Data Preparation and Customer Analysis Python Notebook

Conduct analysis on your client's transaction dataset and identify customer purchasing behaviours to generate insights and provide commercial recommendations.

Examine transaction data

- insconsistencies?
- null data?
- numeric data?
- clean data is a must
- merge the data
- Its then time to analyse

Data to look at and metrics to define

- total sales
- drivers of sales
- highest sales come from

To do

- charts
- graphs
- interesting trends?

To find through the data

- Which customer segments to target?
- Chips packet size
- Over conclusion based on analysis

Task 1:

1. Problem

Conduct analysis on client's transaction dataset and identify customer purchasing behaviours to generate insights and provide commercial recommendations.

2. Data

Data provided by Inside Sherpa and Quantium

In [1]:
```
%matplotlib inline
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
```

In [2]:
```
# QVI_purchase_behavior dataset
purchase_behavior = pd.read_csv("purchase_behaviour.csv")
purchase_behavior.head()
```

Out[2]:

	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 [3]:
```
# QVI_transaction_data dataset
transaction_data = pd.read_csv("qvi_transaction_data.csv")
transaction_data.head()
```

Out[3]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY
0	10/17/2018	1	1000	1	5	Natural Chip Compny SeaSalt175g	2
1	5/14/2019	1	1307	348	66	CCs Nacho Cheese 175g	3
2	5/20/2019	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2
3	8/17/2018	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5
4	8/18/2018	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3

Examining Data

In [4]:
```
transaction_data.isnull().sum()
```

Out[4]:
```
DATE              0
STORE_NBR         0
LYLTY_CARD_NBR    0
TXN_ID            0
PROD_NBR          0
PROD_NAME         0
PROD_QTY          0
TOT_SALES         0
dtype: int64
```

No null data

In [5]:
```
mergedata = pd.merge(purchase_behavior, transaction_data)
mergedata.head()
```

Out[5]:

	LYLTY_CARD_NBR	LIFESTAGE	PREMIUM_CUSTOMER	DATE	STORE_NBR	TXN_ID
0	1000	YOUNG SINGLES/COUPLES	Premium	10/17/2018	1	1
1	1002	YOUNG SINGLES/COUPLES	Mainstream	9/16/2018	1	2
2	1003	YOUNG FAMILIES	Budget	3/7/2019	1	3
3	1003	YOUNG FAMILIES	Budget	3/8/2019	1	4
4	1004	OLDER SINGLES/COUPLES	Mainstream	11/2/2018	1	5

Datasets are merged

In [6]:
```
# Groupby DATE needed, so finding the length of DATE to see if groupby w
orked later
len(transaction_data["DATE"])
```

Out[6]:
```
264836
```

Finding the lenght of Date to see if groupby is successful later

In [7]:
```
transaction_data["PROD_NAME"].head()
```

Out[7]:
```
0      Natural Chip        Compny SeaSalt175g
1                    CCs Nacho Cheese    175g
2      Smiths Crinkle Cut  Chips Chicken 170g
3      Smiths Chip Thinly  S/Cream&Onion 175g
4    Kettle Tortilla ChpsHny&Jlpno Chili 150g
Name: PROD_NAME, dtype: object
```

PROD_NAME cloumn needs to be changed, has both Product name and package size(g)

In [8]:
```
# Creating new date frame with total sales grouped by date
date_sales = transaction_data["TOT_SALES"].groupby(transaction_data["DAT
E"])
print(date_sales.sum())
```

```
DATE
1/1/2019     5023
1/10/2019    5315
1/11/2019    5036
1/12/2019    5344
1/13/2019    5108
             ...
9/5/2018     5524
9/6/2018     5863
9/7/2018     5189
9/8/2018     5346
9/9/2018     5596
Name: TOT_SALES, Length: 364, dtype: int64
```

In [9]:
```
# Data frame
date_sales_df = pd.DataFrame(date_sales.sum())
date_sales_df.head()
```

Out[9]:

DATE	TOT_SALES
1/1/2019	5023
1/10/2019	5315
1/11/2019	5036
1/12/2019	5344
1/13/2019	5108

In [10]:
```
# Changing the PROD_NAME column to only display numbers that represent t
he package size
transaction_data['Package Size'] = transaction_data['PROD_NAME'].str.rep
lace(r'[^\d.]+', '')

# Total sales grouped by PROD_NAME
new_sales = transaction_data["TOT_SALES"].astype(int).groupby(transactio
n_data["Package Size"].rename("Package Size").astype(int))
# Total Sales mean by package size
print(new_sales.mean())
```

```
Package Size
70      4.674187
90      2.906915
110     7.649529
125     3.756534
134     6.749143
135     7.632484
150     6.922932
160     3.773737
165     6.502451
170     7.500125
175     7.416569
180     5.650545
190     5.155927
200     3.767047
210     6.724330
220     4.683504
250     8.566740
270     8.675577
300     7.345378
330    10.577751
380    12.064194
Name: TOT_SALES, dtype: float64
```

In [11]:
```
# Data Frame new_sales.mean
df_sales = pd.DataFrame(new_sales.mean())
df_sales.head()
```

Out[11]:

Package Size	TOT_SALES
70	4.674187
90	2.906915
110	7.649529
125	3.756534
134	6.749143

In [12]:
```
# Total sales grouped by store number
store_sales = transaction_data["TOT_SALES"].astype(int).groupby(transact
ion_data["STORE_NBR"].astype(int))
print(store_sales.sum())
```

```
STORE_NBR
1       2425
2       2043
3      12790
4      14658
5       9459
        ...
268     2629
269    11212
270    11247
271     9692
272     4646
Name: TOT_SALES, Length: 272, dtype: int32
```

In [13]:
```
store_sales = pd.DataFrame(store_sales.sum())
store_sales.head()
```

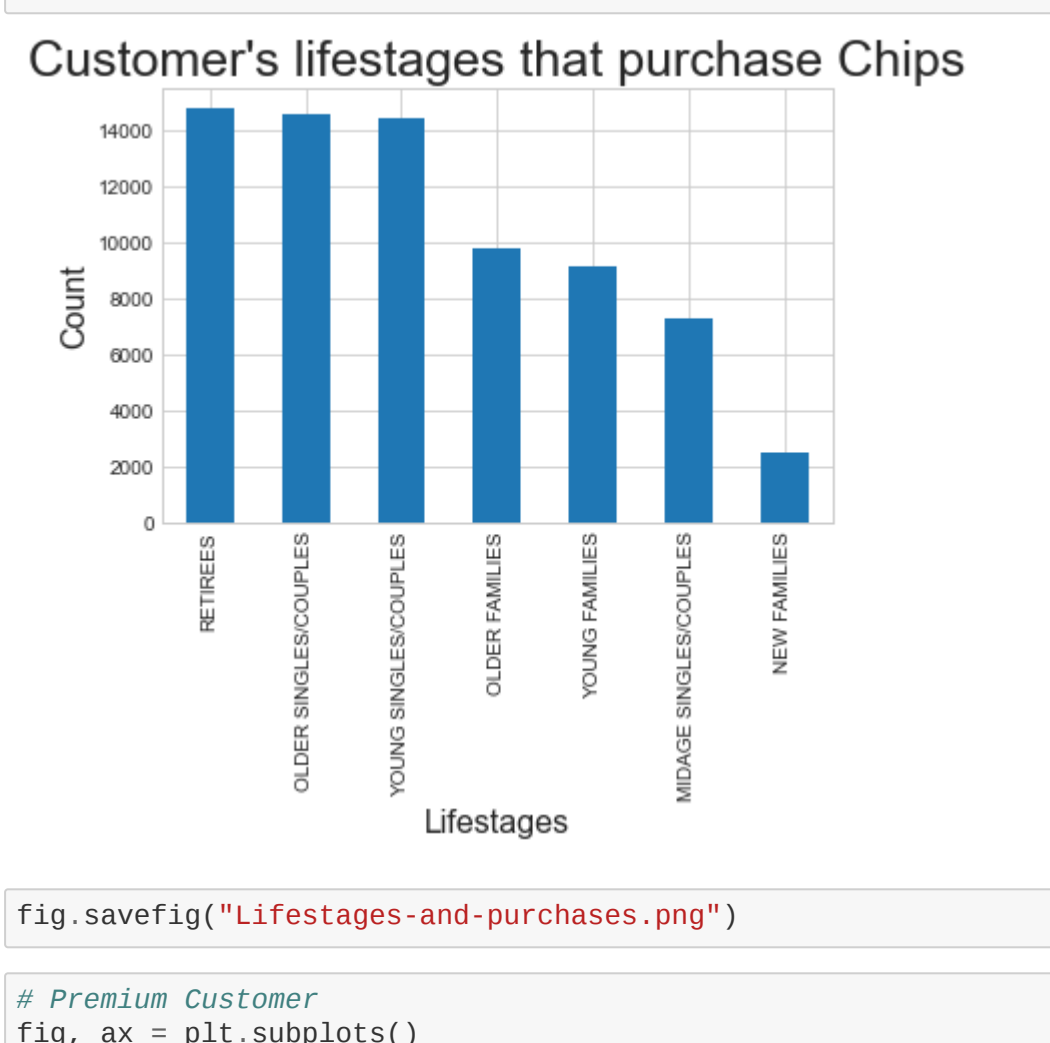
Out[13]:

STORE_NBR	TOT_SALES
1	2425
2	2043
3	12790
4	14658
5	9459

3. Visualizations

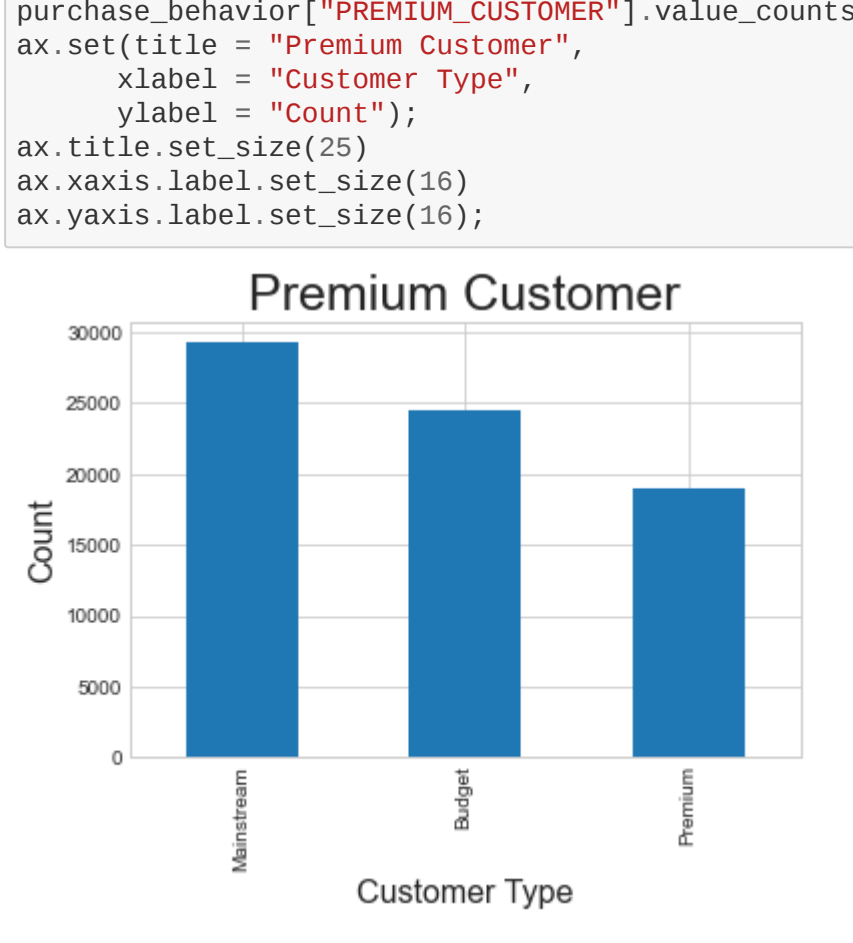
QVI_purchase_behavior dataset

In [14]:
```
# Customer of Chips' Lifestages

# Using seaborn-whitegrid
plt.style.use("seaborn-whitegrid")

# Bar plot
fig, ax = plt.subplots()
purchase_behavior['LIFESTAGE'].value_counts().plot(kind='bar');
ax.set(title = "Customer's lifestages that purchase Chips",
      xlabel = "Lifestages",
      ylabel = "Count");
ax.title.set_size(25);
ax.xaxis.label.set_size(16)
ax.yaxis.label.set_size(16);
```



In [15]:
```
fig.savefig("Lifestages-and-purchases.png")
```

In [16]:
```
# Premium Customer
fig, ax = plt.subplots()
purchase_behavior["PREMIUM_CUSTOMER"].value_counts().plot(kind = "bar");
ax.set(title = "Premium Customer",
      xlabel = "Customer Type",
      ylabel = "Count");
ax.title.set_size(25)
ax.xaxis.label.set_size(16)
ax.yaxis.label.set_size(16);
```



In [17]:
```
fig.savefig("Premium-customer.png")
```

Done with QVI_purchase_behavior dataset

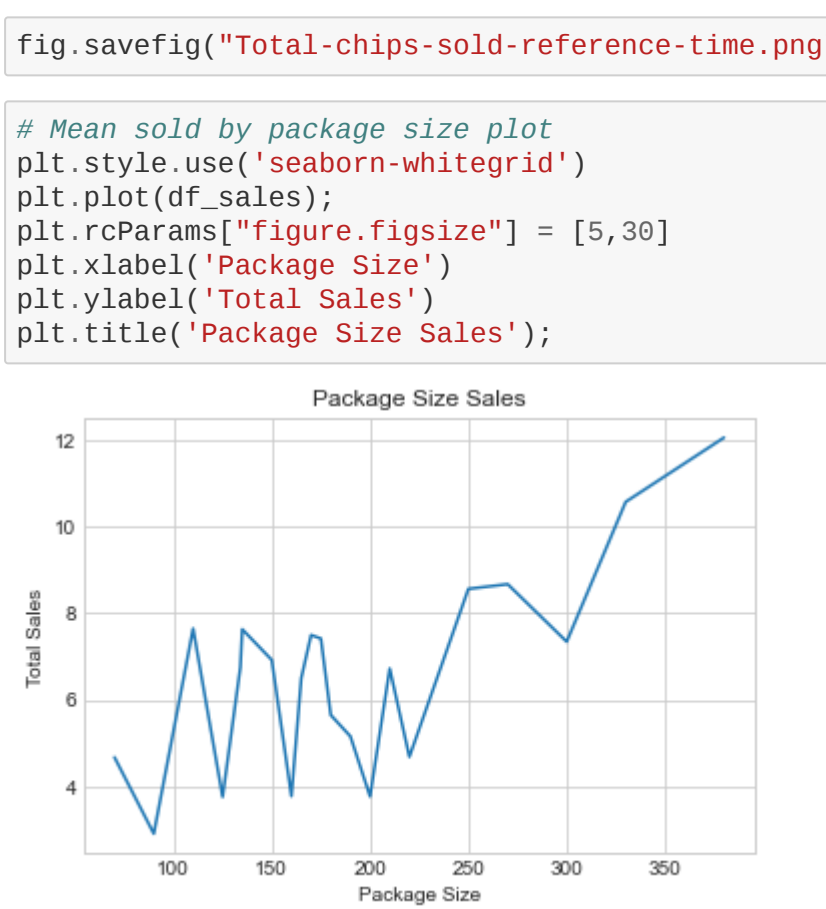
QVI_transaction_data dataset

In [18]:
```
# Change Style
plt.style.use('seaborn-white')
```

In [19]:
```
# total sales of chips from all stores and all brands as time passed
fig, ax = plt.subplots(figsize = (40,20))
ax.plot(date_sales_df);
ax.set(title = "Total Chips of all Brands Sold With Time",
      xlabel = "Total Sold",
      ylabel = "Date");
ax.title.set_size = (50)
ax.xaxis.label.set_size = (20)
ax.yaxis.label.set_size = (20);
```

