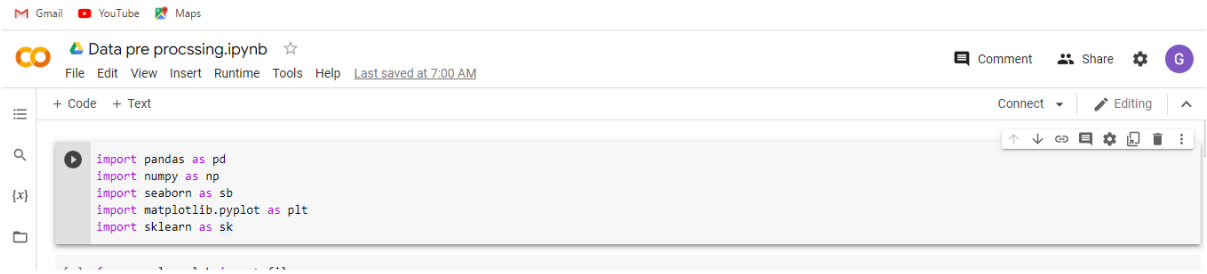
DATA PRE PROCESSING

Team id	PNT2022TMID45520
Project name	AI powered Food Demand Forecaster

1.Importing The Libraries:

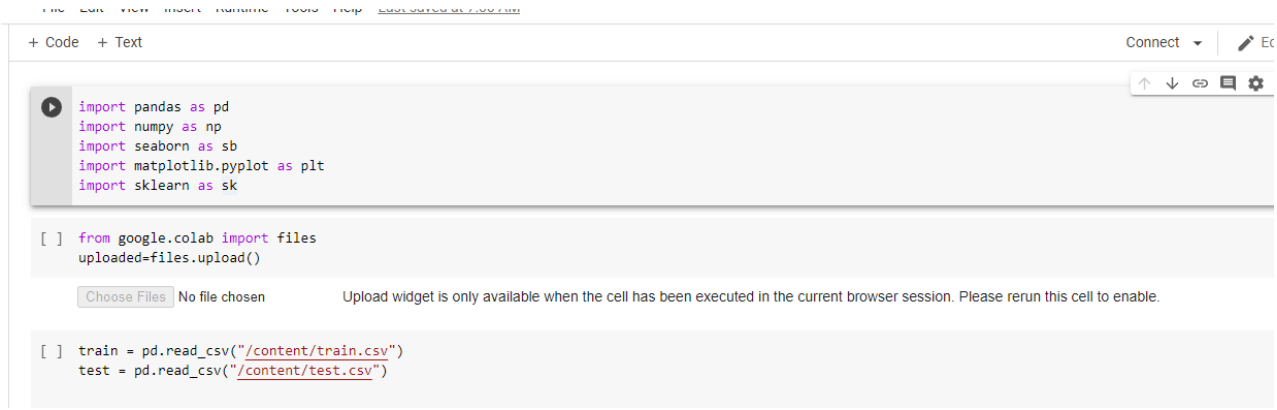
Pandas: It is a python library mainly used for data manipulation.
NumPy: This python library is used for numerical analysis.
Matplotlib and Seaborn: Both are the data visualization library used for plotting graph which will help us for understanding the data.

Pickle:to serialize your machine learning algorithms and save the serialized format to a file.



2.Reading The Dataset:

- first step will be to read it into a data structure that's compatible with pandas.
- Let's load a .csv data file into pandas. There is a function for it, called **read_csv()**.We will need to locate the directory of the CSV file at first (it's more efficient to keep the dataset in the same directory as your program).



3.Exploratory Data Analysis:

Exploratory data analysis is an approach to analyzing data sets to summarize their main characteristics, often with visual methods and used for determine how best to manipulate data sources to get the answers you need, making it easier for data scientists to discover patterns, spot anomalies, test a hypothesis, or check assumptions.

head() : To check first five rows of dataset, we have a function call **head( ).**

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```
[ ] train.head()
```

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders
0	1379560	1.0	55.0	1885.0	136.83	152.29	0.0	0.0	177.0
1	1466964	1.0	55.0	1993.0	136.83	135.83	0.0	0.0	270.0
2	1346989	1.0	55.0	2539.0	134.86	135.86	0.0	0.0	189.0
3	1338232	1.0	55.0	2139.0	339.50	437.53	0.0	0.0	54.0
4	1448490	1.0	55.0	2631.0	243.50	242.50	0.0	0.0	40.0

