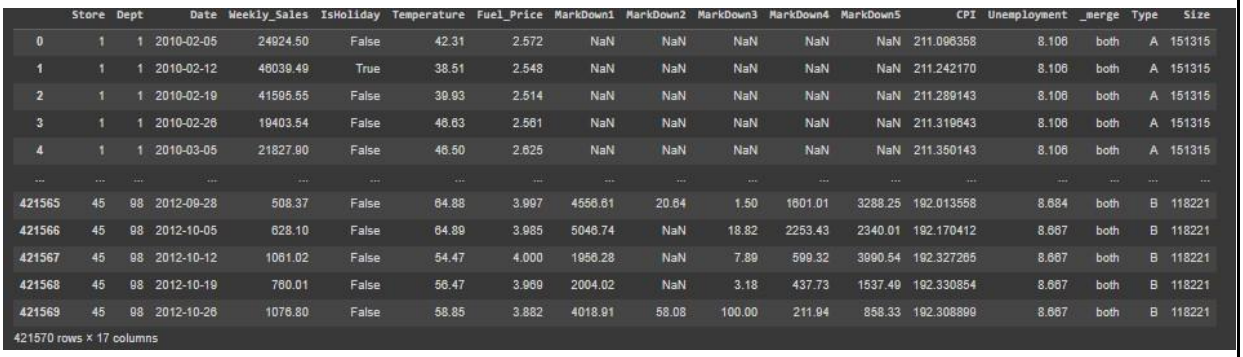
Data Collection and Preprocessing Phase

Date	10 July 2024
Team ID	740020
Project Title	Walmart Sales Analysis For Retail Industry With Machine Learning
Maximum Marks	6 Marks

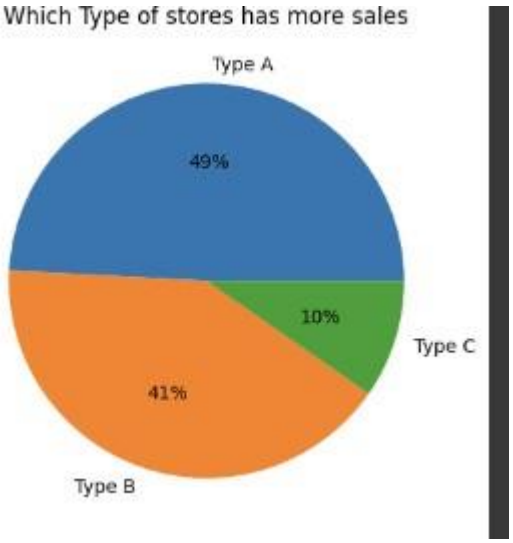
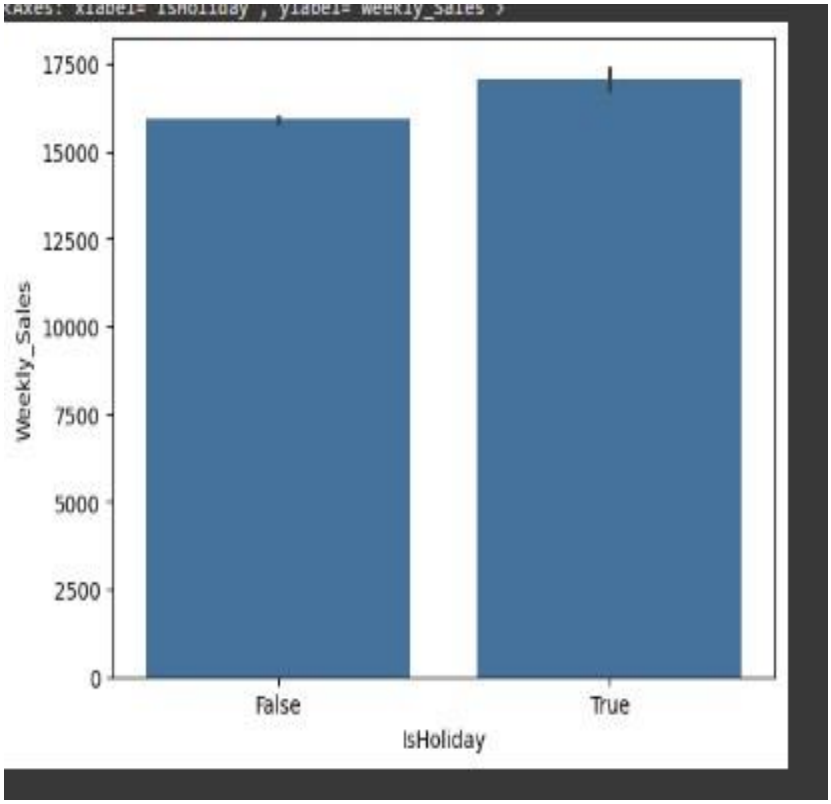
Data Exploration and Preprocessing Report