In [20]:
```
fig.savefig("Total-chips-sold-reference-time.png")
```

In [21]:
```
# Mean sold by package size plot
plt.style.use('seaborn-whitegrid')
plt.plot(df_sales);
plt.rcParams["figure.figsize"] = [5,30]
plt.xlabel('Package Size')
plt.ylabel('Total Sales')
plt.title('Package Size Sales');
```



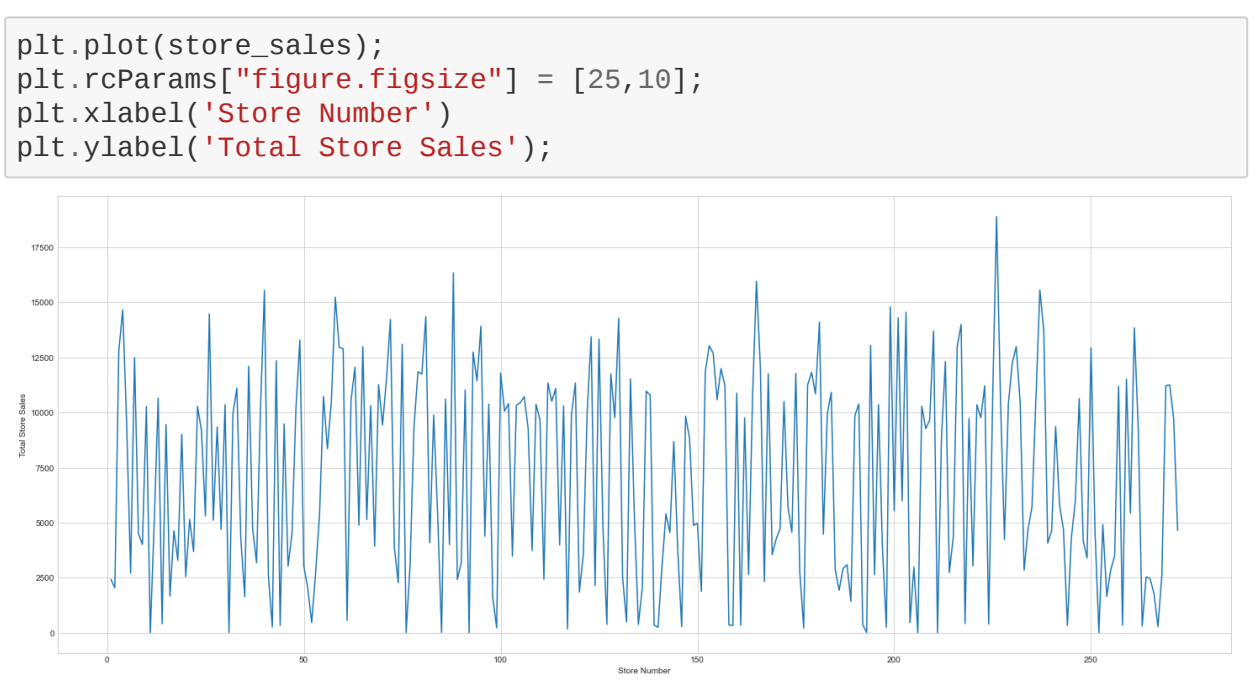
In [22]:
```
fig.savefig("Package-size-total-sales.png")
```

In [23]:
```
df_sales.loc[df_sales['TOT_SALES'].idxmax()]
```

Out[23]:
```
TOT_SALES    12.064194
Name: 380, dtype: float64
```

package size 380 grams is most sold chips package size

In [27]:
```
plt.plot(store_sales);
plt.rcParams["figure.figsize"] = [25,10];
plt.xlabel('Store Number')
plt.ylabel('Total Store Sales');
```



In [25]:
```
fig.savefig("Store-with-the-most-sales.png")
```

In [26]:
```
store_sales.loc[store_sales['TOT_SALES'].idxmax()]
```

Out[26]:
```
TOT_SALES    18893
Name: 226, dtype: int32
```

Store 226 had the most number of chip sales over the time period

Done with QVI_transaction_data dataset

In [ ]: