DATA CLEANING STARTS

In [1]:
```
pip install pandoc
```

```
Requirement already satisfied: pandoc in c:\users\ritika shukla\appdata\local\programs\python\python311\lib\site
-packages (2.4)
Requirement already satisfied: plumbum in c:\users\ritika shukla\appdata\local\programs\python\python311\lib\sit
e-packages (from pandoc) (1.8.3)
Requirement already satisfied: ply in c:\users\ritika shukla\appdata\local\programs\python\python311\lib\site-pa
ckages (from pandoc) (3.11)
Requirement already satisfied: pywin32 in c:\users\ritika shukla\appdata\local\programs\python\python311\lib\sit
e-packages (from plumbum->pandoc) (306)
Note: you may need to restart the kernel to use updated packages.
```

```
[notice] A new release of pip is available: 24.0 -> 24.2
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
import pandoc
```

In [3]:
```
df=pd.read_csv(r'C:\Users\ritika shukla\Downloads\qua\purchase.csv')
df.head()
```

Out[3]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER
0	1000	YOUNG SINGLES/COUPLES	Premium
1	1002	YOUNG SINGLES/COUPLES	Mainstream
2	1003	YOUNG FAMILIES	Budget
3	1004	OLDER SINGLES/COUPLES	Mainstream
4	1005	MIDAGE SINGLES/COUPLES	Mainstream

In [4]:
```
df.tail()
```

Out[4]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER
72632	2370651	MIDAGE SINGLES/COUPLES	Mainstream
72633	2370701	YOUNG FAMILIES	Mainstream
72634	2370751	YOUNG FAMILIES	Premium
72635	2370961	OLDER FAMILIES	Budget
72636	2373711	YOUNG SINGLES/COUPLES	Mainstream

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 72637 entries, 0 to 72636
Data columns (total 3 columns):
 #   Column            Non-Null Count  Dtype 
---  ------            --------------  ----- 
 0   LYLTY_CARD_NBR    72637 non-null  int64 
 1   LIFESTAGE         72637 non-null  object
 2   PREMIUM_CUSTOMER  72637 non-null  object
dtypes: int64(1), object(2)
memory usage: 1.7+ MB
```

In [6]:
```
df1=pd.read_excel(r'C:\Users\ritika shukla\Downloads\qua\transaction.xlsx')
df1.head()
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 264836 entries, 0 to 264835
Data columns (total 8 columns):
 #   Column          Non-Null Count   Dtype         
---  ------          --------------   -----         
 0   DATE            264836 non-null  datetime64[ns]
 1   STORE_NBR       264836 non-null  int64         
 2   LYLTY_CARD_NBR  264836 non-null  int64         
 3   TXN_ID          264836 non-null  int64         
 4   PROD_NBR        264836 non-null  int64         
 5   PROD_NAME       264836 non-null  object        
 6   PROD_QTY        264836 non-null  int64         
 7   TOT_SALES       264836 non-null  float64       
dtypes: datetime64[ns](1), float64(1), int64(5), object(1)
memory usage: 16.2+ MB
```

In [7]:

```
df_merged=df.merge(df1[['DATE','STORE_NBR','LYLTY_CARD_NBR', 'PROD_NAME','PROD_QTY','TOT_SALES']])
df_merged.head()
```

Out[7]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALES
0	1000	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	Natural Chip Compny SeaSalt175g	2	6.0
1	1002	YOUNG SINGLES/COUPLES	Mainstream	2018-09-16	1	Red Rock Deli Chikn&Garlic Aioli 150g	1	2.7
2	1003	YOUNG FAMILIES	Budget	2019-03-07	1	Grain Waves Sour Cream&Chives 210G	1	3.6
3	1003	YOUNG FAMILIES	Budget	2019-03-08	1	Natural ChipCo Hony Soy Chckn175g	1	3.0
4	1004	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	WW Original Stacked Chips 160g	1	1.9

In [8]:

```
df_merged.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 264836 entries, 0 to 264835
Data columns (total 8 columns):
 #   Column            Non-Null Count   Dtype         
---  ------            --------------   -----         
 0   LYLTY_CARD_NBR    264836 non-null  int64         
 1   LIFESTAGE         264836 non-null  object        
 2   PREMIUM_CUSTOMER  264836 non-null  object        
 3   DATE              264836 non-null  datetime64[ns]
 4   STORE_NBR         264836 non-null  int64         
 5   PROD_NAME         264836 non-null  object        
 6   PROD_QTY          264836 non-null  int64         
 7   TOT_SALES         264836 non-null  float64       
dtypes: datetime64[ns](1), float64(1), int64(3), object(3)
memory usage: 16.2+ MB
```

In [9]:

