

Grading Rubric:

Criteria	Poor Command Score: 1	Fair/ Some Command Score: 2	Good Command Score: 3	Superior Command Score: 4
Abstract	A summary of the contents of assignment work is poorly explained.	A summary of the contents of assignment work is fairly explained.	A summary of the contents of assignment work is adequately explained.	A summary of the contents of assignment work is clearly explained.
Data Analysis Process	Problem Definition, Data Collection, Data Cleaning and Data Processing, Data Analysis, Data Visualization and Data storytelling are poorly done and explained.	Problem Definition, Data Collection, Data Cleaning and Data Processing are clearly explained. Data Analysis, Data Visualization and Data storytelling are poorly done and explained.	Problem Definition, Data Collection, Data Cleaning and Data Processing are clearly explained. Data Analysis, Data Visualization and Data storytelling are fairly done and explained.	Problem Definition, Data Collection, Data Cleaning and Data Processing are clearly explained. Data Analysis, Data Visualization and Data storytelling are clearly done and explained.
References	References were insufficient and not formatted.	References were insufficient and not well formatted.	References were sufficient, recent, and well formatted in IEEE format.	References were sufficient, very recent, and well formatted in IEEE format.
Appendix	Jupyter notebook program is added without any comments statement.	Each line in the Jupyter notebook program is fairly explained by using comments statement.	Each line in the Jupyter notebook program is explained adequately by using comments statement.	Each line in the Jupyter notebook program is clearly explained by using comments statement.
Format (Language (Spelling, Wording, Grammar) & Efforts)	Errors are serious and numerous. Reader must stop and reread and may struggle to discern the writer's intention. Multiple and serious errors. Very little effort. Poor and unfinished assignment.	Frequent errors that impede the flow of communication. Ok with < 15 errors. Inconsistent effort. Generally complete assignment with care.	Occasional errors that have only minor impact on flow of communication. Good with < 10 errors. Makes good effort. Generally, completes assignment with thoroughness.	There are no errors that impair the flow of communication. Perfect with < 5 errors. Works to the best of his/her ability. Produce a high quality finished assignment.

1. Abstract

.....

.....

a summary of the contents of your assignment work

(Half page)

.....

.....

2. Data Analysis Process:

2.1 Problem Definition

..... Student's choice

.....

2.2 Data Collection

.....

.....

2.3 Data Cleaning and Data Processing

Discovering Duplicates - duplicated()

```
In [9]: data.duplicated()
```

```
Out[9]: 0      False
1      False
2      False
3      False
4      False

8802    False
8803    False
8804    False
8805    False
8806    False
Length: 8807, dtype: bool
```

Removing Duplicates

Empty Cells - isnull()

Remove Rows

2.4 Data Analysis

a. The general information about the entire data set `car_prices.csv`

Initial Analysis of Pandas Data Frame

- `head(n)` - returns first n rows (default first 5 rows)

```
In [7]: data.head(2) # returns first 2 records
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Siviwe Mabale, Thabani...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...

- `tail(n)` - returns last n rows

```
In [8]: data.tail(3) # returns last 3 records
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozes Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

- `sample(n)` - sample random n rows

```
In [9]: data.sample(4) # sample random n rows
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8218	s8219	Movie	The Boss's Daughter	Olivier Loustau	Christa Thérêt, Olivier Loustau, Florence Thom...	France	March 10, 2017	2015	TV-MA	98 min	Dramas, International Movies, Romantic Movies	While working together, a married textile fore...
5449	s5450	Movie	Catfight	Onur Tukel	Sandra Oh, Anne Heche, Alicia Silverstone, Amy...	United States	June 1, 2017	2016	TV-MA	96 min	Comedies, Independent Movies	Two college frenemies whose lives aren't what ...
7149	s7150	Movie	Jumping the Broom	Salim Akil	Angela Bassett, Paula Patton, Laz Alonso, Lore...	United States	November 1, 2020	2011	PG-13	113 min	Comedies, Romantic Movies	After a whirlwind romance, a couple rushes to ...
3279	s3280	TV Show	The Club	NaN	Alejandro Speitzer, Minnie West, Jorge Caballe...	Mexico	November 15, 2019	2019	TV-MA	1 Season	Crime TV Shows, International TV Shows, Spanis...	A band of misfit rich kids in Mexico strike ou...

Write INSIGHTS for Initial Analysis of Pandas Data Frame

- _____
- _____
- _____

Dimension of Data Frame

- `shape` - shows how many features (columns) and observations (rows) there are in the dataset.
- `columns` - shows the column labels(header) of the Data Frame.

Write INSIGHTS for Dimension of Data Frame

- _____
- _____
- _____

Data types of Data Frame

- `info()` - prints information about a Data Frame including the index dtype and columns, non-null values and memory usage.
- `dtypes` - returns the data type of each column.

Write INSIGHTS for Data types of Data Frame

- _____
- _____
- _____

Descriptive statistics for numeric columns

- `describe()` - returns stats like: mean, standard deviation, percentile, count, min and max for numeric columns.

Write INSIGHTS for descriptive statistics for numeric columns

- _____
- _____
- _____

Descriptive statistics for non-numeric columns

- `describe(include='object')` – returns summary statistics for string.

Write INSIGHTS for descriptive statistics for non-numeric columns

- _____
- _____
- _____

Inspect single column of Data Frame

- `nunique()` - returns the number of unique values in this column.

- `unique()` - give us all unique values.

- `value_counts(dropna=False)` - returns the values and their frequency.

Write INSIGHTS for Inspect single column of Data Frame

- _____
- _____
- _____

b. Find the most expensive car with details of make, model, seller and selling price.

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7652	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	Attenborough	United States	January 1, 2020	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

c. Find the number of cars sold in each model of BMW

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7652	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	Attenborough	United States	January 1, 2020	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

d. Find the total number of cars sold in 2000

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7652	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	Attenborough	United States	January 1, 2020	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

e. Do additional EDA steps to explain your problem definition in detail.

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7979	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	TV-MA	Season 1	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7979	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	TV-MA	Season 1	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

```
In [15]: data.describe(include='object')
```

```
Out[15]:
```

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7979	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	TV-MA	Season 1	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

Write INSIGHTS for your problem definition

- _____
- _____
- _____

2.5 Data Visualization

a. Choose the suitable type of chart to plot an interactive chart for the number of cars sold over year after 2000.

```
In [1]: # Bar chart with title
import pandas as pd
from bokeh.plotting import figure, show

# Read data from data set
df = pd.read_csv("Sales Report - Barchart Dataset.csv")
x=df.ItemName
y=df.NumberofItems

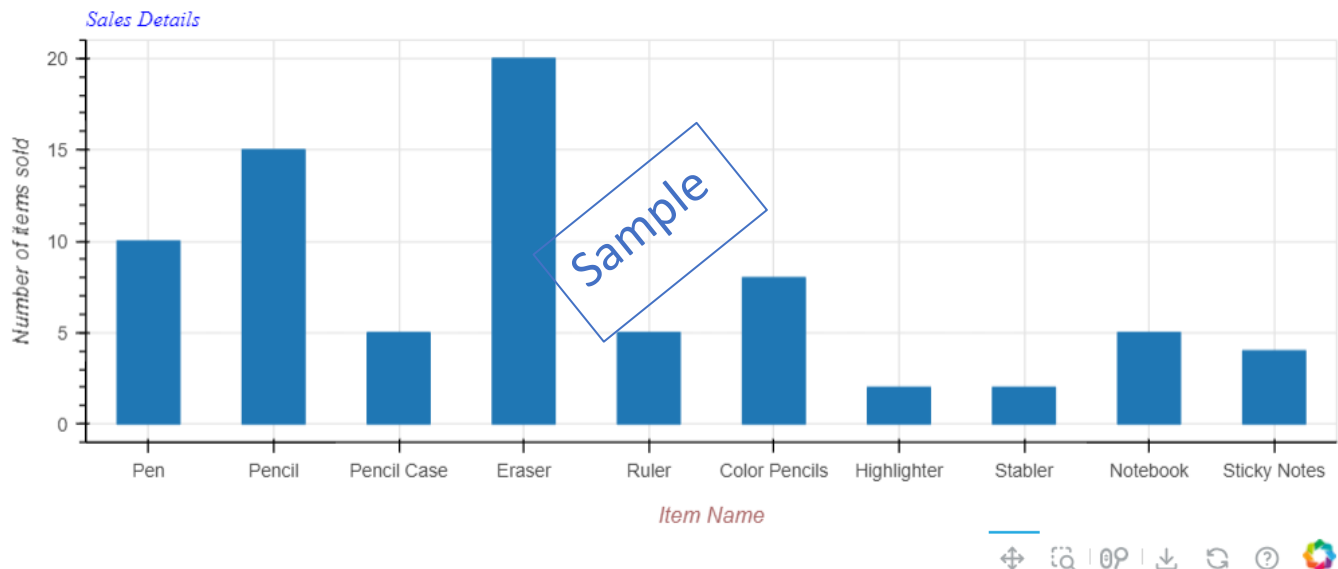
#Categorical axes (x_range=x)
p = figure(x_range=x,width=800, height=350, title="Sales Details", toolbar_location='below')

# Title
p.title.text_color = "blue"
p.title.text_font = "times"
p.title.text_font_style = "italic"

# Labels
p.xaxis.axis_label = "Item Name"
p.xaxis.axis_label_text_color = "#aa6666" # set the text color of the label
p.xaxis.axis_label_standoff = 10 # the distance between the axis label and the major tick labels
p.yaxis.axis_label = "Number of items sold"
p.yaxis.axis_label_text_font_style = "italic" # set the text style of the label

# ploat a bar chart
p.vbar(x, top=y,width=0.5)

# show the results
show(p)
```



b. Choose the suitable type of chart to plot an interactive chart for the top 10 seller to their total selling price.

```
In [1]: # Bar chart with title
import pandas as pd
from bokeh.plotting import figure, show

# Read data from data set
df = pd.read_csv("Sales Report - Barchart Dataset.csv")
x=df.ItemName
y=df.NumberofItems

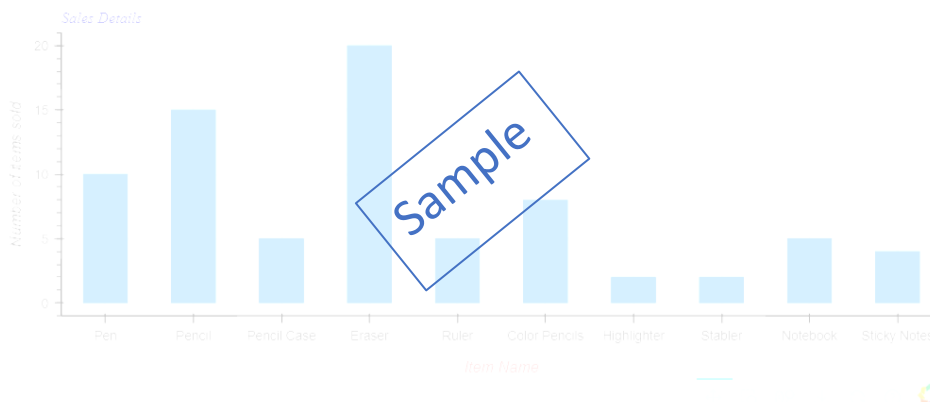
#Categorical axes (x_range=x)
p = figure(x_range=x,width=800, height=350, title="Sales Details", toolbar_location='below')

# Title
p.title.text_color = "blue"
p.title.text_font = "times"
p.title.text_font_style = "italic"

# Labels
p.xaxis.axis_label = "Item Name"
p.xaxis.axis_label_text_color = "#aa6666" # set the text color of the Label
p.xaxis.axis_label_standoff = 10 # the distance between the axis label and the major tick labels
p.yaxis.axis_label = "Number of items sold"
p.yaxis.axis_label_text_font_style = "italic" # set the text style of the Label

# plot a bar chart
p.vbar(x, top=y,width=0.5)

# show the results
show(p)
```



c. Plot multiple graphs to explain your problem definition in detail.

```
In [1]: # Bar chart with title
import pandas as pd
from bokeh.plotting import figure, show

# Read data from data set
df = pd.read_csv("Sales Report - Barchart Dataset.csv")
x=df.ItemName
y=df.NumberofItems

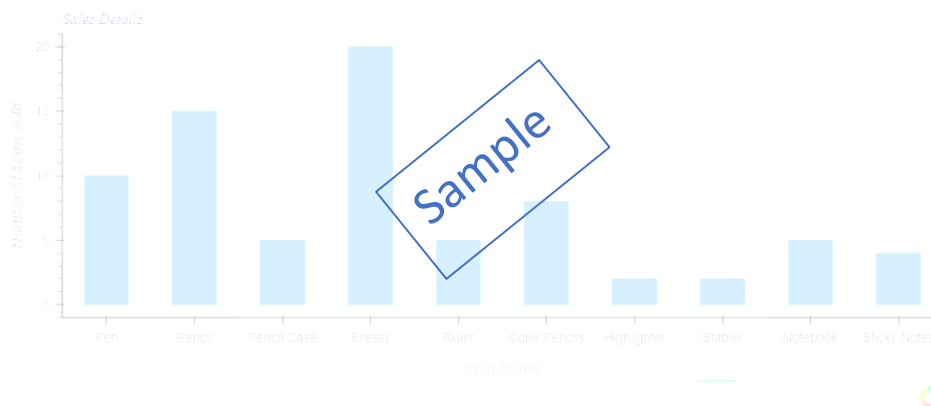
#Categorical axes (x_range=x)
p = figure(x_range=x,width=800, height=350, title="Sales Details", toolbar_location='below')

# Title
p.title.text_color = "blue"
p.title.text_font = "times"
p.title.text_font_style = "italic"

# Labels
p.xaxis.axis_label = "Item Name"
p.xaxis.axis_label_text_color = "#aa6666" # set the text color of the Label
p.xaxis.axis_label_standoff = 10 # the distance between the axis label and the major tick labels
p.yaxis.axis_label = "Number of items sold"
p.yaxis.axis_label_text_font_style = "italic" # set the text style of the Label

# plot a bar chart
p.vbar(x, top=y,width=0.5)

# show the results
show(p)
```



2.6 Data storytelling

Movies and TV Shows are the 2 types of Netflix productions. 4528 directors were directed all 8807 productions. All Movies and TV Shows released from the year 1925 to 2021, were recorded in this data frame.

Netflix produced 6131 movies and 2676 TV shows. So, Netflix produce more movies than TV shows. 517 movies and 436 TV shows were released in 2020. Rajiv Chilaka, Raúl Campos, Jan Suter, Marcus Raboy, Suhas Kadav and Jay Karas are the 5 successful directors in this platform. The total number of documentaries in the Netflix is 869.

Netflix produces two main types of content: movies and TV shows. Across these productions, a total of 4,528 directors have contributed to the 8,807 titles in the dataset. The recorded data spans from the year 1925 to 2021.

Of all the productions, Netflix has created 6,131 movies and 2,676 TV shows, indicating a greater emphasis on movie production. In the year 2020 alone, Netflix released 517 movies and 436 TV shows.

Among the list of directors, Rajiv Chilaka, Raúl Campos, Jan Suter, Marcus Raboy, Suhas Kadav, and Jay Karas stand out as the top five most successful directors on the platform.

Documentaries, a notable genre on Netflix, account for a total of 869 titles in the dataset.

3. References

- 1.
- 2.
- 3.

4. Appendix

Explanatory Data Analysis EDA program

```
In [3]: # Import Python Libraries
```

```
In [1]: import pandas as pd # Pandas is a Python library used for working with data sets
```

```
In [5]: # Reading Dataset
```

Sample

```
In [2]: data = pd.read_csv("netflix_titles.csv") # CSV (Comma-Separated Values) files  
data # printing the Dataset
```

Out[2]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Bou, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train l...
...
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	November 20, 2019	2007	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	July 1, 2019	2018	TV-Y7	2 Seasons	Kids' TV, Korean TV Shows, TV Comedies	While living alone in a spooky town, a young g...
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

8807 rows × 12 columns

Exploratory data analysis (EDA)

```
In [ ]: # Initial Analysis of Pandas DataFrame
```

```
In [5]: data.head() # returns first 5 records
```

Out[5]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 21, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train l...

Sample

In [6]: `data.tail() # returns last 5 records`

Out[6]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	November 20, 2019	2007	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	July 1, 2019	2018	TV-Y7	2 Seasons	Kids' TV, Korean TV Shows, TV Comedies	While living alone in a spooky town, a young g...
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody from Toy Story, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

In [7]: `data.head(2) # returns first 2 records`

Out[7]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...

In [8]: `data.tail(3) # returns last 3 records`

Out[8]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	November 1, 2019	2009	R	88 min	Comedies, Horror Movies	Looking to survive in a world taken over by zo...
8805	s8806	Movie	Zoom	Peter Hewitt	Tom Aker, Courteney Cox, Chevy Chase, Kate Ma...	United States	January 11, 2020	2006	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former superhero...
8806	s8807	Movie	Zubaan	Mozez Singh	Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...	India	March 2, 2019	2015	TV-14	111 min	Dramas, International Movies, Music & Musicals	A scrappy but poor boy worms his way into a ty...

In [9]: `data.sample(4) # sample random n rows`

Out[9]:

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
8218	s8219	Movie	The Boss's Daughter	Olivier Loustau	Christa Th��ret, Olivier Loustau, Florence Thom...	France	March 10, 2017	2015	TV-MA	98 min	Dramas, International Movies, Romantic Movies	While working together, a married textile fore...
5449	s5450	Movie	Catfight	Onur Tukel	Sandra Oh, Anne Heche, Alicia Silverstone, Amy...	United States	June 1, 2017	2016	TV-MA	96 min	Comedies, Independent Movies	Two college frenemies whose lives aren't what ...
7149	s7150	Movie	Jumping the Broom	Salim Akil	Angela Bassett, Paula Patton, Laz Alonso, Lore...	United States	November 1, 2020	2011	PG-13	113 min	Comedies, Romantic Movies	After a whirlwind romance, a couple rushes to ...
3279	s3280	TV Show	The Club	NaN	Alejandro Speitzer, Minnie West, Jorge Caballe...	Mexico	November 15, 2019	2019	TV-MA	1 Season	Crime TV Shows, International TV Shows, Spanis...	A band of misfit rich kids in Mexico strike ou...

Sample

In []: `# Dimension of DataFrame`In [10]: `data.shape # shows how many rows and columns in the dataset`Out[10]: `(8807, 12)`In [11]: `data.columns # shows the column labels(header) of the DataFrame`Out[11]: `Index(['show_id', 'type', 'title', 'director', 'cast', 'country', 'date_added', 'release_year', 'rating', 'duration', 'listed_in', 'description'], dtype='object')`In []: `# Data types of DataFrame`In [12]: `data.info() # prints information about a DataFrame`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
#   Column                Non-Null Count  Dtype
---  -
0   show_id                8807 non-null   object
1   type                   8807 non-null   object
2   title                  8807 non-null   object
3   director               6173 non-null   object
4   cast                   7982 non-null   object
5   country                7976 non-null   object
6   date_added             8797 non-null   object
7   release_year           8807 non-null   int64
8   rating                 8803 non-null   object
9   duration               8804 non-null   object
10  listed_in              8807 non-null   object
11  description            8807 non-null   object
dtypes: int64(1), object(11)
memory usage: 825.8+ KB
```

Sample

```
In [13]: data.dtypes # returns the data type of each column
```

```
Out[13]: show_id      object
         type        object
         title       object
         director     object
         cast         object
         country      object
         date_added   object
         release_year  int64
         rating       object
         duration     object
         listed_in    object
         description  object
         dtype: object
```

```
In [ ]: # Descriptive statistics for numeric columns
```

```
In [14]: data.describe() # returns stats like: mean, standard deviation, percentile, count, min and max for numeric columns.
```

Out[14]: **release_year**

count	8807.000000
mean	2014.180198
std	8.819312
min	1925.000000
25%	2013.000000
50%	2017.000000
75%	2019.000000
max	2021.000000

In []: *# Descriptive statistics for non-numeric columns*

In [15]: `data.describe(include='object')`

Out[15]:

	show_id	type	title	director	cast	country	date_added	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	17	220	514	8775
top	s1	Movie	Dick Johnson Is Dead	Raïna Chilaka	David Attenborough	United States	January 1, 2020	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	3207	1793	362	4

In []: *# Inspect single column of DataFrame*

In [16]: `data.type.unique()` *# returns the number of unique values in this column*

Out[16]: 2

In [18]: `data.director.unique()` *# returns the number of unique values in this column*

Out[18]: 4528

```
In [19]: data.type.unique() # give us all unique values
```

```
Out[19]: array(['Movie', 'TV Show'], dtype=object)
```

```
In [23]: data.listed_in.unique() # give us all unique values
```

Sample

```
Out[23]: array(['Documentaries', 'International TV Shows, TV Dramas, TV Mysteries',
'Crime TV Shows, International TV Shows, TV Action & Adventure',
'Docuseries, Reality TV',
'International TV Shows, Romantic TV Shows, TV Comedies',
'TV Dramas, TV Horror, TV Mysteries', 'Children & Family Movies',
'Dramas, Independent Movies, International Movies',
'British TV Shows, Reality TV', 'Comedies, Dramas',
'Crime TV Shows, Docuseries, International TV Shows',
'Dramas, International Movies',
'Children & Family Movies, Comedies',
'British TV Shows, Crime TV Shows, Docuseries',
'TV Comedies, TV Dramas', 'Documentaries, International Movies',
'Crime TV Shows, Spanish-Language TV Shows, TV Dramas',
'Thrillers',
'International TV Shows, Spanish-Language TV Shows, TV Action & Adventure',
'International TV Shows, TV Action & Adventure, TV Dramas',
'Comedies, International Movies',
'Comedies, International Movies, Romantic Movies',
'Docuseries, International TV Shows, Reality TV',
'Comedies, International Movies, Music & Musicals', 'Comedies',
'Horror Movies, Sci-Fi & Fantasy', 'TV Comedies',
'British TV Shows, International TV Shows, TV Comedies',
'International TV Shows, TV Dramas, TV Thrillers', "Kids' TV",
'Dramas, International Movies, Thrillers',
'Action & Adventure, Dramas, International Movies',
"Kids' TV, TV Comedies", 'Action & Adventure, Dramas',
"Kids' TV, TV Sci-Fi & Fantasy",
'Action & Adventure, Classic Movies, Drama',
'Dramas, Horror Movies, Thrillers',
'Action & Adventure, Horror Movies, Thrillers',
'Action & Adventure', 'Dramas, Thrillers',
'International TV Shows, TV Dramas',
'International TV Shows, TV Dramas, TV Sci-Fi & Fantasy',
'Action & Adventure, Anime Features, International Movies',
'Reality TV', 'Docuseries, International TV Shows',
'Documentaries, International Movies, Sports Movies',
'International TV Shows, Reality TV, Romantic TV Shows',
'British TV Shows, Docuseries, International TV Shows',
'Anime Series, International TV Shows',
'Comedies, Dramas, International Movies',
'Crime TV Shows, TV Comedies, TV Dramas',
'Action & Adventure, Comedies, Dramas', "Anime Series, Kids' TV",
'International Movies, Thrillers', "Kids' TV, Korean TV Shows",
'Documentaries, Sports Movies', 'Sci-Fi & Fantasy, Thrillers',
'Dramas, International Movies, Romantic Movies',
```

'Documentaries, Music & Musicals',
"Kids' TV, TV Comedies, TV Sci-Fi & Fantasy",
"British TV Shows, Kids' TV", 'Docuseries, Science & Nature TV',
'Children & Family Movies, Dramas',
"Kids' TV, TV Dramas, Teen TV Shows",
'Crime TV Shows, International TV Shows, Spanish-Language TV Shows',
'Docuseries, International TV Shows, Spanish-Language TV Shows',
'Dramas', 'Comedies, Romantic Movies', 'Dramas, Romantic Movies',
'Comedies, Dramas, Independent Movies',
'Crime TV Shows, TV Action & Adventure, TV Comedies',
'Children & Family Movies, Music & Musicals',
'Action & Adventure, Classic Movies, Cult Movies',
'International TV Shows, TV Action & Adventure, TV Comedies',
'Action & Adventure, Sci-Fi & Fantasy',
'Action & Adventure, Comedies', 'Classic Movies, Comedies, Dramas',
'Comedies, Cult Movies', 'Comedies, Cult Movies, Music & Musicals',
'Comedies, Music & Musicals', 'TV Shows',
'Action & Adventure, International Movies',
'Anime Series, International TV Shows, Teen TV Shows',
'Action & Adventure, Children & Family Movies, Cult Movies',
'Comedies, Dramas, Romantic Movies',
'Comedies, Cult Movies, Sci-Fi & Fantasy',
'Classic Movies, Dramas',
'Action & Adventure, Children & Family Movies, Comedies',
'Dramas, Faith & Spirituality', 'Documentaries, LGBTQ Movies',
'Action & Adventure, Classic Movies', 'Docuseries',
'International TV Shows, TV Comedies',
'Dramas, Independent Movies',
'Action & Adventure, Comedies, International Movies',
'International TV Shows, Spanish-Language TV Shows, TV Dramas',
'Crime TV Shows, International TV Shows, TV Dramas',
'Action & Adventure, Horror Movies, International Movies',
'Comedies, International Movies, Sci-Fi & Fantasy',
'Action & Adventure, International Movies, Music & Musicals',
'Dramas, International Movies, Music & Musicals',
'Horror Movies, International Movies', 'Reality TV, Teen TV Shows',
'Crime TV Shows, TV Dramas, TV Mysteries',
'International TV Shows, Reality TV',
'International TV Shows, TV Comedies, TV Dramas',
'Dramas, Independent Movies, Romantic Movies', 'Horror Movies',
'Documentaries, LGBTQ Movies, Sports Movies',
'Horror Movies, International Movies, Thrillers',
'Action & Adventure, Anime Features',
'TV Dramas, TV Mysteries, TV Sci-Fi & Fantasy',
'International TV Shows, Spanish-Language TV Shows, TV Comedies',

'Children & Family Movies, Comedies, Music & Musicals',
'Comedies, Independent Movies',
'Anime Series, International TV Shows, Romantic TV Shows',
'Classic Movies, Dramas, Independent Movies',
'International TV Shows, Romantic TV Shows, Spanish-Language TV Shows',
'International TV Shows, TV Dramas, Teen TV Shows',
'Stand-Up Comedy',
'Action & Adventure, Anime Features, Children & Family Movies',
'International TV Shows, Romantic TV Shows, TV Dramas',
'International Movies, Music & Musicals',
'TV Action & Adventure, TV Dramas, TV Mysteries',
'Horror Movies, Independent Movies, International Movies',
'Comedies, Cult Movies, International Movies',
'Classic Movies, Dramas, International Movies', 'Movies',
'Crime TV Shows, Docuseries',
'Children & Family Movies, Comedies, Sci-Fi & Fantasy',
'Anime Series, International TV Shows, TV Thrillers',
'Action & Adventure, Horror Movies, Sci-Fi & Fantasy',
'Classic Movies, Comedies, Cult Movies',
'TV Dramas, Teen TV Shows',
'Action & Adventure, Sci-Fi & Fantasy, Thrillers',
'Children & Family Movies, Comedies, Dramas',
'Dramas, Sports Movies',
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'Dramas, Independent Movies, Thrillers',
'TV Dramas, TV Sci-Fi & Fantasy',
'Action & Adventure, International Movies, Thrillers',
'British TV Shows, International TV Shows, Reality TV',
'TV Action & Adventure, TV Dramas, Teen TV Shows', 'Anime Series',
'Crime TV Shows, TV Action & Adventure, TV Sci-Fi & Fantasy',
'Crime TV Shows, International TV Shows, TV Comedies',
'Stand-Up Comedy & Talk Shows, TV Comedies',
'Classic & Cult TV, TV Action & Adventure, TV Dramas',
'Children & Family Movies, Sports Movies',
'TV Action & Adventure, TV Sci-Fi & Fantasy',
'Anime Series, Stand-Up Comedy & Talk Shows', 'TV Dramas',
'Anime Features, Children & Family Movies, International Movies',
'Classic & Cult TV, Crime TV Shows, International TV Shows',
'Crime TV Shows, International TV Shows, Romantic TV Shows',
'Horror Movies, LGBTQ Movies',
'Action & Adventure, Dramas, Romantic Movies',
'Documentaries, International Movies, Music & Musicals',
'TV Comedies, TV Dramas, Teen TV Shows',
'Children & Family Movies, Comedies, Sports Movies',

'Children & Family Movies, Dramas, International Movies',
'Comedies, Documentaries, International Movies',
'Romantic TV Shows, TV Dramas',
'Anime Series, TV Horror, TV Thrillers',
'International Movies, Romantic Movies',
'TV Action & Adventure, TV Dramas, TV Sci-Fi & Fantasy',
"Kids' TV, Korean TV Shows, TV Comedies",
'British TV Shows, Crime TV Shows, International TV Shows',
'Crime TV Shows, TV Horror, TV Mysteries',
'Docuseries, International TV Shows, Science & Nature TV',
'British TV Shows, International TV Shows, TV Dramas',
"Kids' TV, TV Action & Adventure, TV Sci-Fi & Fantasy",
'International Movies, Romantic Movies, Thrillers',
'Action & Adventure, Cult Movies, International Movies',
'Action & Adventure, Comedies, Sci-Fi & Fantasy',
"International TV Shows, Kids' TV, TV Mysteries",
'Action & Adventure, Thrillers',
'Dramas, Faith & Spirituality, International Movies',
'Action & Adventure, Classic Movies, Comedies',
'Action & Adventure, Comedies, Sports Movies',
'Action & Adventure, Children & Family Movies, Classic Movies',
'Action & Adventure, Children & Family Movies, Dramas',
'Horror Movies, Thrillers', 'Action & Adventure, Romantic Movies',
'Dramas, Romantic Movies, Sci-Fi & Fantasy',
'Dramas, Music & Musicals, Romantic Movies',
'Anime Series, Crime TV Shows, International TV Shows',
'Reality TV, Romantic TV Shows',
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'Reality TV, TV Action & Adventure, TV Mysteries',
'Crime TV Shows, TV Dramas',
'International TV Shows, Reality TV, Spanish-Language TV Shows',
'Crime TV Shows, TV Dramas, TV Thrillers',
'British TV Shows, Docuseries',
'International TV Shows, Korean TV Shows, TV Comedies',
'Action & Adventure, Anime Features, Classic Movies',
'TV Action & Adventure, TV Dramas, TV Horror',
'Crime TV Shows, International TV Shows, TV Thrillers',
'Anime Series, Crime TV Shows, TV Horror',
'Anime Features, Documentaries', 'Comedies, Horror Movies',
'International TV Shows, Spanish-Language TV Shows, Stand-Up Comedy & Talk Shows',
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'Romantic TV Shows, TV Comedies, TV Dramas',
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'Dramas, International Movies, Sports Movies',
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'Horror Movies, Romantic Movies, Sci-Fi & Fantasy',
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'Action & Adventure, Anime Features, Horror Movies',
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'Docuseries, Reality TV, Science & Nature TV',
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'Dramas, Independent Movies, Sports Movies',
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'Docuseries, TV Sci-Fi & Fantasy',
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'International Movies, Sci-Fi & Fantasy',
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'Comedies, Dramas, LGBTQ Movies',
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'Children & Family Movies, Dramas, Music & Musicals',
'Action & Adventure, Independent Movies, International Movies',
'Action & Adventure, Children & Family Movies, Sci-Fi & Fantasy',
'Horror Movies, Independent Movies, Sci-Fi & Fantasy',
'TV Dramas, TV Sci-Fi & Fantasy, Teen TV Shows',
'Anime Features, International Movies, Sci-Fi & Fantasy',
'Dramas, Independent Movies, Music & Musicals',
"Kids' TV, TV Comedies, TV Dramas",
'Children & Family Movies, Documentaries, Sports Movies',
'Independent Movies, Sci-Fi & Fantasy, Thrillers',
'Anime Features, Music & Musicals, Sci-Fi & Fantasy',

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'Anime Series, Crime TV Shows',
'Dramas, Sci-Fi & Fantasy, Thrillers',
'TV Comedies, TV Dramas, TV Horror',
'Children & Family Movies, Comedies, LGBTQ Movies',
'International TV Shows, TV Action & Adventure, TV Sci-Fi & Fantasy',
'Docuseries, TV Dramas',
'Horror Movies, International Movies, Romantic Movies',
'Crime TV Shows, Docuseries, Science & Nature TV',
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"Kids' TV, Spanish-Language TV Shows, Teen TV Shows",
'Comedies, Horror Movies, Independent Movies',
'Action & Adventure, International Movies, Sports Movies',
'Action & Adventure, Independent Movies, Sci-Fi & Fantasy',
'Horror Movies, LGBTQ Movies, Music & Musicals',
'Comedies, Music & Musicals, Sports Movies',
'TV Horror, TV Mysteries, Teen TV Shows',
'Romantic TV Shows, TV Comedies',
"Kids' TV, Reality TV, Science & Nature TV",
'International Movies, Romantic Movies, Sci-Fi & Fantasy',
'TV Comedies, TV Horror, TV Thrillers', 'TV Action & Adventure',
'International TV Shows, Spanish-Language TV Shows, TV Horror',

'Crime TV Shows, TV Action & Adventure, TV Thrillers',
'Music & Musicals, Stand-Up Comedy',
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'TV Comedies, TV Sci-Fi & Fantasy, Teen TV Shows',
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'Stand-Up Comedy & Talk Shows, TV Mysteries, TV Sci-Fi & Fantasy',
'TV Sci-Fi & Fantasy, TV Thrillers',
'Comedies, Independent Movies, Music & Musicals',
'Comedies, Cult Movies, Independent Movies',
'Documentaries, Dramas, International Movies',
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'British TV Shows, Docuseries, Science & Nature TV',
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'Sci-Fi & Fantasy', 'Comedies, LGBTQ Movies',
'Comedies, Independent Movies, Thrillers',
'Classic Movies, Cult Movies, Dramas',
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'Action & Adventure, Documentaries, International Movies',
'Children & Family Movies, Independent Movies',
'Comedies, Cult Movies, Dramas',
'International TV Shows, TV Horror, TV Thrillers',
'Classic Movies, Thrillers',

'Crime TV Shows, TV Dramas, TV Horror',
'British TV Shows, Docuseries, Reality TV',
'Documentaries, LGBTQ Movies, Music & Musicals',
'Classic Movies, Dramas, Romantic Movies',
'Crime TV Shows, Romantic TV Shows, Spanish-Language TV Shows',
'Classic Movies, Cult Movies, Horror Movies',
'Anime Series, Crime TV Shows, TV Thrillers',
'Children & Family Movies, Classic Movies',
'Classic Movies, Comedies, International Movies',
'Comedies, Sci-Fi & Fantasy',
'Action & Adventure, Cult Movies, Dramas',
'Documentaries, Faith & Spirituality, Music & Musicals',
'British TV Shows, Classic & Cult TV, TV Comedies',
'International Movies, Sports Movies', 'International TV Shows',
"Classic & Cult TV, Kids' TV, Spanish-Language TV Shows",
'Romantic TV Shows, Spanish-Language TV Shows, TV Dramas',
'Children & Family Movies, Comedies, Faith & Spirituality',
'British TV Shows, Crime TV Shows, TV Dramas',
'Classic Movies, Dramas, Music & Musicals',
'Cult Movies, Horror Movies, Thrillers',
'Action & Adventure, Classic Movies, Sci-Fi & Fantasy',
'TV Action & Adventure, TV Comedies',
'Classic Movies, Comedies, Music & Musicals', 'Independent Movies',
'Documentaries, Horror Movies',
'Classic & Cult TV, TV Horror, TV Mysteries',
'Comedies, Faith & Spirituality, International Movies',
'Dramas, Horror Movies, Sci-Fi & Fantasy',
'British TV Shows, TV Dramas, TV Sci-Fi & Fantasy',
'Comedies, Cult Movies, Horror Movies',
'Comedies, Cult Movies, Sports Movies',
'Classic Movies, Documentaries',
'Action & Adventure, Faith & Spirituality, Sci-Fi & Fantasy',
'Action & Adventure, Children & Family Movies',
'International TV Shows, Reality TV, TV Action & Adventure',
'Docuseries, Science & Nature TV, TV Dramas', 'Anime Features',
'Action & Adventure, Horror Movies, Independent Movies',
'Action & Adventure, Classic Movies, International Movies',
'Cult Movies, Independent Movies, Thrillers',
'Crime TV Shows, TV Comedies',
'Classic Movies, Cult Movies, Documentaries',
"Classic & Cult TV, Kids' TV, TV Comedies",
'Classic Movies, Dramas, LGBTQ Movies',
'Classic Movies, Dramas, Sports Movies',
'Action & Adventure, Cult Movies',
'Action & Adventure, Comedies, Music & Musicals',

Sample

```
'Classic Movies, Horror Movies, Thrillers',
'Classic Movies, Comedies, Independent Movies',
'Children & Family Movies, Classic Movies, Dramas',
'Dramas, Faith & Spirituality, Sports Movies',
'Classic Movies, Comedies, Romantic Movies',
'Dramas, Horror Movies, Music & Musicals',
'Classic Movies, Independent Movies, Thrillers',
'Children & Family Movies, Faith & Spirituality',
'Classic Movies, Comedies, Sports Movies',
'Comedies, Dramas, Sports Movies',
'Action & Adventure, Romantic Movies, Sci-Fi & Fantasy',
'Classic & Cult TV, TV Sci-Fi & Fantasy',
'Comedies, Cult Movies, LGBTQ Movies',
'Comedies, Horror Movies, Sci-Fi & Fantasy',
'Action & Adventure, Comedies, Horror Movies',
'Classic & Cult TV, Crime TV Shows, TV Dramas',
'Action & Adventure, Documentaries, Sports Movies',
'International Movies, LGBTQ Movies, Romantic Movies',
'Cult Movies, Dramas, Thrillers'], dtype=object)
```

Sample

```
In [38]: data.type.value_counts(dropna=True) # returns the values and their frequency, answer for b
```

```
Out[38]: type
Movie      6131
TV Show    2676
Name: count, dtype: int64
```

```
In [37]: allyear=data.groupby(['release_year','type']).size().reset_index(name='Total') # answer for c
year2020=allyear[allyear['release_year'] == 2020]
year2020
```

```
Out[37]:
```

	release_year	type	Total
115	2020	Movie	517
116	2020	TV Show	436

```
In [3]: data.director.value_counts(dropna=True).head(5) # answer for d
```



```
Out[3]: director
        Rajiv Chilaka          19
        Raúl Campos, Jan Suter 18
        Marcus Raboy           16
        Suhas Kadav            16
        Jay Karas              14
        Name: count, dtype: int64
```

Sample

```
In [40]: sum(data['listed_in'].str.contains('Documentaries')) # answer for 2
```

```
Out[40]: 869
```

```
In [ ]:
```