```
[ ] test.head()
```

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured
0	1028232	146	55	1885	158.11	159.11	0	0
1	1127204	146	55	1993	160.11	159.11	0	0
2	1212707	146	55	2539	157.14	159.14	0	0
3	1082698	146	55	2631	162.02	162.02	0	0
4	1400926	146	55	1248	163.93	163.93	0	0

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```
[ ] train.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 103621 entries, 0 to 103620
Data columns (total 9 columns):
 #   Column                 Non-Null Count   Dtype
---  ------                 --------------   -----
 0   id                     103621 non-null  int64
 1   week                   103620 non-null  float64
 2   center_id              103620 non-null  float64
 3   meal_id                103620 non-null  float64
 4   checkout_price         103620 non-null  float64
 5   base_price             103620 non-null  float64
 6   emailer_for_promotion  103620 non-null  float64
 7   homepage_featured      103620 non-null  float64
 8   num_orders             103620 non-null  float64
dtypes: float64(8), int64(1)
memory usage: 7.1 MB
```

```
train['num_orders'].describe()
```

```
count    103620.000000
mean        261.858483
std         433.910688
min          13.000000
25%          54.000000
50%         136.000000
75%         323.000000
max       24299.000000
Name: num_orders, dtype: float64
```

train['num_orders'].describe()

4.Checking For Null Values:

a. Imputing data using Imputation method in **sklearn**

b. Filling **NaN** values with mean, median and mode using **fillna()** method.

We will be using **isnull().sum()** method to see which total number of missing values.

```
[ ] train.isnull().sum()

id                      0
week                    1
center_id               1
meal_id                 1
checkout_price          1
base_price              1
emailer_for_promotion   1
homepage_featured       1
num_orders              1
dtype: int64
```

5.Reading And Merging .Csv Files:

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```
[ ] meal_info = pd.read_csv("/content/meal_info.csv")
    center_info = pd.read_csv("/content/fulfilment_center_info.csv")

[ ] trainfinal = pd.merge(train, meal_info, on="meal_id", how="outer")
    trainfinal = pd.merge(trainfinal, center_info, on="center_id", how="outer")

[ ] trainfinal.head()
```

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders	category	cuisine	city_code	region_co
0	1379560.0	1.0	55.0	1885.0	136.83	152.29	0.0	0.0	177.0	Beverages	Thai	647.0	56
1	1018704.0	2.0	55.0	1885.0	135.83	152.29	0.0	0.0	323.0	Beverages	Thai	647.0	56
2	1196273.0	3.0	55.0	1885.0	132.92	133.92	0.0	0.0	96.0	Beverages	Thai	647.0	56
3	1116527.0	4.0	55.0	1885.0	135.86	134.86	0.0	0.0	163.0	Beverages	Thai	647.0	56
4	1343872.0	5.0	55.0	1885.0	146.50	147.50	0.0	0.0	215.0	Beverages	Thai	647.0	56

6.Dropping Columns:

colab.research.google.com/drive/1rl6pGZAUeaMf1BdDu7WaxlnRTEFMfTw#scrollTo=HoOEEfugoFge

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```
[ ] cols=trainfinal.columns.tolist()
    print(cols)

    ['id', 'week', 'checkout_price', 'base_price', 'emailer_for_promotion', 'homepage_featured', 'num_orders', 'category', 'cuisine', 'city_code', 'region_code', 'cer

[ ] cols=cols[:2]+cols[9:]+cols[7:9]+cols[2:7]
    print(cols)

    ['id', 'week', 'city_code', 'region_code', 'center_type', 'op_area', 'category', 'cuisine', 'checkout_price', 'base_price', 'emailer_for_promotion', 'homepage_fea

[ ] trainfinal=trainfinal[cols]

[ ] trainfinal.dtypes

    id                     float64
    week                   float64
    city_code              float64
    region_code            float64
    center_type             object
    op_area                float64
    category                object
    cuisine                 object
```

7.Label Encoding:

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```
[ ] lb1=LabelEncoder()
    trainfinal['center_type']=lb1.fit_transform(trainfinal['center_type'])
    lb2=LabelEncoder()
    trainfinal['category']=lb1.fit_transform(trainfinal['category'])
    lb1=LabelEncoder()
    trainfinal['cuisine']=lb1.fit_transform(trainfinal['cuisine'])
```

```
trainfinal.head()
```

	id	week	city_code	region_code	center_type	op_area	category	cuisine	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_order
0	1379560.0	1.0	647.0	56.0	2	2.0	0	3	136.83	152.29	0.0	0.0	177
1	1018704.0	2.0	647.0	56.0	2	2.0	0	3	135.83	152.29	0.0	0.0	323
2	1196273.0	3.0	647.0	56.0	2	2.0	0	3	132.92	133.92	0.0	0.0	96
3	1116527.0	4.0	647.0	56.0	2	2.0	0	3	135.86	134.86	0.0	0.0	163
4	1343872.0	5.0	647.0	56.0	2	2.0	0	3	146.50	147.50	0.0	0.0	215

```
[ ] trainfinal.shape
```

```
(103624, 13)
```

8.Data Visualization

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```
[ ] plt.style.use('fivethirtyeight')
    plt.figure(figsize=(12,7))
    sb.distplot(trainfinal.num_orders,bins=25)
    plt.xlabel("num_orders")
    plt.ylabel("Number of Buyers")
    plt.xlabel("num_orders Distribution")
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.p
  warnings.warn(msg, FutureWarning)
Text(0.5, 0, 'num_orders Distribution')
```

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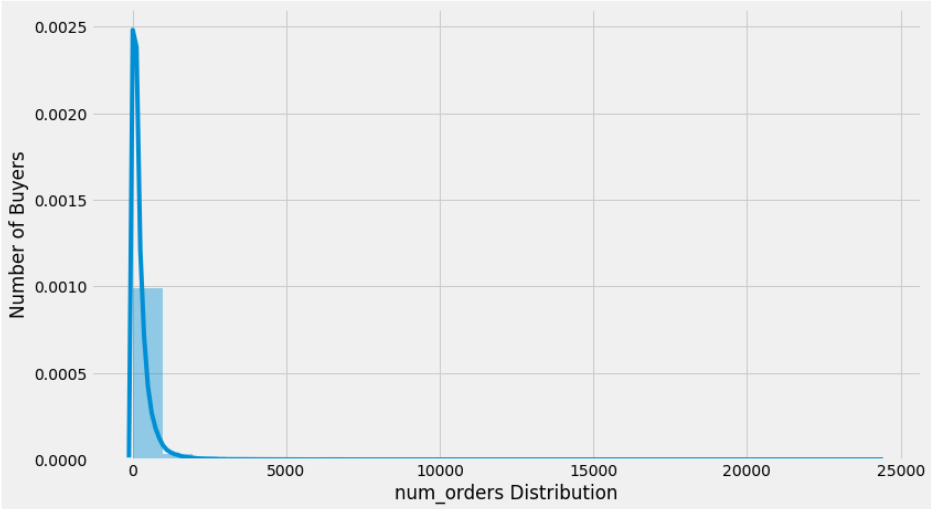
```
Text(0.5, 0, 'num_orders Distribution')
```



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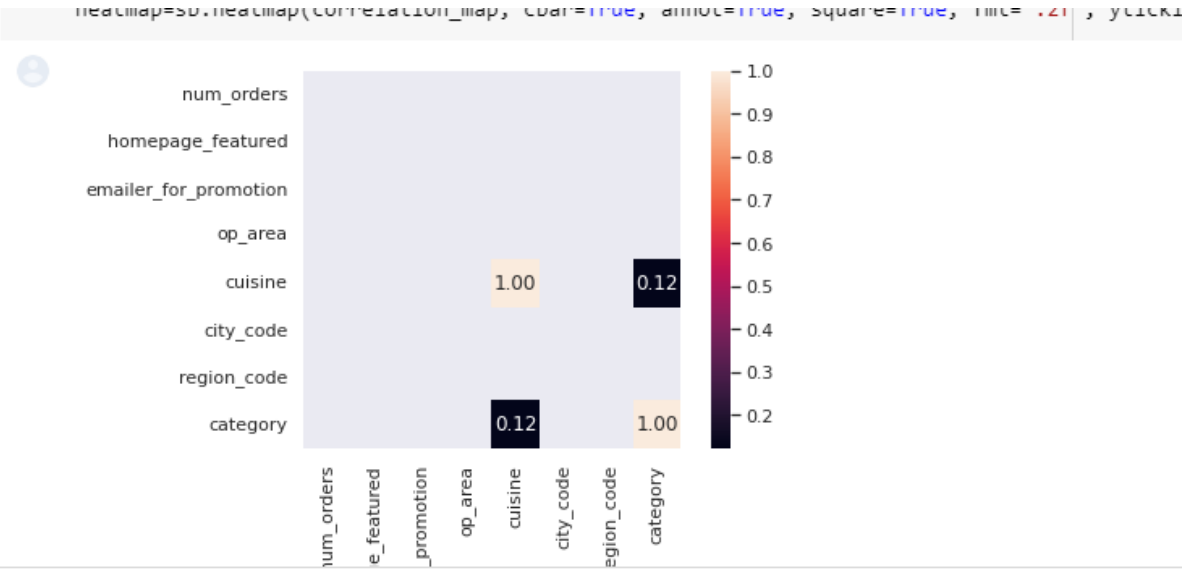
```
[ ] trainfinal2=trainfinal.drop(['id'],axis=1)
    correlation=trainfinal2.corr(method='pearson')
    columns=correlation.nlargest(8,'num_orders').index
    columns

    Index(['num_orders', 'homepage_featured', 'emailer_for_promotion', 'op_area',
           'cuisine', 'city_code', 'region_code', 'category'],
          dtype='object')
```

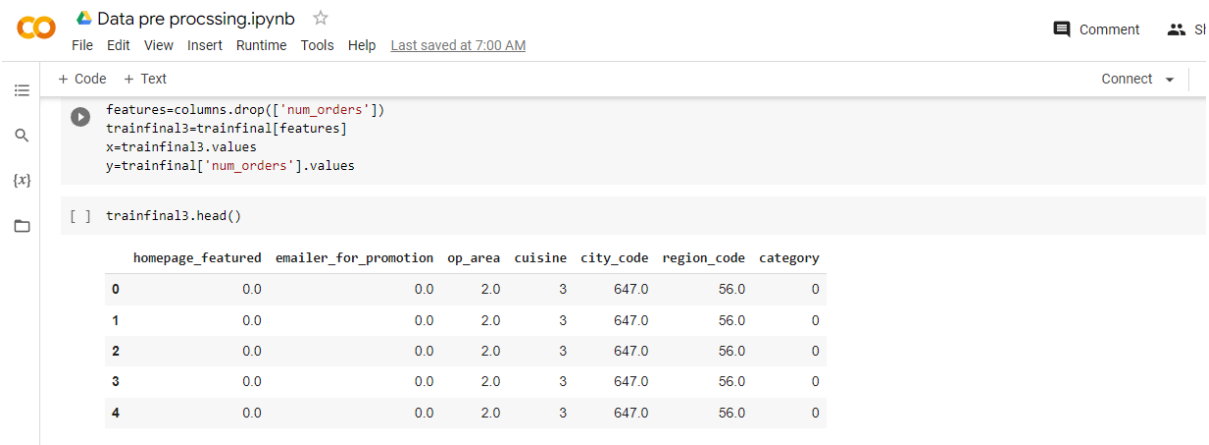
```
[ ] trainfinal2=trainfinal.drop(['id'],axis=1)
    correlation=trainfinal2.corr(method='pearson')
    columns=correlation.nlargest(8,'num_orders').index
    columns

    Index(['num_orders', 'homepage_featured', 'emailer_for_promotion', 'op_area',
           'cuisine', 'city_code', 'region_code', 'category'],
          dtype='object')
```

```
[ ] correlation_map=np.corrcoef(trainfinal[columns].values.T)
    sb.set(font_scale=1.0)
    heatmap=sb.heatmap(correlation_map, cbar=True, annot=True, square=True, fmt='.2f', yticklabels=columns.values, xticklabels=columns.values)
```



9.Splitting The Dataset Into Dependent And Independent Variable:

1. The independent variable in the dataset would be considered as 'x' and the **'homepage_featured', 'emailer_for_promotion', 'op_area', 'cuisine', 'city_code', 'region_code',** 'category' columns would be considered as independent variable.
2. The dependent variable in the dataset would be considered as 'y' and the **'num_orders'** column is considered as dependent variable.



	homepage_featured	emailer_for_promotion	op_area	cuisine	city_code	region_code	category
0	0.0	0.0	2.0	3	647.0	56.0	0
1	0.0	0.0	2.0	3	647.0	56.0	0
2	0.0	0.0	2.0	3	647.0	56.0	0
3	0.0	0.0	2.0	3	647.0	56.0	0
4	0.0	0.0	2.0	3	647.0	56.0	0

Split The Dataset Into Train Set And Test Set:

When you are working on a model and you want to train it, you obviously have a dataset. But after training, we have to test the model on some test dataset. For this, you will a dataset which is different from the training set you used earlier. But it might not always be possible to have so much data during the development phase. In such cases, the solution is to split the dataset into two sets, one for training and the other for testing.

3	0.0	0.0	2.0	3	647.0	56.0	0
4	0.0	0.0	2.0	3	647.0	56.0	0

```
from sklearn.model_selection import train_test_split
x_train, x_val, y_train, y_val=train_test_split(x,y,test_size=0.25)
```

[ ]