```
df_merged['PROD_NAME']=df_merged['PROD_NAME'].str.lower()
df_merged.head()
```

Out[9]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALES
0	1000	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	natural chip compny seasalt175g	2	6.0
1	1002	YOUNG SINGLES/COUPLES	Mainstream	2018-09-16	1	red rock deli chikn&garlic aioli 150g	1	2.7
2	1003	YOUNG FAMILIES	Budget	2019-03-07	1	grain waves sour cream&chives 210g	1	3.6
3	1003	YOUNG FAMILIES	Budget	2019-03-08	1	natural chipco hony soy chckn175g	1	3.0
4	1004	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	ww original stacked chips 160g	1	1.9

In [10]:

```
regex='chip'
```

```
df_merged=df_merged[df_merged['PROD_NAME'].str.contains(regex)==True]
df_merged
```

Out[10]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALE
0	1000	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	natural chip compny seasalt175g	2	6
3	1003	YOUNG FAMILIES	Budget	2019-03-08	1	natural chipco hony soy chckn175g	1	3
4	1004	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	ww original stacked chips 160g	1	1
14	1011	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	smiths crinkle cut chips barbecue 170g	1	2
17	1013	RETIREES	Budget	2019-03-04	1	doritos corn chip southern chicken 150g	1	3
...	...	...	...	...	...	...	...	
264814	2330251	RETIREES	Budget	2018-11-29	77	smiths crnkle chip orgnl big bag 380g	2	11
264818	2330291	OLDER SINGLES/COUPLES	Mainstream	2019-06-18	77	ww d/style chip sea salt 200g	1	1
264819	2330311	YOUNG SINGLES/COUPLES	Budget	2018-11-09	77	tostitos smoked chipotle 175g	1	4
264828	2370581	OLDER SINGLES/COUPLES	Budget	2018-12-17	88	doritos corn chip southern chicken 150g	2	7
264835	2373711	YOUNG SINGLES/COUPLES	Mainstream	2018-12-14	88	smiths crinkle chips salt & vinegar 330g	2	11

74570 rows × 8 columns

In [11]:

```
df_merged['pos']=df_merged['PROD_NAME'].str.find(' ')
df_merged['BRAND']=df_merged.apply(lambda x: x['PROD_NAME'][0:x['pos']], axis=1)
df_merged.head()
```

Out[11]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALES	p
0	1000	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	natural chip compny seasalt175g	2	6.0	
3	1003	YOUNG FAMILIES	Budget	2019-03-08	1	natural chipco hony soy chckn175g	1	3.0	
4	1004	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	ww original stacked chips 160g	1	1.9	
14	1011	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	smiths crinkle cut chips barbecue 170g	1	2.9	
17	1013	RETIREES	Budget	2019-03-04	1	doritos corn chip southern chicken 150g	1	3.9	

In [12]:

```
df_merged.drop(['LYLTY_CARD_NBR','pos'], axis='columns', inplace=True)
df_merged.head()
```

Out[12]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALES	BRAND
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	natural chip compny seasalt175g	2	6.0	natural
3	YOUNG FAMILIES	Budget	2019-03-08	1	natural chipco hony soy chckn175g	1	3.0	natural
4	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	ww original stacked chips 160g	1	1.9	ww
14	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	smiths crinkle cut chips barbecue 170g	1	2.9	smiths
17	RETIREES	Budget	2019-03-04	1	doritos corn chip southern chicken 150g	1	3.9	doritos

In [13]:
```python
df_merged['pos']=df_merged['PROD_NAME'].str.find('chip')
df_merged['new']=df_merged.apply(lambda x: x['PROD_NAME'][x['pos']: ], axis=1)
df_merged.head()
```

Out[13]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_NAME	PROD_QTY	TOT_SALES	BRAND	pos	
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	natural chip compny seasalt175g	2	6.0	natural	8	con seasalt
3	YOUNG FAMILIES	Budget	2019-03-08	1	natural chipco hony soy chckn175g	1	3.0	natural	8	chipco chckn
4	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	ww original stacked chips 160g	1	1.9	ww	20	chips
14	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	smiths crinkle cut chips barbecue 170g	1	2.9	smiths	20	c barb
17	RETIREES	Budget	2019-03-04	1	doritos corn chip southern chicken 150g	1	3.9	doritos	13	sout chi

In [14]:
```python
df_merged.drop(['PROD_NAME','pos'], axis='columns', inplace=True)
df_merged.head()
```

Out[14]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	new
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chip compny seasalt175g
3	YOUNG FAMILIES	Budget	2019-03-08	1	1	3.0	natural	chipco hony soy chckn175g
4	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	1	1.9	ww	chips 160g
14	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	1	2.9	smiths	chips barbecue 170g
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chip southern chicken 150g

In [15]:
```python
df_merged['pos']=df_merged['new'].str.find(' ')
df_merged['PRODUCTS']=df_merged.apply(lambda x: x['new'][0:x['pos']], axis=1)
df_merged.drop(['new','pos'], axis='columns', inplace=True)
df_merged.head()
```

Out[15]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chip
3	YOUNG FAMILIES	Budget	2019-03-08	1	1	3.0	natural	chipco
4	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	1	1.9	ww	chips
14	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	1	2.9	smiths	chips
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chip

In [16]:

