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

```
Requirement already satisfied: pandas in c:\users\sharankusuma\anaconda3\lib\site-packages (2.0.3)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: numpy>=1.21.0 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas) (1.24.3)
Requirement already satisfied: six>=1.5 in c:\users\sharankusuma\anaconda3\lib\site-packages (from python-dateutil>=2.8.2->pandas) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
pip install numpy
```

```
Requirement already satisfied: numpy in c:\users\sharankusuma\anaconda3\lib\site-packages (1.24.3)
Note: you may need to restart the kernel to use updated packages.
```

In [3]:
```
pip install seaborn
```

```
Requirement already satisfied: seaborn in c:\users\sharankusuma\anaconda3\lib\site-packages (0.12.2)
Requirement already satisfied: numpy!=1.24.0,>=1.17 in c:\users\sharankusuma\anaconda3\lib\site-packages (from seaborn) (1.24.3)
Requirement already satisfied: pandas>=0.25 in c:\users\sharankusuma\anaconda3\lib\site-packages (from seaborn) (2.0.3)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from seaborn) (3.7.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.0.5)
Requirement already satisfied: cycler>=0.10 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (23.1)
Requirement already satisfied: pillow>=6.2.0 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (9.4.0)
Requirement already satisfied: pyparsing<3.1,>=2.3.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (3.0.9)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\sharankusuma\anaconda3\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas>=0.25->seaborn) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\users\sharankusuma\anaconda3\lib\site-packages (from pandas>=0.25->seaborn) (2023.3)
Requirement already satisfied: six>=1.5 in c:\users\sharankusuma\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib!=3.6.1,>=3.1->seaborn) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

In [4]:
```
import pandas as pd
import numpy as np
import seaborn as sns
```

In [7]:
```
file_path = "C:\\Users\\SharanKusuma\\Downloads\\"
transaction_data = pd.read_csv(file_path + "QVI_transaction_data.csv")
```

In [8]:
```
transaction_data.head()
```

Out[8]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
0	43390	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0
1	43599	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3
2	43605	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9
3	43329	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0
4	43330	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8

In [10]:
```
#summerizing transaction dataset
transaction_data.describe()
```

Out[10]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_QTY	TOT_SALES
count	264836.000000	264836.00000	2.648360e+05	2.648360e+05	264836.000000	264836.000000	264836.000000
mean	43464.036260	135.08011	1.355495e+05	1.351583e+05	56.583157	1.907309	7.304200
std	105.389282	76.78418	8.057998e+04	7.813303e+04	32.826638	0.643654	3.083226
min	43282.000000	1.00000	1.000000e+03	1.000000e+00	1.000000	1.000000	1.500000
25%	43373.000000	70.00000	7.002100e+04	6.760150e+04	28.000000	2.000000	5.400000
50%	43464.000000	130.00000	1.303575e+05	1.351375e+05	56.000000	2.000000	7.400000
75%	43555.000000	203.00000	2.030942e+05	2.027012e+05	85.000000	2.000000	9.200000
max	43646.000000	272.00000	2.373711e+06	2.415841e+06	114.000000	200.000000	650.000000

In [12]:
```
customer_data = pd.read_csv(file_path + "QVI_purchase_behaviour.csv")
```

In [13]:
```
customer_data.head()
```

Out[13]:

	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 [14]:
```
#summerizing customer dataset

customer_data.describe()
```

Out[14]:

	LYLTY_CARD_NBR
count	7.263700e+04
mean	1.361859e+05
std	8.989293e+04
min	1.000000e+03
25%	6.620200e+04
50%	1.340400e+05
75%	2.033750e+05
max	2.373711e+06

In [15]:
```
#checking outliers
transaction_data.isnull().sum()
```

Out[15]:
```
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
```

In [18]:
```
data_types = transaction_data.dtypes
print(data_types)
```

```
DATE              int64
STORE_NBR         int64
LYLTY_CARD_NBR    int64
TXN_ID            int64
PROD_NBR          int64
PROD_NAME        object
PROD_QTY          int64
TOT_SALES       float64
dtype: object
```

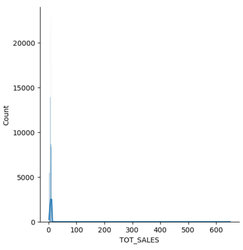
checking outliers

In [20]:
```
import matplotlib.pyplot as plt
```

In [25]:
```
sns.displot(transaction_data.TOT_SALES, kde = True)
```

```
C:\Users\SharanKusuma\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```

Out[25]:
```
<seaborn.axisgrid.FacetGrid at 0x216b059010>
```



In [22]:
```
numeric_data = transaction_data.select_dtypes(['float','int'])
```

In [23]:
```
numeric_data.head()
```

Out[23]:

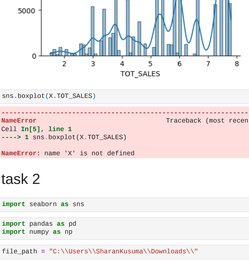
	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_QTY	TOT_SALES
0	43390	1	1000	1	5	2	6.0
1	43599	1	1307	348	66	3	6.3
2	43605	1	1343	383	61	2	2.9
3	43329	2	2373	974	69	5	15.0
4	43330	2	2426	1038	108	3	13.8

In [34]:
```
X = numeric_data[numeric_data['TOT_SALES']<8.000]
```

In [35]:
```
sns.displot(X.TOT_SALES, kde = True)
```

```
C:\Users\SharanKusuma\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```

Out[35]:
```
<seaborn.axisgrid.FacetGrid at 0x216d225690>
```



In [5]:
```
sns.boxplot(X.TOT_SALES)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[5], line 1
----> 1 sns.boxplot(X.TOT_SALES)

NameError: name 'X' is not defined
```

task 2

In [2]:
```
import seaborn as sns
```

In [8]:
```
import pandas as pd
import numpy as np
```

In [10]:
```
file_path = "C:\\Users\\SharanKusuma\\Downloads\\"
```

In [11]:
```
dataset = pd.read_csv(file_path + "QVI_data.csv")
```

In [12]:
```
dataset.head()
```

Out[12]:

	LYLTY_CARD_NBR	DATE	STORE_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE	BRAND	LIFESTAGE	PREMIUM_CUSTOMER
0	1000	2018-10-17	1	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	NATURAL	YOUNG SINGLES/COUPLES	Premium
1	1002	2018-09-16	1	2	58	Red Rock Deli Chikn&Garlic Aioli 150g	1	2.7	150	RRD	YOUNG SINGLES/COUPLES	Mainstream
2	1003	2019-03-07	1	3	52	Grain Waves Sour Cream&Chives 210G	1	3.6	210	GRNWVES	YOUNG FAMILIES	Budget
3	1003	2019-03-08	1	4	106	Natural ChipCo Hony Soy Chckn175g	1	3.0	175	NATURAL	YOUNG FAMILIES	Budget
4	1004	2018-11-02	1	5	96	WW Original Stacked Chips 160g	1	1.9	160	WOOLWORTHS	OLDER SINGLES/COUPLES	Mainstream

In [13]:
```
total_sales_revenue = sum(dataset.TOT_SALES)
```

In [15]:
```
print(total_sales_revenue)
```

```
1933114.9999996515
```

In [20]:
```
dataset.describe()
```

Out[20]:

	LYLTY_CARD_NBR	STORE_NBR	TXN_ID	PROD_NBR	PROD_QTY	TOT_SALES	PACK_SIZE
count	2.648340e+05	264834.000000	2.648340e+05	264834.000000	264834.000000	264834.000000	264834.000000
mean	1.355488e+05	135.079423	1.351576e+05	56.583554	1.905813	7.299346	182.425512
std	8.057990e+04	76.784063	7.813292e+04	32.826444	0.343436	2.527241	64.325148
min	1.000000e+03	1.000000	1.000000e+00	1.000000	1.000000	1.500000	70.000000
25%	7.002100e+04	70.000000	6.760050e+04	28.000000	2.000000	5.400000	150.000000
50%	1.303570e+05	130.000000	1.351365e+05	56.000000	2.000000	7.400000	170.000000
75%	2.030940e+05	203.000000	2.026986e+05	85.000000	2.000000	9.200000	175.000000
max	2.373711e+06	272.000000	2.415841e+06	114.000000	5.000000	29.500000	380.000000

In [21]:
```
total_customers = 241584
```

In [22]:
```
dataset.shape
```

Out[22]:
```
(264834, 12)
```

In [23]:
```
avg_number_of_transaction_per_customer = total_customers/264834
```

In [24]:
```
print(avg_number_of_transaction_per_customer)
```

```
0.9122091574344684
```

In [ ]:
```

```