Dataset variables will be statistically analyzed to identify patterns and outliers, with Python employed for preprocessing tasks like normalization and feature engineering. Data cleaning will address missing values and outliers, ensuring quality for subsequent analysis and modeling, and forming a strong foundation for insights and predictions.

Section	Description
Data Overview	Dimension: 421570 rows × 17 columns Descriptive statistics: 
Univariate Analysis	

	Store	Dept	Date	Weekly_Sales	IsHoliday	Temperature	Fuel_Price	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5	CPI	Unemployment	_merge	Type	Size
0	1	1	2010-02-05	24924.50	False	42.31	2.572	NaN	NaN	NaN	NaN	NaN	211.096358	8.106	both	A	151315
1	1	1	2010-02-12	46039.49	True	38.51	2.548	NaN	NaN	NaN	NaN	NaN	211.242170	8.106	both	A	151315
2	1	1	2010-02-19	41595.55	False	39.93	2.514	NaN	NaN	NaN	NaN	NaN	211.289143	8.106	both	A	151315
3	1	1	2010-02-26	19403.54	False	46.63	2.561	NaN	NaN	NaN	NaN	NaN	211.319643	8.106	both	A	151315
4	1	1	2010-03-05	21827.90	False	46.50	2.625	NaN	NaN	NaN	NaN	NaN	211.350143	8.106	both	A	151315
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
421565	45	98	2012-09-28	508.37	False	64.88	3.997	4556.61	20.64	1.50	1601.01	3288.25	192.013558	8.684	both	B	118221
421566	45	98	2012-10-05	628.10	False	64.89	3.985	5046.74	NaN	18.82	2253.43	2340.01	192.170412	8.667	both	B	118221
421567	45	98	2012-10-12	1061.02	False	54.47	4.000	1956.28	NaN	7.89	599.32	3990.54	192.327265	8.667	both	B	118221
421568	45	98	2012-10-19	760.01	False	56.47	3.969	2004.02	NaN	3.18	437.73	1537.49	192.330854	8.667	both	B	118221
421569	45	98	2012-10-26	1076.80	False	58.85	3.882	4018.91	58.08	100.00	211.94	858.33	192.308899	8.667	both	B	118221

421570 rows × 17 columns

	
Bivariate Analysis	

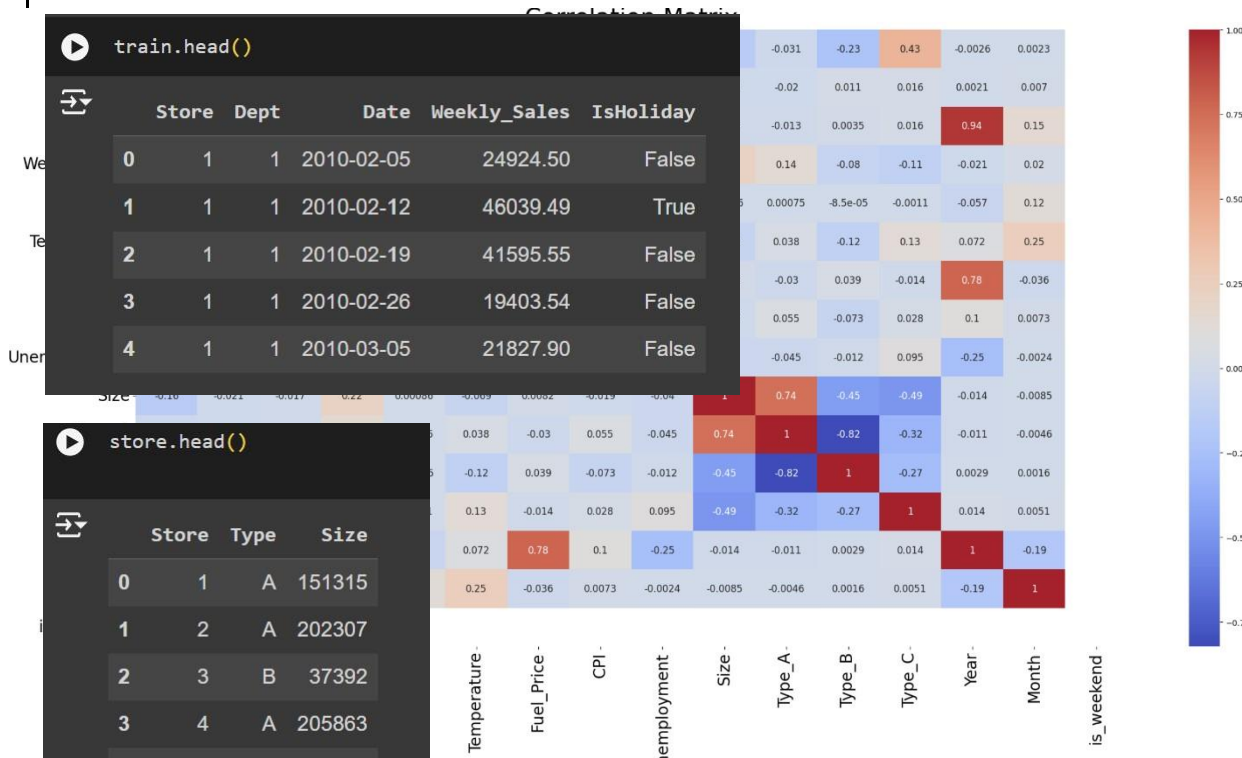
Multivariate Analysis	
Outliers and Anomalies	
Data Preprocessi	
Loading Data	

```
train.head()
```

	Store	Dept	Date	Weekly_Sales	IsHoliday
0	1	1	2010-02-05	24924.50	False
1	1	1	2010-02-12	46039.49	True
2	1	1	2010-02-19	41595.55	False
3	1	1	2010-02-26	19403.54	False
4	1	1	2010-03-05	21827.90	False

```
store.head()
```

	Store	Type	Size
0	1	A	151315
1	2	A	202307
2	3	B	37392
3	4	A	205863
4	5	B	34875




```
[ ] features.head()
```

	Store	Date	Temperature	Fuel_Price	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5	CPI	Unemployment	IsHoliday
0	1	2010-02-05	42.31	2.572	NaN	NaN	NaN	NaN	NaN	211.096358	8.106	False
1	1	2010-02-12	38.51	2.548	NaN	NaN	NaN	NaN	NaN	211.242170	8.106	True
2	1	2010-02-19	39.93	2.514	NaN	NaN	NaN	NaN	NaN	211.289143	8.106	False
3	1	2010-02-26	46.63	2.561	NaN	NaN	NaN	NaN	NaN	211.319643	8.106	False
4	1	2010-03-05	46.50	2.625	NaN	NaN	NaN	NaN	NaN	211.350143	8.106	False

```
[ ] train= pd.read_csv('/content/train.csv (1).zip')
    store= pd.read_csv('/content/stores.csv')
    features= pd.read_csv('/content/features.csv (1).zip')
```

Handling Negative Values

```
data2.describe()
```

	Store	Dept	Weekly_Sales	Temperature	Fuel_Price	CPI	Unemployment	Size
count	421570.000000	421570.000000	421570.000000	421570.000000	421570.000000	421570.000000	421570.000000	421570.000000
mean	22.200546	44.260317	15981.258123	60.090059	3.361027	171.201947	7.960289	136727.915739
std	12.785297	30.492054	22711.183519	18.447931	0.458515	39.159276	1.863296	60980.583328
min	1.000000	1.000000	-4988.940000	-2.060000	2.472000	126.064000	3.879000	34875.000000
25%	11.000000	18.000000	2079.650000	46.680000	2.933000	132.022667	6.891000	93638.000000
50%	22.000000	37.000000	7612.030000	62.090000	3.452000	182.318780	7.866000	140167.000000
75%	33.000000	74.000000	20205.852500	74.280000	3.738000	212.416993	8.572000	202505.000000
max	45.000000	99.000000	693099.360000	100.140000	4.468000	227.232807	14.313000	219622.000000

```
data3=data2.loc[data2['Weekly_Sales']>=0]
data3.describe()
```

	Store	Dept	Weekly_Sales	Temperature	Fuel_Price	CPI	Unemployment	Size
count	420285.000000	420285.000000	420285.000000	420285.000000	420285.000000	420285.000000	420285.000000	420285.000000
mean	22.195477	44.242771	16030.329773	60.090474	3.360888	171.212152	7.960077	136749.569176
std	12.787213	30.507197	22728.500149	18.448260	0.458523	39.162280	1.863873	60992.688568
min	1.000000	1.000000	0.000000	-2.060000	2.472000	126.064000	3.879000	34875.000000
25%	11.000000	18.000000	2117.560000	46.680000	2.933000	132.022667	6.891000	93638.000000
50%	22.000000	37.000000	7659.090000	62.090000	3.452000	182.350989	7.866000	140167.000000
75%	33.000000	74.000000	20268.380000	74.280000	3.738000	212.445487	8.567000	202505.000000
max	45.000000	99.000000	693099.360000	100.140000	4.468000	227.232807	14.313000	219622.000000

Data Transformation

```
if 'Type' in data9.columns:
    data9 = pd.get_dummies(data9, columns=['Type'])
else:
    print("Column 'Type' does not exist. It might have  been already one-hot encoded.")
```

```
data9['Date']=pd.to_datetime(data9['Date'])
```

```
data9['Year']=data9['Date'].dt.year
data9['Month']=data9['Date'].dt.month
```

```
data9[['Date','Month','Year']].head()
```

	Date	Month	Year
0	2010-02-05	2	2010
3	2010-02-26	2	2010
4	2010-03-05	3	2010
5	2010-03-12	3	2010
6	2010-03-19	3	2010

```
data9['Dayofweek_name']=data9['Date'].dt.day_name()
data9[['Date','Dayofweek_name']].head()
```

	Date	Dayofweek_name
0	2010-02-05	Friday
3	2010-02-26	Friday
4	2010-03-05	Friday
5	2010-03-12	Friday
6	2010-03-19	Friday

<table>
<tr><td></td><td>

```
[ ] data9['is_weekend']=np.where(data9['Dayofweek_name'].isin(['Saturday','Sunday']),1,0)

[ ] data9['IsHoliday']=data9['IsHoliday'].astype(int)
    del data9['Dayofweek_name']

[ ] data9['Type_A']=data9['Type_A'].astype(int)
    data9['Type_B']=data9['Type_B'].astype(int)
    data9['Type_C']=data9['Type_C'].astype(int)

    print(data9.head())
```

```
   Store  Dept       Date  Weekly_Sales  IsHoliday  Temperature  Fuel_Price  \
0      1     1 2010-02-05      24924.50          0        42.31       2.572
3      1     1 2010-02-26      19403.54          0        46.63       2.561
4      1     1 2010-03-05      21827.90          0        46.50       2.625
5      1     1 2010-03-12      21043.39          0        57.79       2.667
6      1     1 2010-03-19      22136.64          0        54.58       2.720

           CPI  Unemployment    Size  Type_A  Type_B  Type_C  Year  Month  \
0  211.096358         8.106  151315       1       0       0  2010      2
3  211.319643         8.106  151315       1       0       0  2010      2
4  211.350143         8.106  151315       1       0       0  2010      3
5  211.380643         8.106  151315       1       0       0  2010      3
6  211.215635         8.106  151315       1       0       0  2010      3

   is_weekend
0           0
3           0
4           0
5           0
6           0
```

</td></tr>
<tr><td>Feature Engineering</td><td>Attached the codes in final submission.</td></tr>
<tr><td>Save Processed Data</td><td>-</td></tr>
</table>