```
df_merged['PRODUCTS']=df_merged['PRODUCTS'].str.replace('chip','chips')
df_merged.head()
```

Out[16]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chips
3	YOUNG FAMILIES	Budget	2019-03-08	1	1	3.0	natural	chipsco
4	OLDER SINGLES/COUPLES	Mainstream	2018-11-02	1	1	1.9	ww	chipss
14	OLDER SINGLES/COUPLES	Mainstream	2018-12-19	1	1	2.9	smiths	chipss
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chips

In [17]:

```
df_merged=df_merged[df_merged['PRODUCTS']=='chips']
df_merged.head()
```

Out[17]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chips
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chips
30	YOUNG SINGLES/COUPLES	Premium	2019-02-20	1	1	3.0	natural	chips
31	YOUNG FAMILIES	Budget	2018-11-21	1	2	6.0	smiths	chips
40	YOUNG FAMILIES	Mainstream	2018-10-30	1	1	3.0	natural	chips

In [18]:

```
df_merged.tail()
```

Out[18]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS
264771	YOUNG SINGLES/COUPLES	Premium	2018-12-27	272	2	7.8	doritos	chips
264811	RETIREES	Mainstream	2019-06-20	77	2	6.0	natural	chips
264814	RETIREES	Budget	2018-11-29	77	2	11.8	smiths	chips
264818	OLDER SINGLES/COUPLES	Mainstream	2019-06-18	77	1	1.9	ww	chips
264828	OLDER SINGLES/COUPLES	Budget	2018-12-17	88	2	7.8	doritos	chips

In [19]:

```
df_merged['month']=df_merged['DATE'].dt.month
df_merged['year']=df_merged['DATE'].dt.year

df_merged.head()
```

```
C:\Users\ritika shukla\AppData\Local\Temp\ipykernel_13888\191690799.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#retu
rning-a-view-versus-a-copy
  df_merged['month']=df_merged['DATE'].dt.month
C:\Users\ritika shukla\AppData\Local\Temp\ipykernel_13888\191690799.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#retu
rning-a-view-versus-a-copy
  df_merged['year']=df_merged['DATE'].dt.year
```

Out[19]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS	month	year
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chips	10	2018
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chips	3	2019
30	YOUNG SINGLES/COUPLES	Premium	2019-02-20	1	1	3.0	natural	chips	2	2019
31	YOUNG FAMILIES	Budget	2018-11-21	1	2	6.0	smiths	chips	11	2018
40	YOUNG FAMILIES	Mainstream	2018-10-30	1	1	3.0	natural	chips	10	2018

DATA CLEANING DONE

VISUALIZATION

In [20]:

```
df_merged.head()
```

Out[20]:

	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	PROD_QTY	TOT_SALES	BRAND	PRODUCTS	month	year
0	YOUNG SINGLES/COUPLES	Premium	2018-10-17	1	2	6.0	natural	chips	10	2018
17	RETIREES	Budget	2019-03-04	1	1	3.9	doritos	chips	3	2019
30	YOUNG SINGLES/COUPLES	Premium	2019-02-20	1	1	3.0	natural	chips	2	2019
31	YOUNG FAMILIES	Budget	2018-11-21	1	2	6.0	smiths	chips	11	2018
40	YOUNG FAMILIES	Mainstream	2018-10-30	1	1	3.0	natural	chips	10	2018

In [21]:

```
df_2018=df_merged[df_merged['year']==2018]
df_2019=df_merged[df_merged['year']==2019]
df_2018=df_2018['TOT_SALES'].sum()
df_2019=df_2019['TOT_SALES'].sum()
print("Total Sales 2018 :", int(df_2018))
print("Total Sales 2019 :", int(df_2019))
```

```
Total Sales 2018 : 67453
Total Sales 2019 : 64695
```

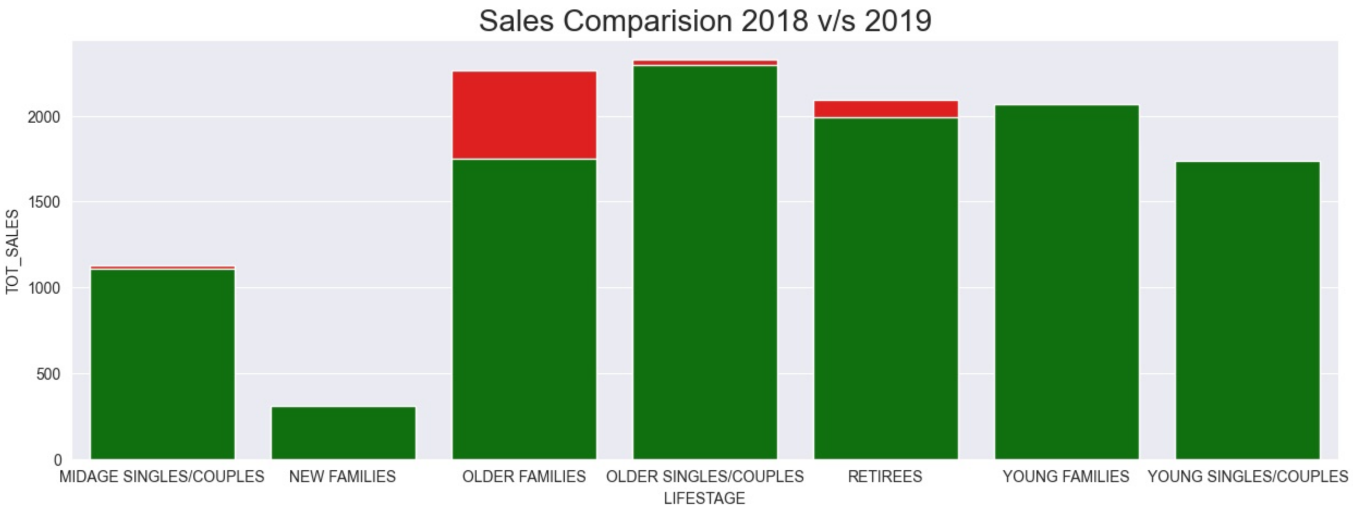
In [22]:

```
df_2018=df_merged[df_merged['year']==2018]
df_2019=df_merged[df_merged['year']==2019]

df_2018_qty=df_2018['PROD_QTY'].sum()
df_2019_qty=df_2019['PROD_QTY'].sum()

df_2018=df_2018['TOT_SALES'].sum()
df_2019=df_2019['TOT_SALES'].sum()

print("Total Prod 2018 :", df_2018_qty)
print("Total Prod 2019 :", df_2019_qty)

print("Avg Prod sold 2018 :", (df_2018) / (df_2018_qty))
print("Avg Prod sold 2019 :", (df_2019) / (df_2019_qty))
```

