_Match  946 non-null    object
 16  Team1Players     950 non-null    object
 17  Team2Players     950 non-null    object
 18  Umpire1          950 non-null    object
 19  Umpire2          950 non-null    object
dtypes: Int32(1), float64(1), object(18)
memory usage: 145.8+ KB
```