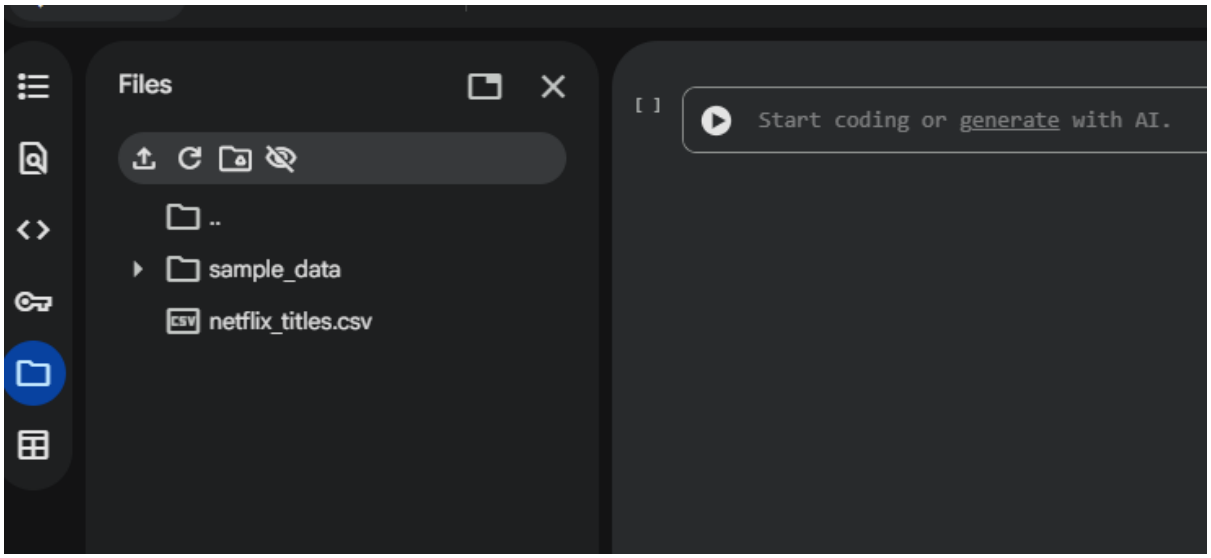
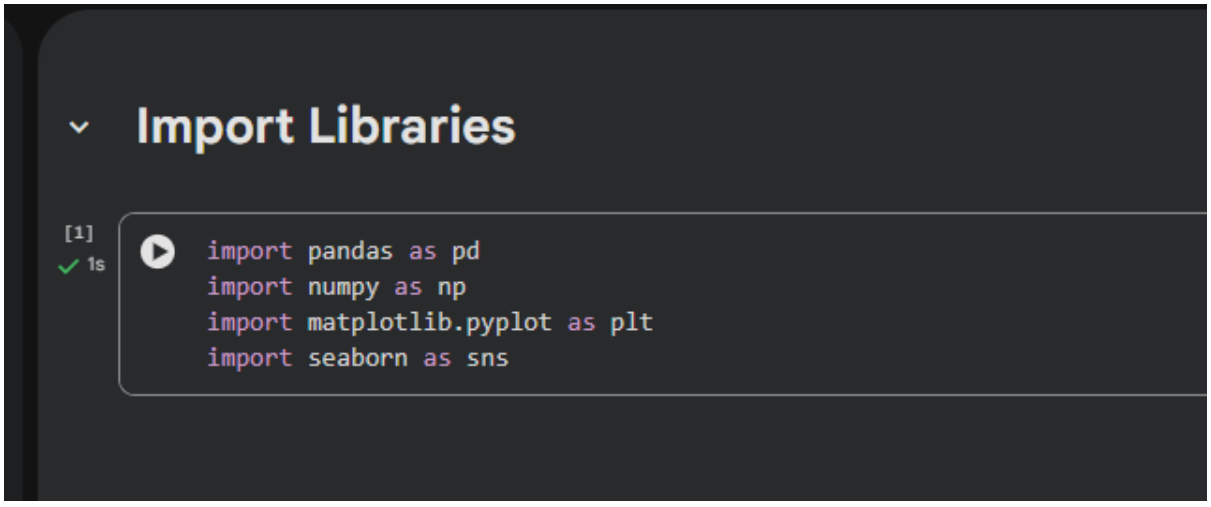
Name:**Sumbul** **Data Science**
Abdul wahid (internship)

Introduction: In this task, advanced data cleaning and preprocessing techniques were applied to a real-world dataset as part of Week 1 of the Data Science Internship. The goal was to transform raw and messy data into a clean, analysis-ready format using Python



Import Libraries:



Dataset Description: The Netflix Movies and TV Shows dataset was selected for this task. It contains information such as title, type, director, cast, country, release year, rating, and duration. The dataset consists of more than 8,000 records and includes missing values and inconsistent data types.

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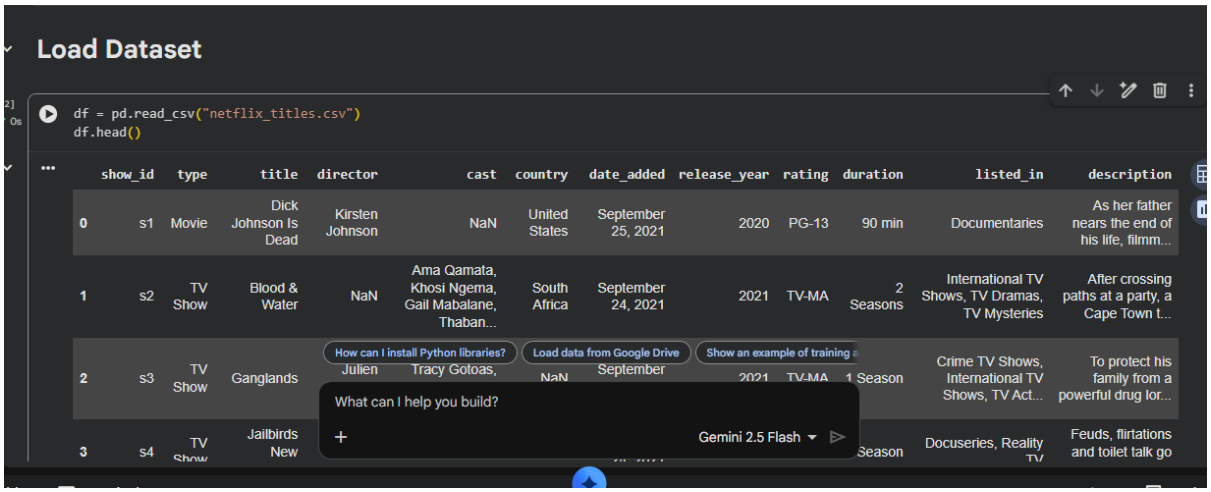
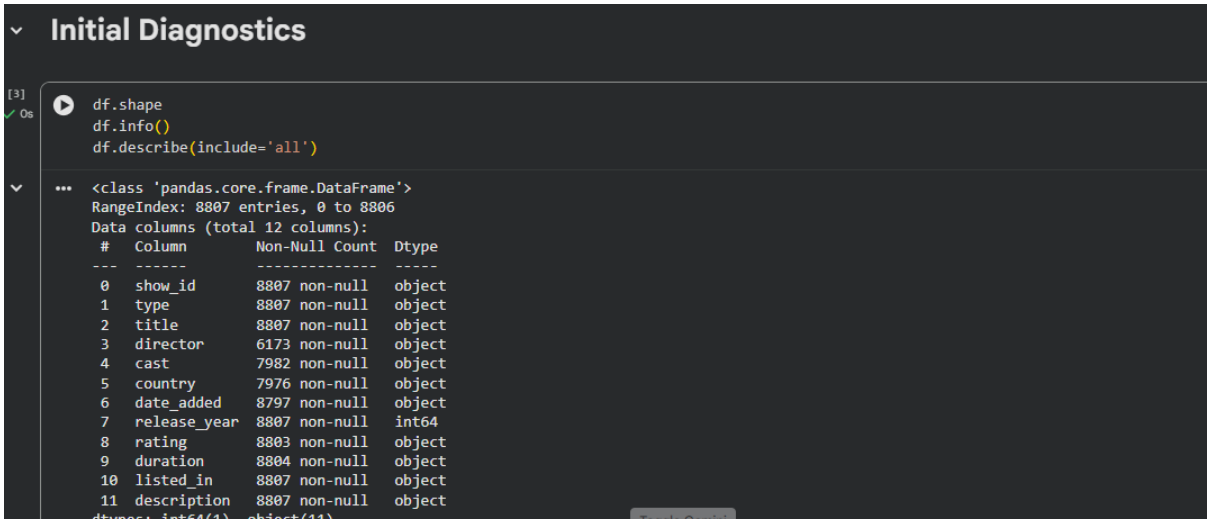
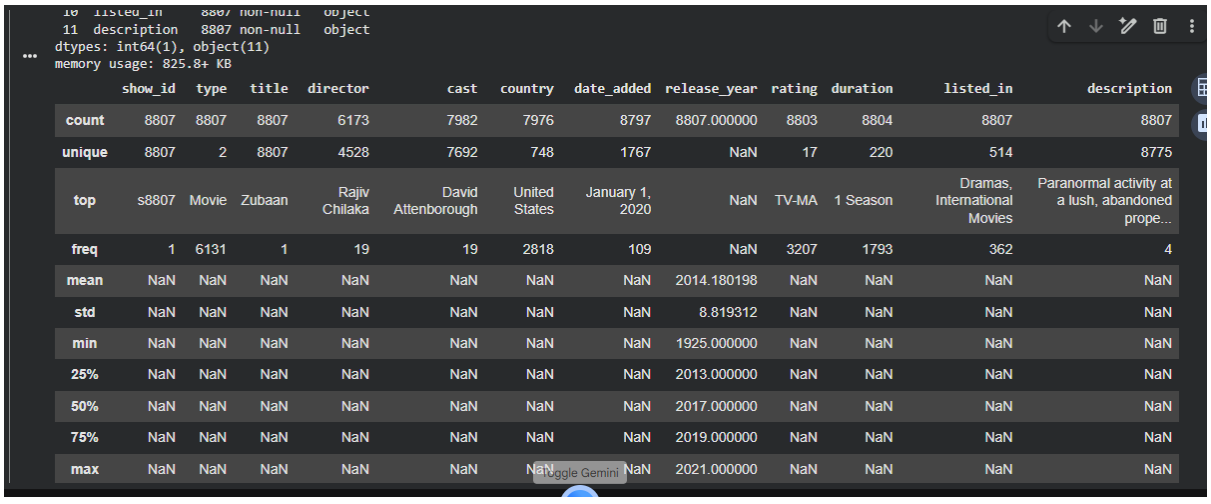


	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	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	Tracy Gotoas,	NaN	September	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	Jailbirds New							Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go

Initial Diagnostics: Initial data inspection was performed to understand the structure, size, and data types of the dataset. This step helped identify missing values and columns requiring preprocessing.





	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
count	8807	8807	8807	6173	7982	7976	8797	8807.000000	8803	8804	8807	8807
unique	8807	2	8807	4528	7692	748	1767	NaN	17	220	514	8775
top	s8807	Movie	Zubaan	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	NaN	TV-MA	1 Season	Dramas, International Movies	Paranormal activity at a lush, abandoned prope...
freq	1	6131	1	19	19	2818	109	NaN	3207	1793	362	4
mean	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2014.180198	NaN	NaN	NaN	NaN
std	NaN	NaN	NaN	NaN	NaN	NaN	NaN	8.819312	NaN	NaN	NaN	NaN
min	NaN	NaN	NaN	NaN	NaN	NaN	NaN	1925.000000	NaN	NaN	NaN	NaN
25%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2013.000000	NaN	NaN	NaN	NaN
50%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2017.000000	NaN	NaN	NaN	NaN
75%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2019.000000	NaN	NaN	NaN	NaN
max	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2021.000000	NaN	NaN	NaN	NaN

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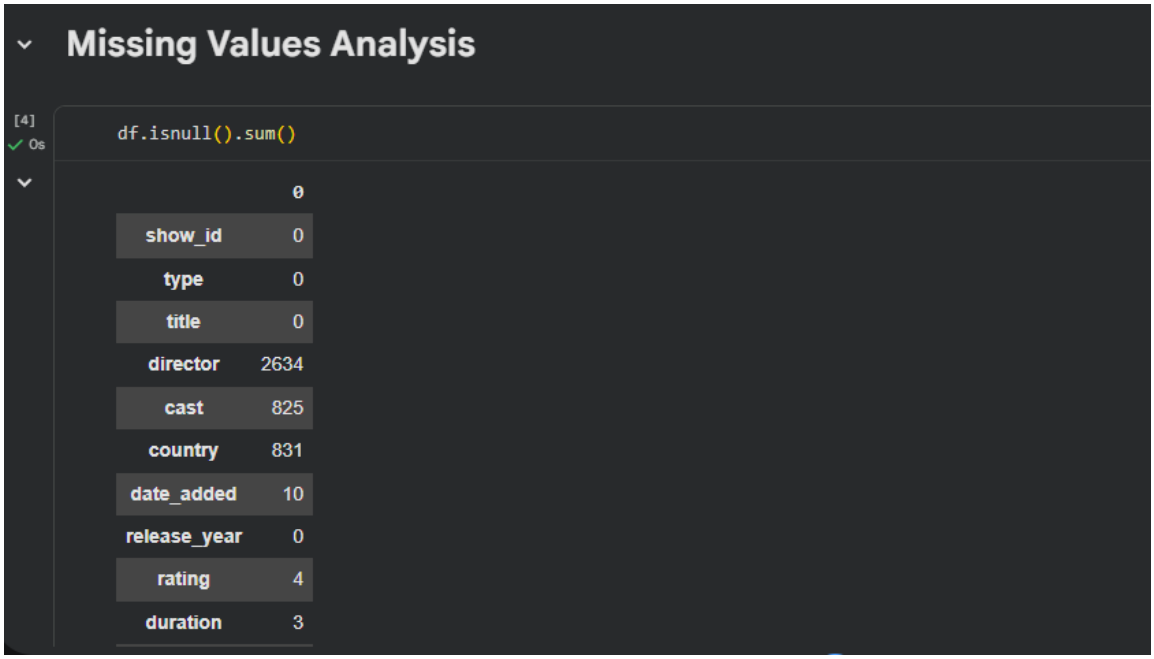
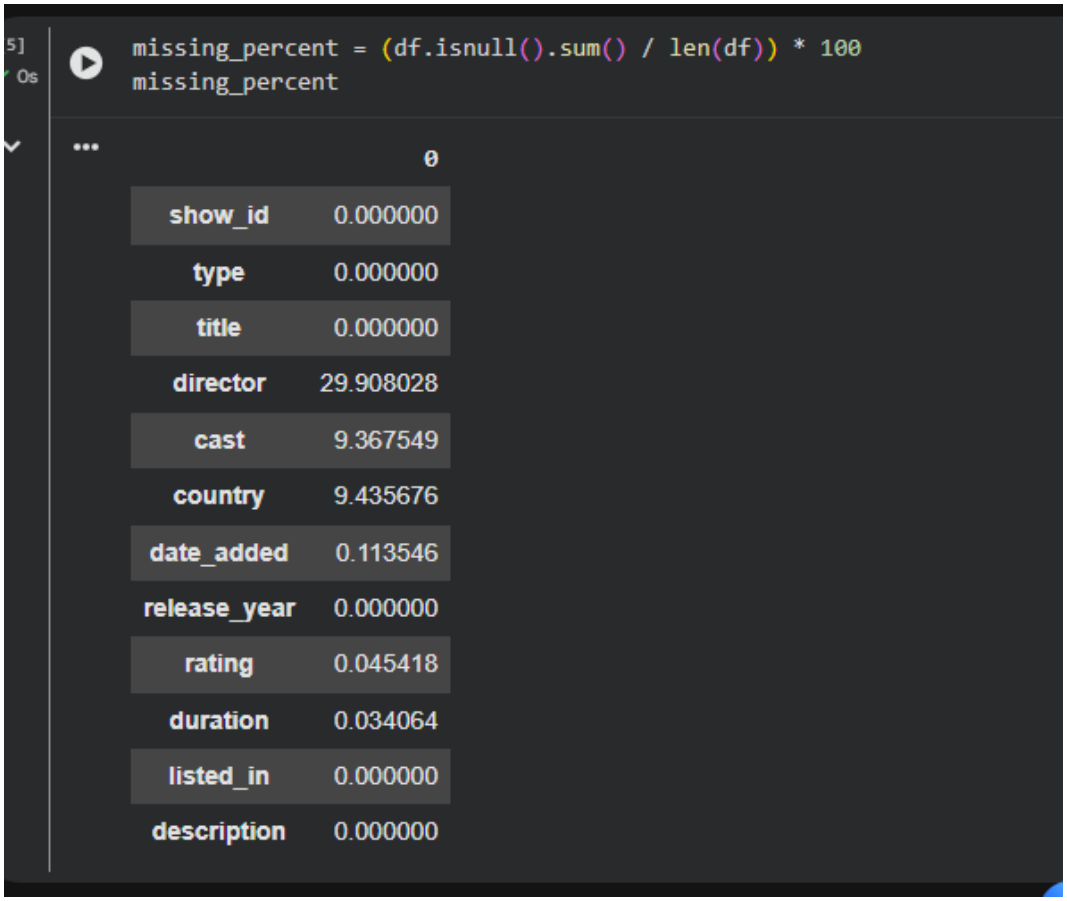
Missing Value Analysis:

Missing values were analyzed using both tabular and visual methods. Several columns such as director, cast, country, and rating contained missing data.





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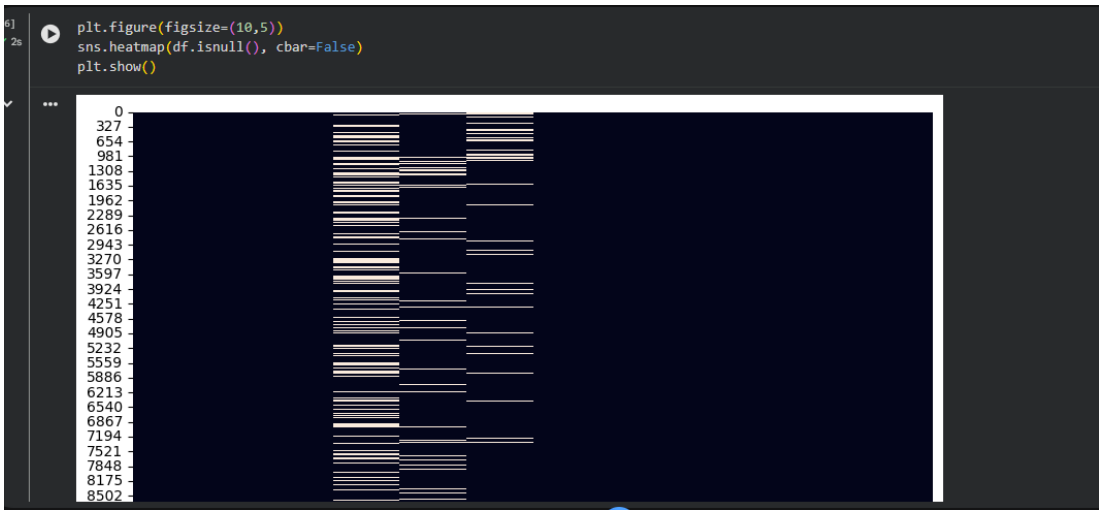

Missing Value Imputation: Two different imputation techniques were applied. Statistical methods such as mean and mode were used for numerical and categorical features. Additionally, KNN Imputation was applied as an advanced machine-learning-based technique to handle missing values more effectively.

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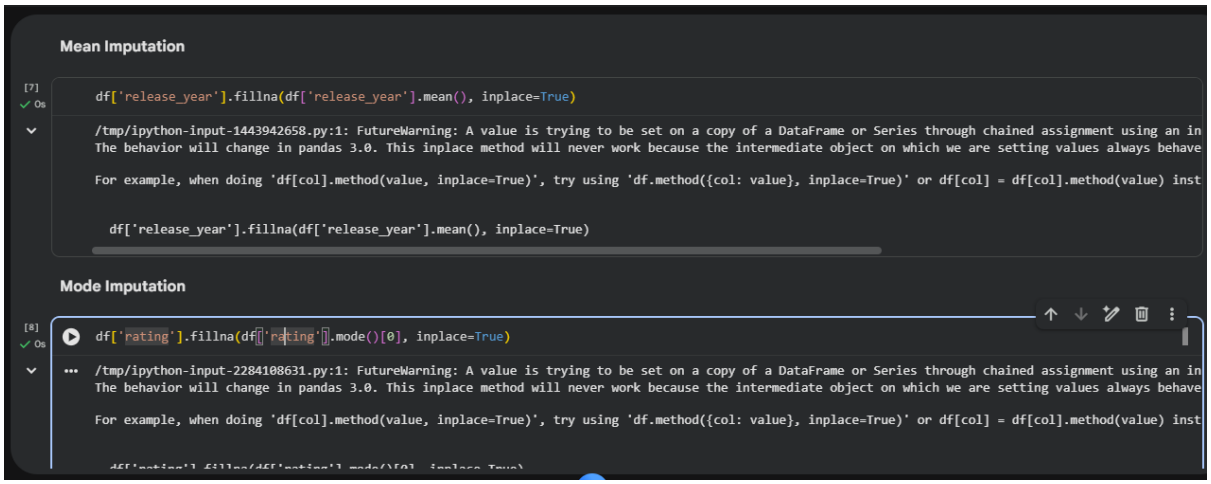

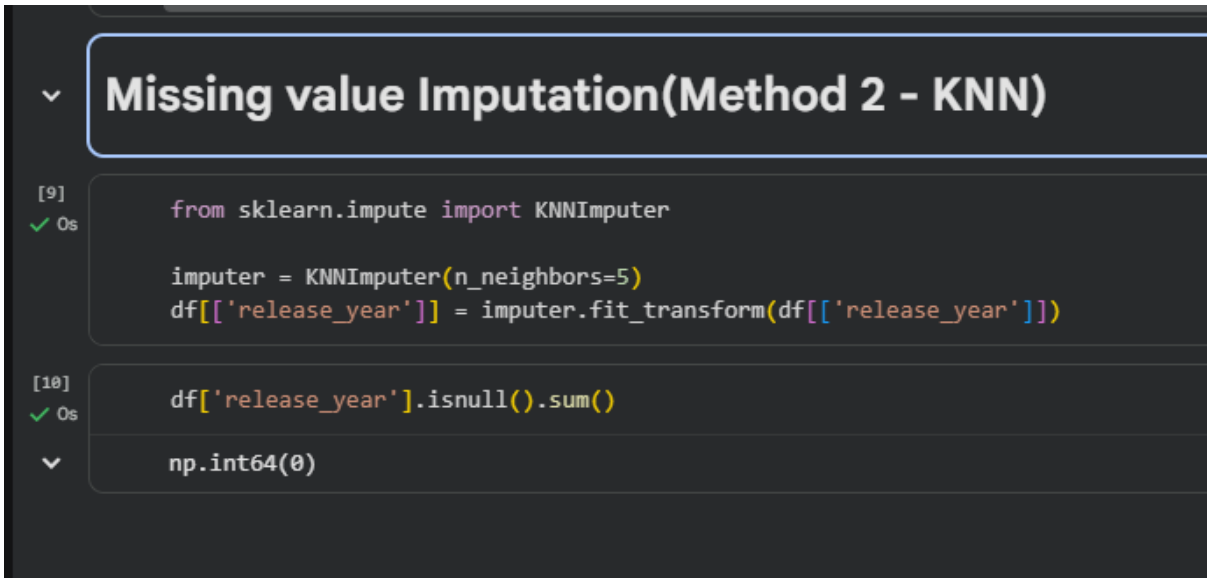

Data Type Correction & Date Parsing: Data type corrections were performed to ensure consistency across the dataset. The date_added column was converted into a proper datetime format for better usability.

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Data Parsing Data Type Correction

```
[11]
✓ 0s
df['date_added'] = pd.to_datetime(df['date_added'], errors='coerce')
df.info()
```

```
<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    8709 non-null   datetime64[ns]
 7   release_year  8807 non-null   float64
 8   rating        8807 non-null   object
 9   duration      8804 non-null   object
 10  listed_in     8807 non-null   object
 11  description   8807 non-null   object
dtypes: datetime64[ns](1), float64(1), object(10)
memory usage: 825.8+ KB
```

Outlier Detection & Treatment: Outliers in the release_year column were detected using the Interquartile Range (IQR) method. Identified outliers were removed to improve data quality and reliability.

IQR Method(Outlier Detection)

```
[13]
✓ 0s
Q1 = df['release_year'].quantile(0.25)
Q3 = df['release_year'].quantile(0.75)

IQR = Q3 - Q1
lower = Q1 - 1.5 * IQR
upper = Q3 + 1.5 * IQR
```

Outlier Removal

```
[14]
✓ 0s
df = df[(df['release_year'] >= lower) & (df['release_year'] <= upper)]
df.shape
```

```
(8088, 12)
```

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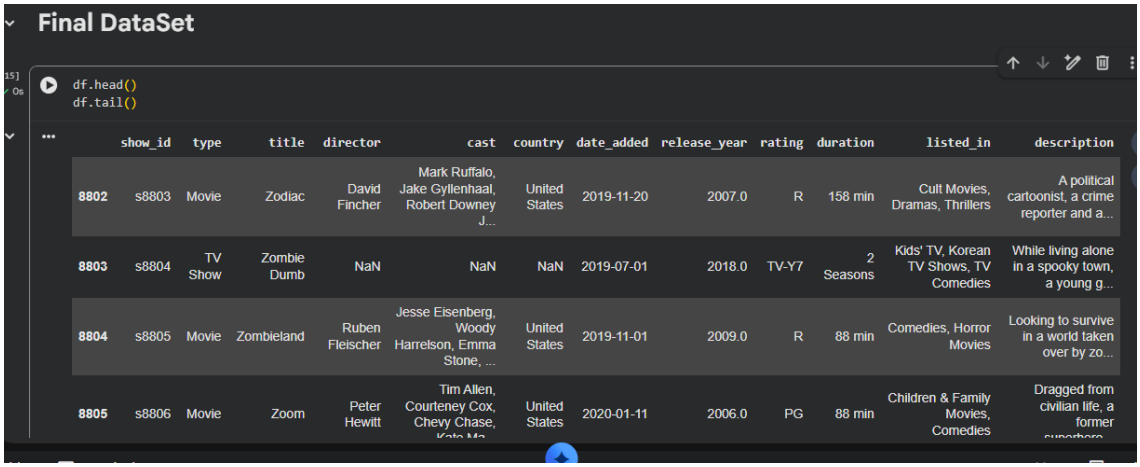
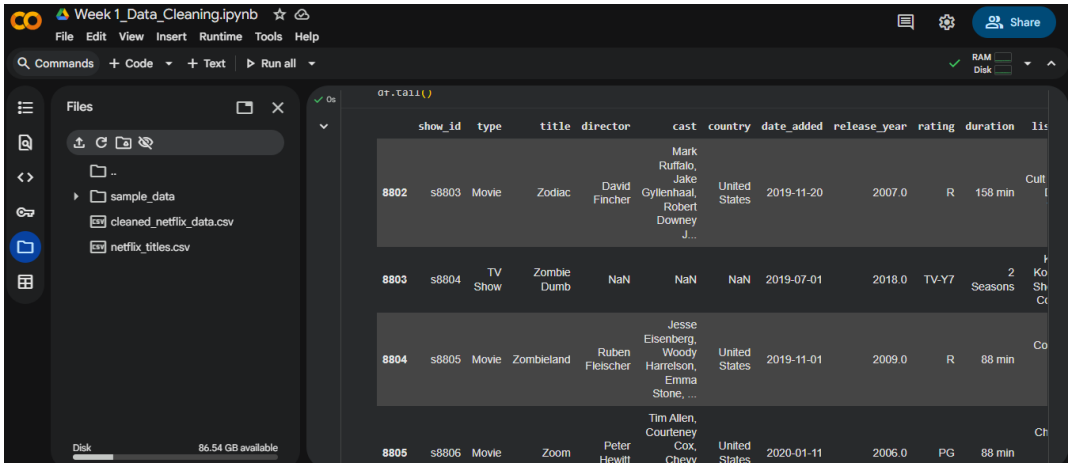
Final Cleaned Dataset:

After applying all cleaning and preprocessing steps, a final clean dataset was obtained. Sample rows were reviewed to verify the results.



	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	2019-11-20	2007.0	R	158 min	Cult Movies, Dramas, Thrillers	A political cartoonist, a crime reporter and a...
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	2019-07-01	2018.0	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	2019-11-01	2009.0	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,	United States	2020-01-11	2006.0	PG	88 min	Children & Family Movies, Comedies	Dragged from civilian life, a former



	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	lis
8802	s8803	Movie	Zodiac	David Fincher	Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...	United States	2019-11-20	2007.0	R	158 min	Cult
8803	s8804	TV Show	Zombie Dumb	NaN	NaN	NaN	2019-07-01	2018.0	TV-Y7	2 Seasons	K Ko Sh C
8804	s8805	Movie	Zombieland	Ruben Fleischer	Jesse Eisenberg, Woody Harrelson, Emma Stone, ...	United States	2019-11-01	2009.0	R	88 min	Co
8805	s8806	Movie	Zoom	Peter Hewitt	Tim Allen, Courteney Cox, Chevy	United States	2020-01-11	2006.0	PG	88 min	Ch

Conclusion:

This task provided hands-on experience in handling real-world data challenges. Advanced preprocessing techniques were successfully applied, resulting in a clean and structured dataset ready for further analysis.