```
Total Prod 2018 : 18068
Total Prod 2019 : 17373
Avg Prod sold 2018 : 3.7333296435687404
Avg Prod sold 2019 : 3.7239049099176875
```

In [30]:

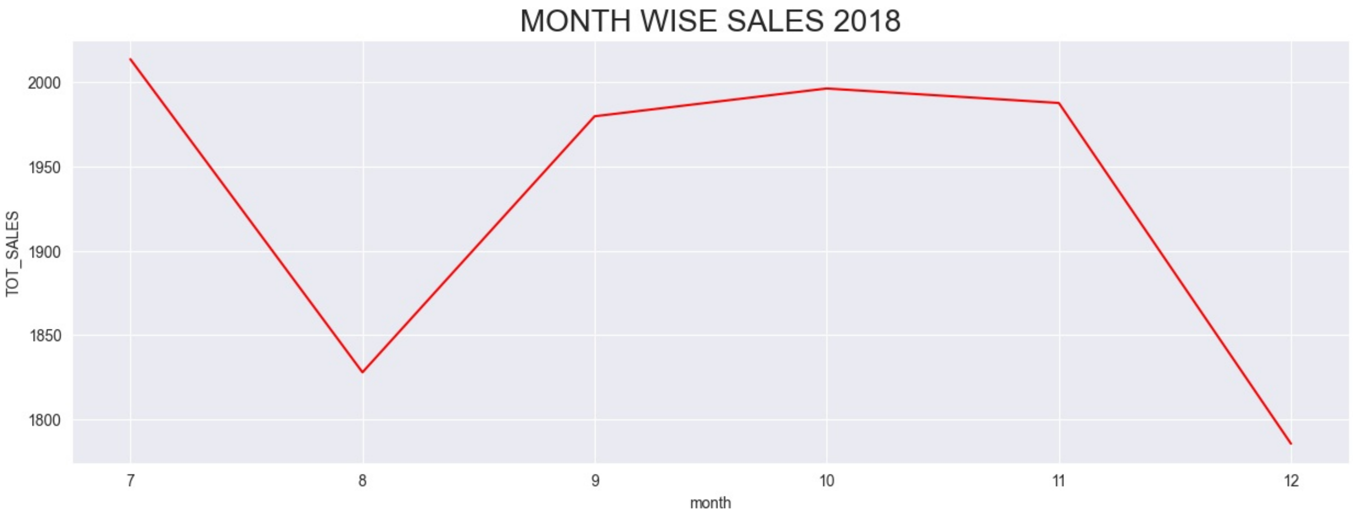
```
sns.set({'figure.figsize': (15,5)})

df_2018=df_merged[df_merged['year']==2018]
df_2019=df_merged[df_merged['year']==2019]
df_2018=df_2018.groupby(['LIFESTAGE'])[['TOT_SALES']].sum()
df_2019=df_2019.groupby(['LIFESTAGE'])[['TOT_SALES']].sum()
sns.barplot(x='LIFESTAGE',y='TOT_SALES', data=df_2018, color='red')
sns.barplot(x='LIFESTAGE',y='TOT_SALES', data=df_2019, color='green')
plt.title("Sales Comparision 2018 v/s 2019", fontsize=20)
plt.show()
```



Sales Comparision 2018 v/s 2019

In [31]:

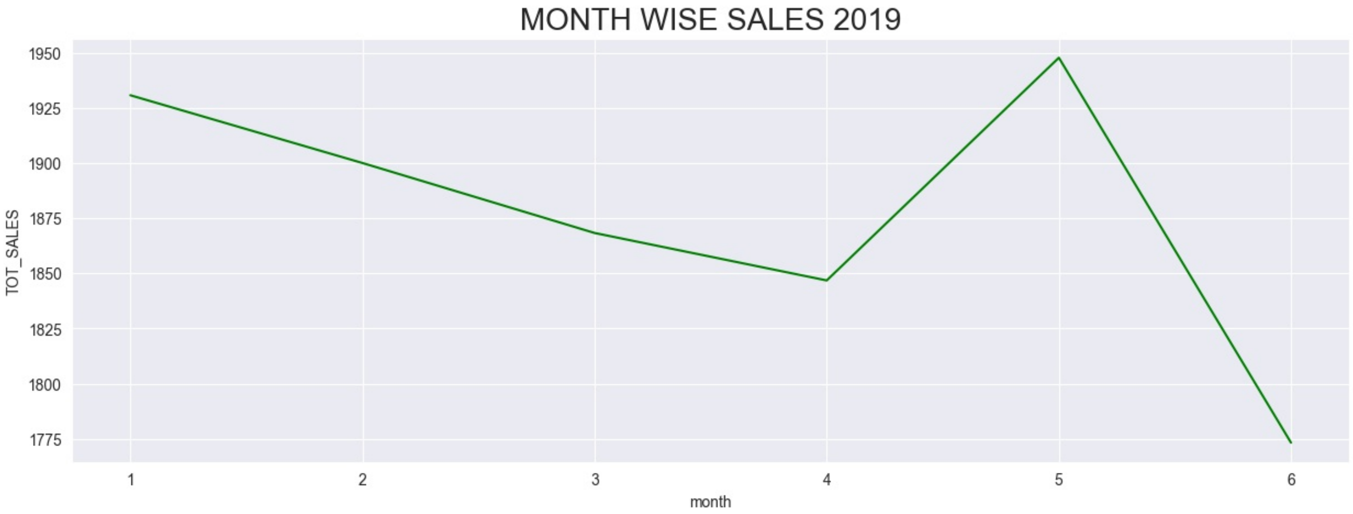
```
sns.set({'figure.figsize': (15,5)})

df_2018=df_merged[df_merged['year']==2018]
df_2019=df_merged[df_merged['year']==2019]
df_2018=df_2018.groupby(['month'])[['TOT_SALES']].sum()
df_2019=df_2019.groupby(['month'])[['TOT_SALES']].sum()

sns.lineplot(x='month', y='TOT_SALES', data=df_2018, color='red')
plt.title("MONTH WISE SALES 2018", fontsize=20)
plt.show()
```



MONTH WISE SALES 2018

In [32]:

```
sns.set({'figure.figsize': (15,5)})

df_2019=df_2019.groupby(['month'])[['TOT_SALES']].sum()
sns.lineplot(x='month', y='TOT_SALES', data=df_2019, color='green')
plt.title("MONTH WISE SALES 2019", fontsize=20)

plt.show()
```

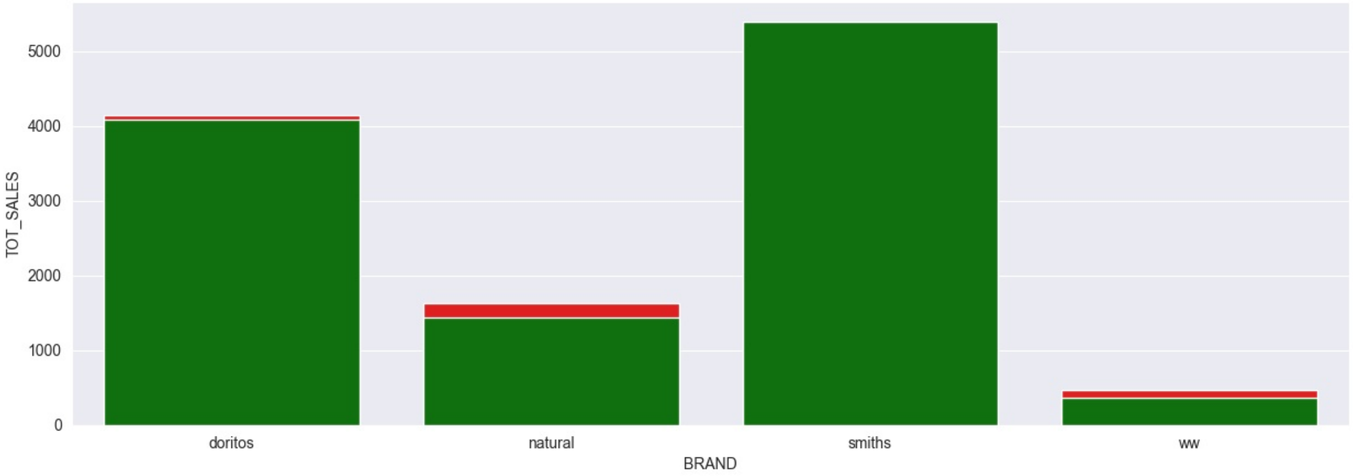


MONTH WISE SALES 2019

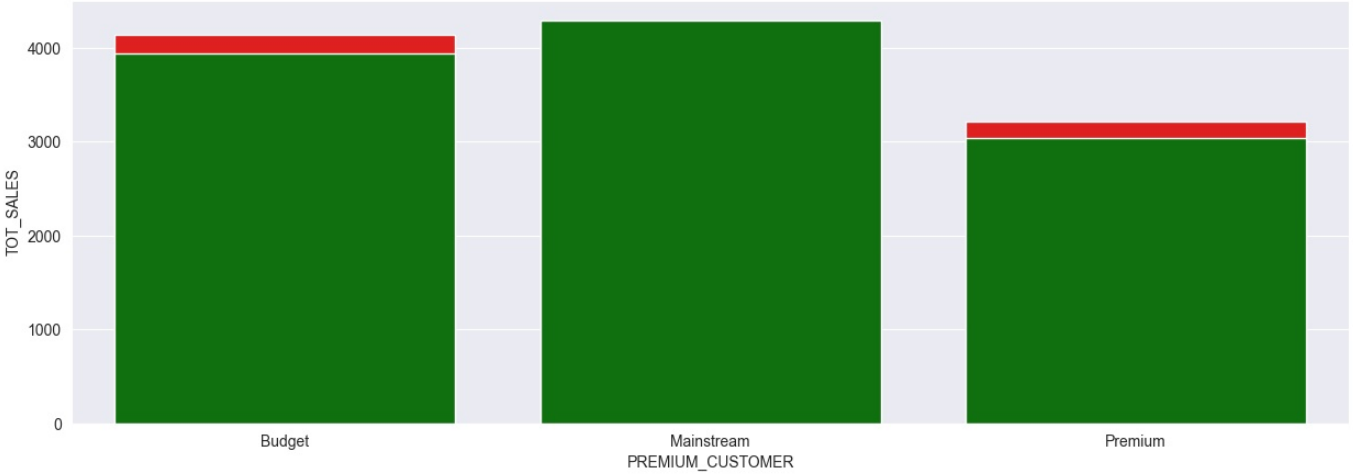
In [33]:

```
sns.set({'figure.figsize': (15,5)})
```

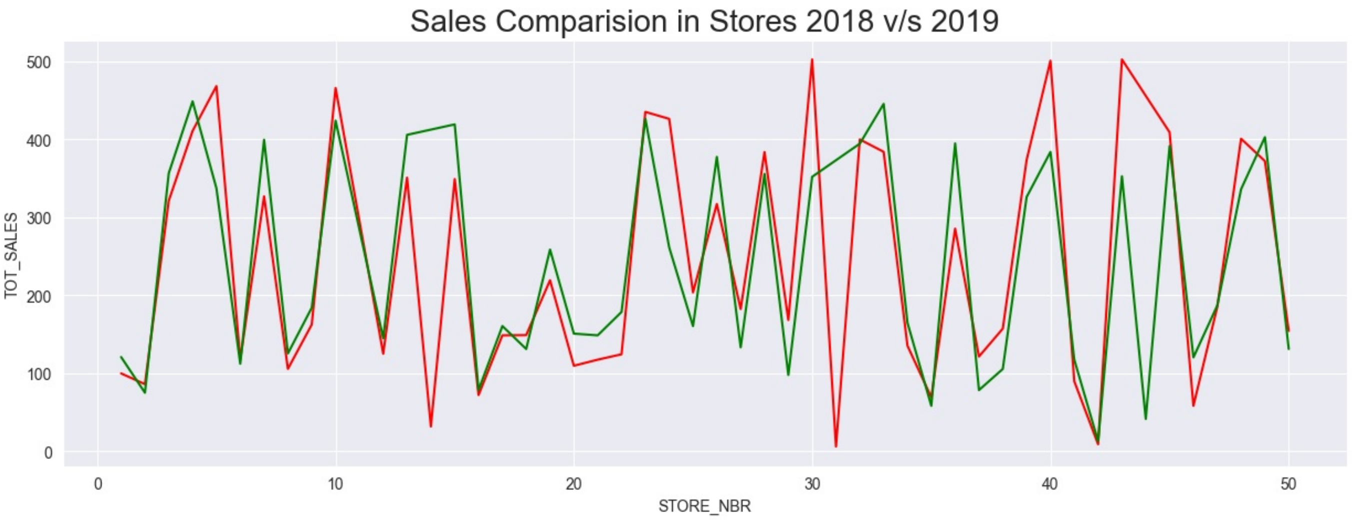
```
df_2018_BRAND=df_merged[df_merged['year']==2018]
df_2019_BRAND=df_merged[df_merged['year']==2019]

df_2018_BRAND=df_2018_BRAND.groupby(['BRAND'])[['TOT_SALES']].sum()
df_2019_BRAND=df_2019_BRAND.groupby(['BRAND'])[['TOT_SALES']].sum()

sns.barplot(x='BRAND', y='TOT_SALES', data=df_2018_BRAND, color='red')
sns.barplot(x='BRAND', y='TOT_SALES', data=df_2019_BRAND, color='green')

plt.show()
```



In [34]:
```
sns.set({'figure.figsize': (15,5)})

df_2018_customer=df_merged[df_merged['year']==2018]
df_2019_customer=df_merged[df_merged['year']==2019]

df_2018_customer=df_2018_customer.groupby(['PREMIUM_CUSTOMER'])[['TOT_SALES']].sum()
df_2019_customer=df_2019_customer.groupby(['PREMIUM_CUSTOMER'])[['TOT_SALES']].sum()

sns.barplot(x='PREMIUM_CUSTOMER', y='TOT_SALES', data=df_2018_customer, color='red')
sns.barplot(x='PREMIUM_CUSTOMER', y='TOT_SALES', data=df_2019_customer, color='green')

plt.show()
```

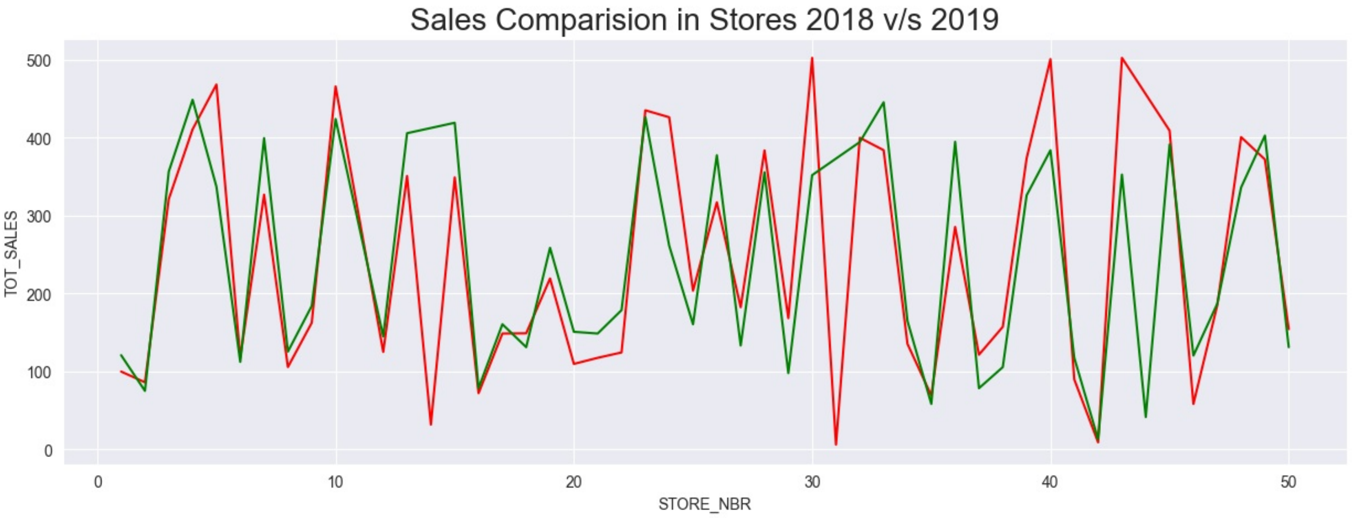


In [35]:
```
sns.set({'figure.figsize': (15,5)})

df_2018_store = df_merged[df_merged['year']==2018]
df_2019_store = df_merged[df_merged['year']==2019]

df_2018_store=df_2018_store.groupby(['STORE_NBR'])[['TOT_SALES']].sum()
df_2019_store=df_2019_store.groupby(['STORE_NBR'])[['TOT_SALES']].sum()

sns.lineplot(x='STORE_NBR', y='TOT_SALES', data=df_2018_store, color='red')
sns.lineplot(x='STORE_NBR', y='TOT_SALES', data=df_2019_store, color='green')

plt.title("Sales Comparision in Stores 2018 v/s 2019", fontsize=20)
plt.show()
```



In [36]:

```python
sns.set({'figure.figsize': (15,5)})

df_merged=df_merged[df_merged['STORE_NBR']<=50]
df_2018_store = df_merged[df_merged['year']==2018]
df_2019_store = df_merged[df_merged['year']==2019]

df_2018_store=df_2018_store.groupby(['STORE_NBR'])[['TOT_SALES']].sum()
df_2019_store=df_2019_store.groupby(['STORE_NBR'])[['TOT_SALES']].sum()

sns.lineplot(x='STORE_NBR', y='TOT_SALES', data=df_2018_store, color='red')
sns.lineplot(x='STORE_NBR', y='TOT_SALES', data=df_2019_store, color='green')

plt.title("Sales Comparision in Stores 2018 v/s 2019", fontsize=20)
plt.show()
```



In [ ]:

In [ ]:

In [ ]: