Experiment No. 1

Aim:

Data Wrangling, I

Perform the following operations using Python on any open source dataset (e.g., data.csv)

1) Import all the required Python Libraries.
2) Locate an open source data from the web (e.g., https://www.kaggle.com). Provide a clear description of the data and its source (i.e., URL of the web site).
3) Load the Dataset into pandas dataframe.
4) Data Preprocessing: check for missing values in the data using pandas isnull(), describe() function to get some initial statistics. Provide variable descriptions. Types of variables etc. Check the dimensions of the data frame.
5) Data Formatting and Data Normalization: Summarize the types of variables by checking the data types (i.e., character, numeric, integer, factor, and logical) of the variables in the data set. If variables are not in the correct data type, apply proper type conversions.
6) Turn categorical variables into quantitative variables in Python.

Requirement:

- Anaconda Installer
- Windows 10 OS
- Jupyter Notebook

Theory:

Data wrangling is the process of cleaning and unifying messy and complex data sets for easy access and analysis.

With the amount of data and data sources rapidly growing and expanding, it is getting increasingly essential for large amounts of available data to be organized for analysis. This process typically includes manually converting and mapping data from one raw form into another format to allow for more convenient consumption and organization of the data.

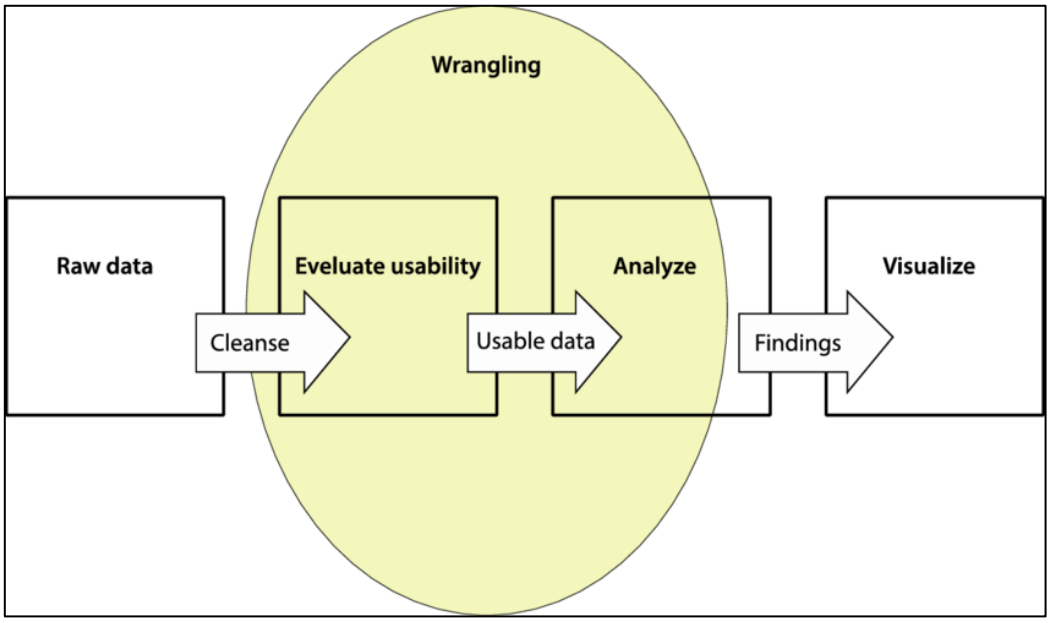
The Goals of Data Wrangling:

- Reveal a "deeper intelligence" by gathering data from multiple sources
- Provide accurate, actionable data in the hands of business analysts in a timely matter

- Reduce the time spent collecting and organizing unruly data before it can be utilized
- Enable data scientists and analysts to focus on the analysis of data, rather than the wrangling
- Drive better decision-making skills by senior leaders in an organization

Key steps to Data Wrangling:

- Data Acquisition: Identify and obtain access to the data within your sources.
- Joining Data: Combine the edited data for further use and analysis.
- Data Cleansing: Redesign the data into a usable and functional format and correct/remove any bad data.



<u>Libraries Used:</u>

Pandas: Pandas is a Python library used for working with data sets. It has functions for analyzing, cleaning, exploring and manipulating data.

Numpy: NumPy is a Python library used for working with arrays. It also has functions for working in domain of linear algebra, fourier transform, and matrices.

<u>Conclusion:</u>

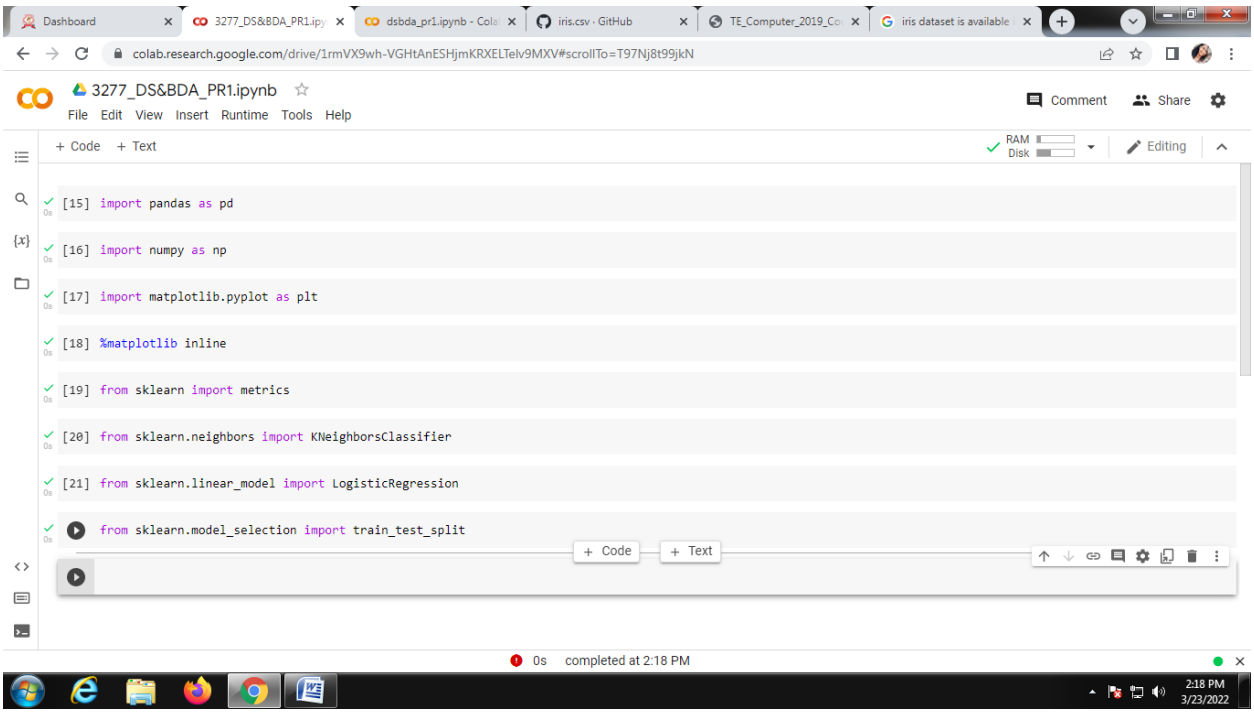
Hence, we have implemented data wrangling practical.

Practical 1

Data Wrangling I

Perform the following operations using Python on any open source dataset (e.g., data.csv)

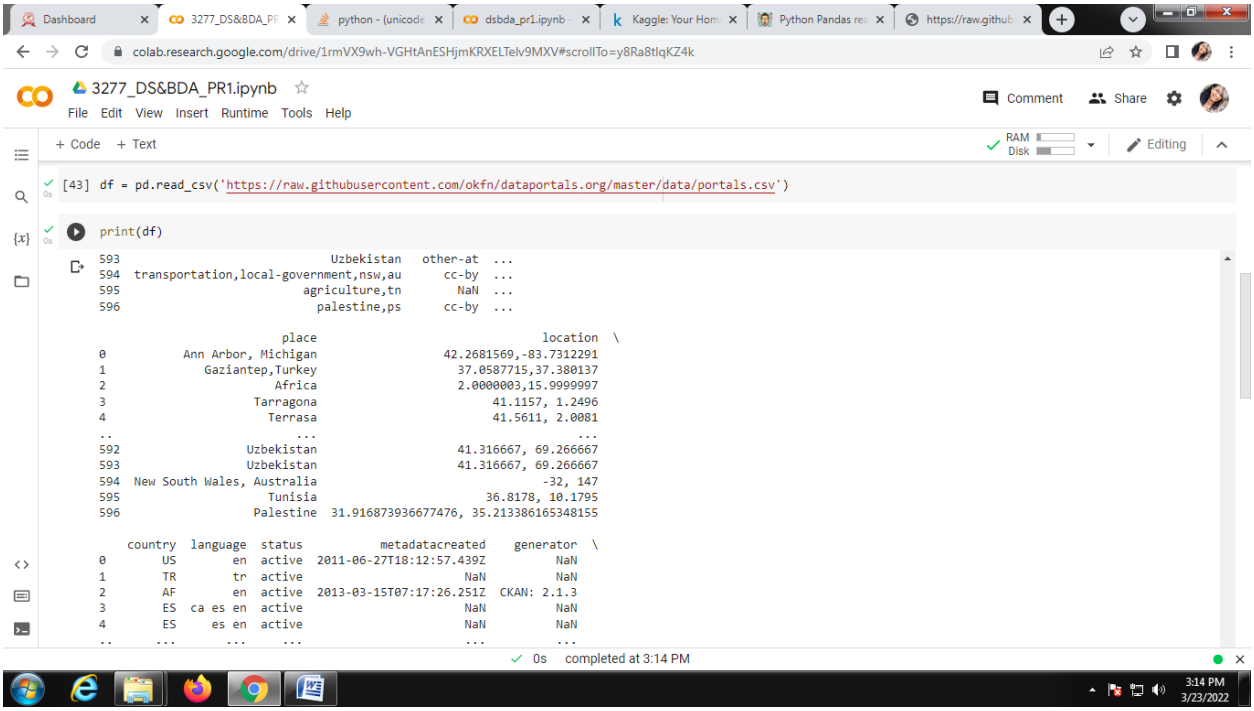
1. Import all the required Python Libraries



2. Locate an open source data from the web (e.g. https://www.kaggle.com). Provide a clear description of the data and its source (i.e. URL of the web site).

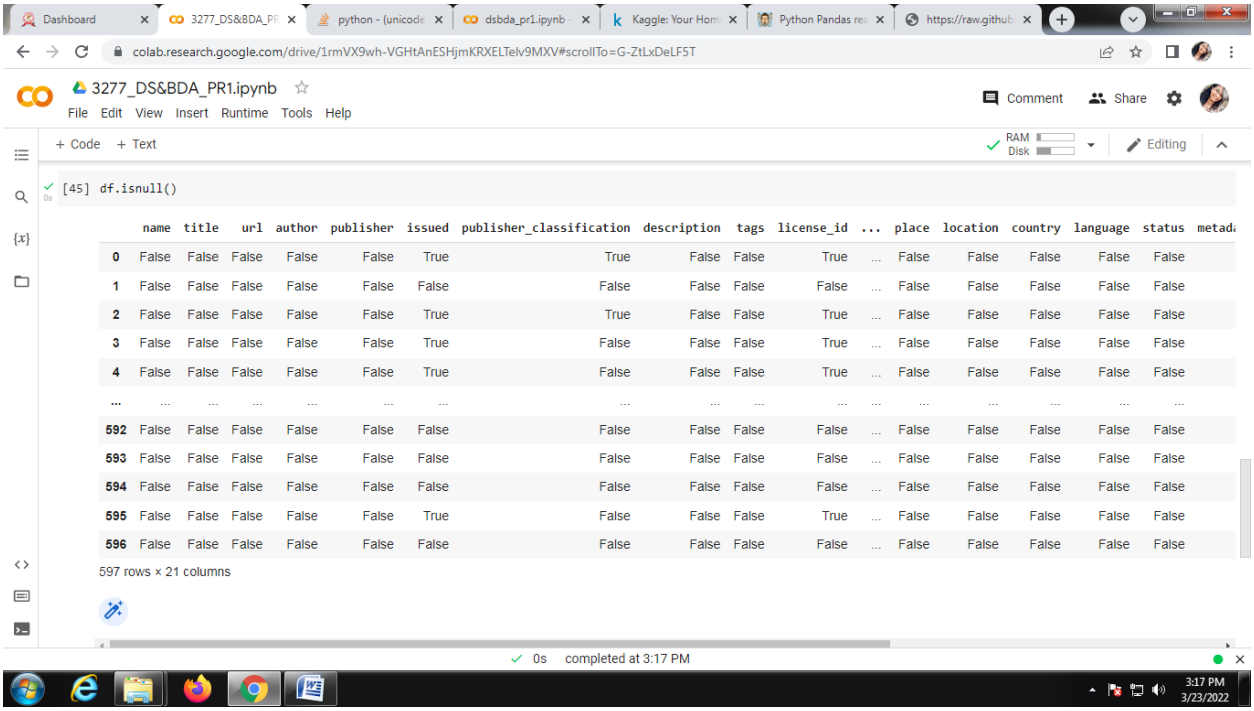
   <u>Description</u>: I've used portals dataset for this practical which is freely available on internet on data portals site.

3. Load the Dataset into Pandas DataFrame.



4. Data Preprocessing: check for missing values in the data using pandas isnull(), describe() function to get some initial statistics. Provide variable descriptions. Types of variables etc. Check the dimensions of the data frame.

isnull() : to check the missing values

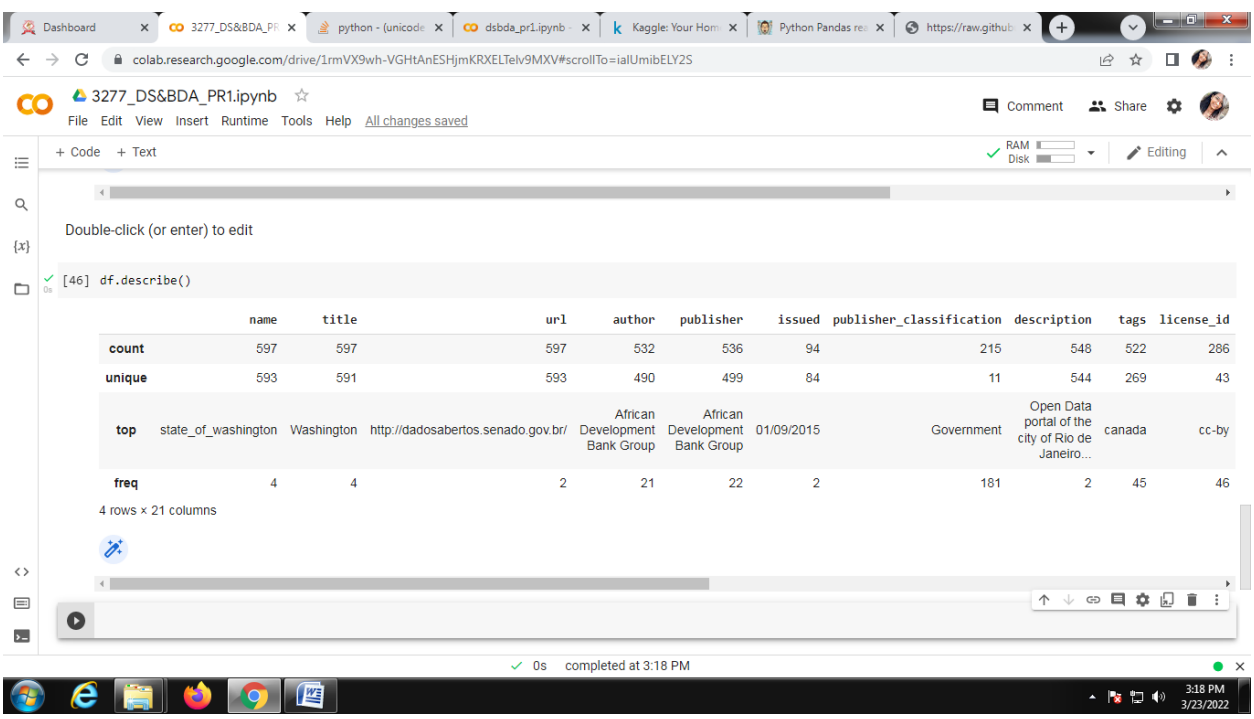


```
[45] df.isnull()
```

	name	title	url	author	publisher	issued	publisher_classification	description	tags	license_id	...	place	location	country	language	status	metada
0	False	False	False	False	False	True	True	False	False	True	...	False	False	False	False	False	
1	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	
2	False	False	False	False	False	True	True	False	False	True	...	False	False	False	False	False	
3	False	False	False	False	False	True	False	False	False	True	...	False	False	False	False	False	
4	False	False	False	False	False	True	False	False	False	True	...	False	False	False	False	False	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
592	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	
593	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	
594	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	
595	False	False	False	False	False	True	False	False	False	True	...	False	False	False	False	False	
596	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	

597 rows × 21 columns

describe() : returns the statistical summary of dataframe or series.



```
[46] df.describe()
```

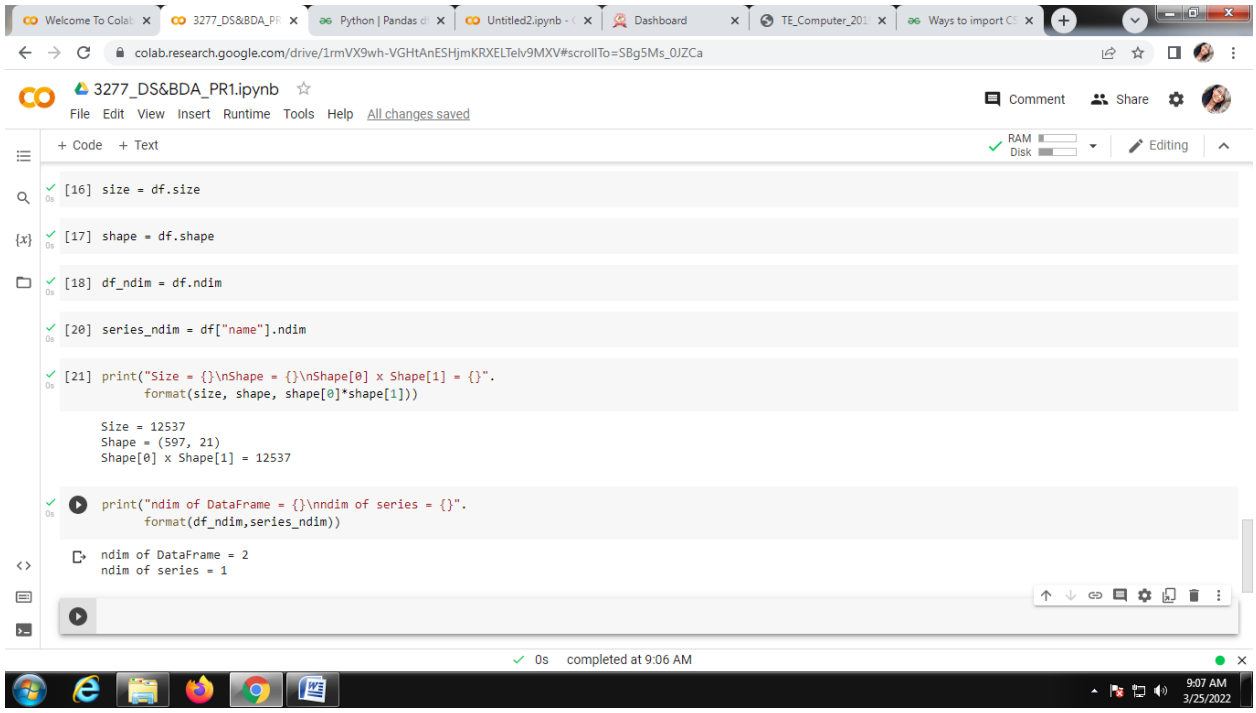
	name	title	url	author	publisher	issued	publisher_classification	description	tags	license_id
count	597	597	597	532	536	94	215	548	522	286
unique	593	591	593	490	499	84	11	544	269	43
top	state_of_washington	Washington	http://dadosabertos.senado.gov.br/	African Development Bank Group	African Development Bank Group	01/09/2015	Government	Open Data portal of the city of Rio de Janeiro...	canada	cc-by
freq	4	4	2	21	22	2	181	2	45	46

4 rows × 21 columns

size() : count the number of element along given axis.

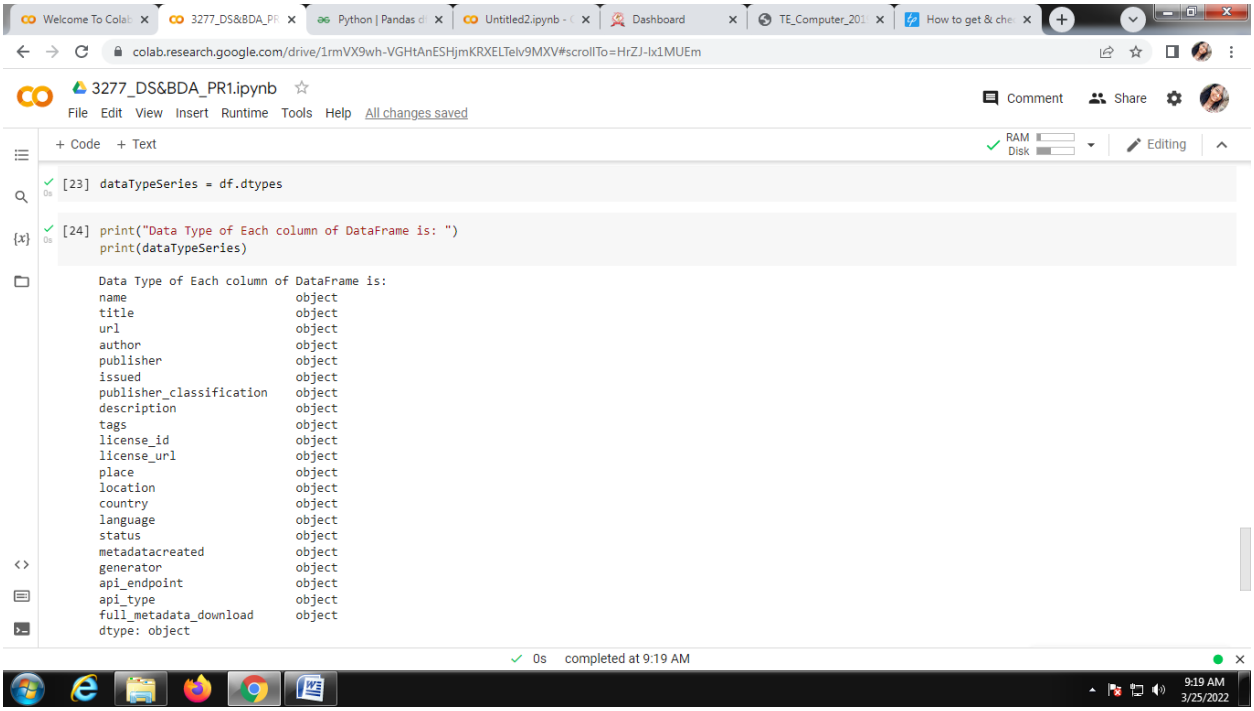
shape() : gives the number of elements in each dimension of an array.

ndim() : return the number of dimensions of an array.



5. Data Formatting and Data Normalization: Summarize the types of variables by checking the data types (i.e., character, numeric, integer, factor, and logical) of the variables in the data set. If variables are not in the correct data type, apply proper type conversions.

dtypes: to check the data types of colums in a DataFrame.



6. Turn categorical variables into quantitative variables in Python.

get_dummies() : this method will return dummy variable colums.

concat() : to concatenate dummy columns into DataFrames

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```
[27] dummies = pd.get_dummies(df.author)
```

```
[29] merged = pd.concat([df, dummies], axis = 'columns')
```

```
[30] merged.drop(['author'], axis = 'columns')
```

	name	title	url	publisher	issued	publisher_classification	description	tags	licens
0	a2gov_org	Ann Arbor, Michigan	http://www.a2gov.org/services/data/Pages/defau...	City of Ann Arbor	NaN	NaN	City of Ann Arbor's Open Data Catalog (USA)	ctic unitedstates	
1	acikveri-sahinbey-bel-tr	Açık Veri Portali - Test Yayını	http://acikveri.sahinbey.bel.tr/dataset	SahinBey Belediyesi	31/01/2015	Government	The first official open data portal of Turkey	turkey national	Unki
2	africa_open_data	Africa Open Data	http://africaopendata.org/	Africa Open Data	NaN	NaN	Africa's largest central repository for Govern...	ckan africa	
3	ajuntament-de-tarragona	Open Data Tarragona	http://opendata.tarragona.cat/	Ajuntament de	NaN	Government	Open Data Tarragona	city spain	

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```
print(merged)
```

```
                      name  \
0                  a2gov_org
1    acikveri-sahinbey-bel-tr
2           africa_open_data
3     ajuntament-de-tarragona
4       ajuntament-de-terassa
..                        ...
592                   stat-uz
593               data-gov-uz
594         transport-for-nsw
595               agridata-tn
596              open_data_ps

                                          title  \
0                                Ann Arbor, Michigan
1                     Açık Veri Portali - Test Yayını
2                                 Africa Open Data
3                               Open Data Tarragona
4                                 Open Data Terassa
..                                              ...
592  The State Committee of the Republic of Uzbekis...
593                    Open Data Portal of Uzbekistan
594                    Transport for NSW Open Data Hub
595                      Agriculture Portal in Tunisia
596                         Palestine Open Data Portal

                                                 url  \
0    http://www.a2gov.org/services/data/Pages/defau
```

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