QUANTIUM TASK 1

From google.colab import files

uploaded = files.upload()

import pandas as pd

Load both CSVs

purchase_df = pd.read_csv('QVI_purchase_behaviour.csv')

transaction_df = pd.read_csv('QVI_transaction_data.csv')

purchase_df.head()

	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

transaction_df.head()

	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

purchase_df.info()

transaction_df.info()

purchase_df.isna().sum()

	0
LYLTY_CARD_NBR	0
LIFESTAGE	0
PREMIUM_CUSTOMER	0

dtype: int64

transaction_df.isna().sum()

	0
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

transaction_df['DATE']= pd.to_datetime(transaction_df['DATE'], origin='1899-12-30', unit='D')

transaction_df.info()

transaction_df['PROD_NAME'].unique()[1:50]

```
array(['CCs Nacho Cheese    175g',
       'Smiths Crinkle Cut  Chips Chicken 170g',
       'Smiths Chip Thinly  S/Cream&Onion 175g',
       'Kettle Tortilla ChpsHny&Jlpno Chili 150g',
       'Old El Paso Salsa   Dip Tomato Mild 300g',
       'Smiths Crinkle Chips Salt & Vinegar 330g',
       'Grain Waves         Sweet Chilli 210g',
       'Doritos Corn Chip Mexican Jalapeno 150g',
       'Grain Waves Sour    Cream&Chives 210G',
       'Kettle Sensations   Siracha Lime 150g',
       'Twisties Cheese     270g', 'WW Crinkle Cut      Chicken 175g',
       'Thins Chips Light&  Tangy 175g', 'CCs Original 175g',
       'Burger Rings 220g', 'NCC Sour Cream &    Garden Chives 175g',
       'Doritos Corn Chip Southern Chicken 150g',
       'Cheezels Cheese Box 125g', 'Smiths Crinkle      Original 330g',
       'Infzns Crn Crnchers Tangy Gcamole 110g',
       'Kettle Sea Salt     And Vinegar 175g',
       'Smiths Chip Thinly  Cut Original 175g', 'Kettle Original 175g',
       'Red Rock Deli Thai  Chilli&Lime 150g',
       'Pringles Sthrn FriedChicken 134g', 'Pringles Sweet&Spcy BBQ 134g',
       'Red Rock Deli SR    Salsa & Mzzrlla 150g',
       'Thins Chips         Originl saltd 175g',
       'Red Rock Deli Sp    Salt & Truffle 150G',
       'Smiths Thinly       Swt Chli&S/Cream175G', 'Kettle Chilli 175g',
       'Doritos Mexicana    170g',
       'Smiths Crinkle Cut  French OnionDip 150g',
       'Natural ChipCo      Hony Soy Chckn175g',
       'Dorito Corn Chp     Supreme 380g', 'Twisties Chicken270g',
       'Smiths Thinly Cut   Roast Chicken 175g',
       'Smiths Crinkle Cut  Tomato Salsa 150g',
       'Kettle Mozzarella   Basil & Pesto 175g',
       'Infuzions Thai SweetChili PotatoMix 110g',
       'Kettle Sensations   Camembert & Fig 150g',
       'Smith Crinkle Cut   Mac N Cheese 150g',
       'Kettle Honey Soy    Chicken 175g',
       'Thins Chips Seasonedchicken 175g',
       'Smiths Crinkle Cut  Salt & Vinegar 170g',
       'Infuzions BBQ Rib   Prawn Crackers 110g',
       'GrnWves Plus Btroot & Chilli Jam 180g',
```

"We can see that there are typos such as 'chp' or 'chps' so we have to handle those and include them in our analysis."

non_chip_products= transaction_df[transaction_df['PROD_NAME'].str.lower().str.contains('salsa')]

non_chip_products.tail()

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
264675	2019-04-20	265	265103	263419	59	Old El Paso Salsa Dip Tomato Med 300g	1	5.1
264678	2019-03-30	265	265111	263428	35	Woolworths Mild Salsa 300g	1	1.5
264719	2018-10-28	266	266278	264104	39	Smiths Crinkle Cut Tomato Salsa 150g	1	2.6
264734	2019-01-11	267	267324	264374	41	Doritos Salsa Mild 300g	1	2.6
264780	2019-01-10	269	269222	266382	64	Red Rock Deli SR Salsa & Mzzrlla 150g	2	5.4

non_chip_products['PROD_NAME']. unique()

non_chip_products.shape

```
array(['Old El Paso Salsa   Dip Tomato Mild 300g',
       'Red Rock Deli SR    Salsa & Mzzrlla 150g',
       'Smiths Crinkle Cut  Tomato Salsa 150g',
       'Doritos Salsa       Medium 300g',
       'Old El Paso Salsa   Dip Chnky Tom Ht300g',
       'Woolworths Mild     Salsa 300g',
       'Old El Paso Salsa   Dip Tomato Med 300g',
       'Woolworths Medium   Salsa 300g', 'Doritos Salsa Mild  300g'],
      dtype=object)
```

transaction_df= transaction_df.drop(non_chip_products.index).reset_index(drop=True)

SUMMARIZING INDIVIDUAL WORDS:

from collections import Counter

import re

all_product_names= ''.join(transaction_df['PROD_NAME'].str.lower())

cleaned_text= re.sub(r'[^a-z\s]', '', all_product_names)

words= cleaned_text.split()

word_count= Counter(words)

top_words= word_count.most_common(20)

print(top_words)

[('chips', 49770), ('gkettle', 39247), ('cheese', 27890), ('gsmiths', 25753), ('salt', 24719), ('gpringles', 23779), ('crinkle', 22490), ('corn', 22063), ('original', 21560), ('gdoritos', 20958), ('cut', 19284), ('chip', 18645), ('chicken', 15407), ('sea', 14145), ('chilli', 13895), ('sour', 13882), ('gthins', 13311), ('crisps', 12607), ('vinegar', 12402), ('grrd', 11128)]

transaction_df['PROD_NAME'].unique()

transaction_df.describe(include='all')

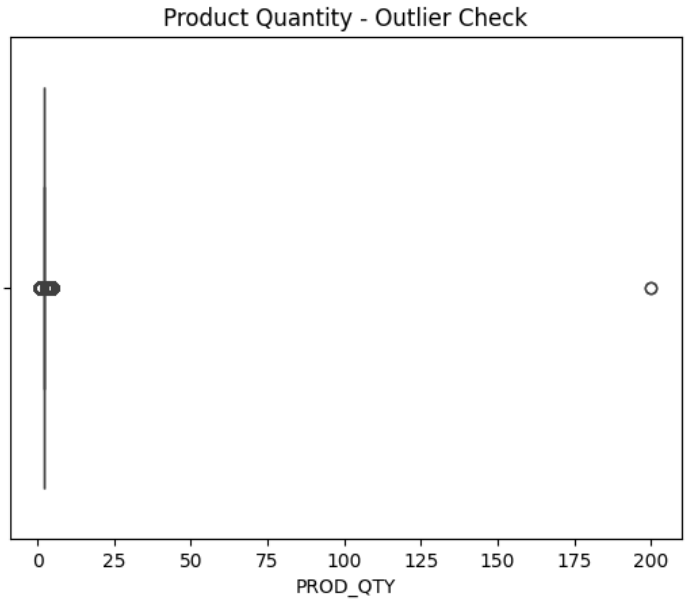
	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
count	246742	246742.000000	2.467420e+05	2.467420e+05	246742.000000	246742	246742.000000	246742.000000
unique	NaN	NaN	NaN	NaN	NaN	105	NaN	NaN
top	NaN	NaN	NaN	NaN	NaN	Kettle Mozzarella Basil & Pesto 175g	NaN	NaN
freq	NaN	NaN	NaN	NaN	NaN	3304	NaN	NaN
mean	2018-12-30 01:19:01.211467520	135.051098	1.355310e+05	1.351311e+05	56.351789	NaN	1.908062	7.321322
min	2018-07-01 00:00:00	1.000000	1.000000e+03	1.000000e+00	1.000000	NaN	1.000000	1.700000
25%	2018-09-30 00:00:00	70.000000	7.001500e+04	6.756925e+04	26.000000	NaN	2.000000	5.800000
50%	2018-12-30 00:00:00	130.000000	1.303670e+05	1.351830e+05	53.000000	NaN	2.000000	7.400000
75%	2019-03-31 00:00:00	203.000000	2.030840e+05	2.026538e+05	87.000000	NaN	2.000000	8.800000
max	2019-06-30 00:00:00	272.000000	2.373711e+06	2.415841e+06	114.000000	NaN	200.000000	650.000000
std	NaN	76.787096	8.071528e+04	7.814772e+04	33.695428	NaN	0.659831	3.077828

import matplotlib.pyplot as plt

sns.boxplot(data= transaction_df, x= 'PROD_QTY')

plt.title('Product Quantity - Outlier Check')

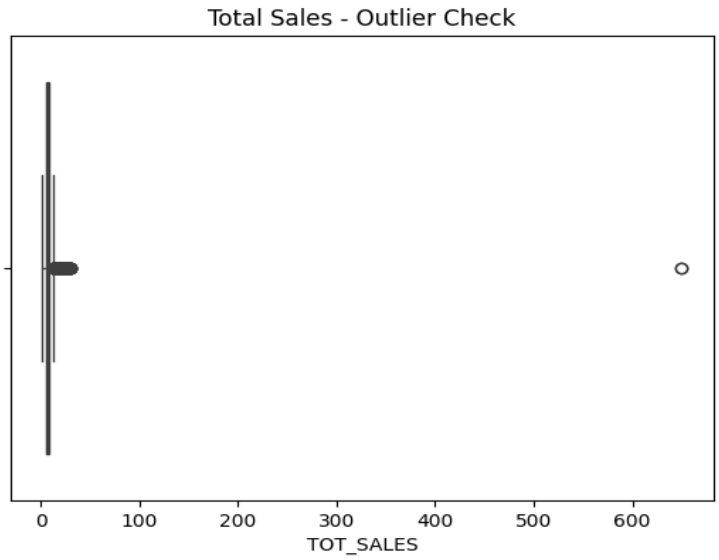
plt.show()



sns.boxplot(data= transaction_df, x= 'TOT_SALES')

plt.title('Total Sales - Outlier Check')

plt.show()



transaction_df[transaction_df['PROD_QTY']>5]

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
64955	2018-08-19	226	226000	226201	4	Dorito Corn Chp Supreme 380g	200	650.0
64956	2019-05-20	226	226000	226210	4	Dorito Corn Chp Supreme 380g	200	650.0

transaction_df[transaction_df['TOT_SALES']>30]

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
64955	2018-08-19	226	226000	226201	4	Dorito Corn Chp Supreme 380g	200	650.0
64956	2019-05-20	226	226000	226210	4	Dorito Corn Chp Supreme 380g	200	650.0

DROP OUTLIER ROWS:

transaction_df= transaction_df.drop(transaction_df[transaction_df['PROD_QTY']>5].index).reset_index(drop=True)

CHECK TRANSACTION TRENDS OVER TIME:

transaction_df['DATE'].head()

trans_per_day= transaction_df.groupby(transaction_df['DATE']).size()

date_range= pd.date_range(start='2018-07-01', end='2019-06-30')

trans_all= trans_per_day.reindex(date_range)

missing_dates= trans_all[trans_all.isna()]

print(missing_dates)

```
2018-12-25   NaN
Freq: D, dtype: float64
```

trans_per_day.shape

import matplotlib.pyplot as plt

plt.figure(figsize=(12,6))

plt.plot(trans_all.index, trans_all.values)

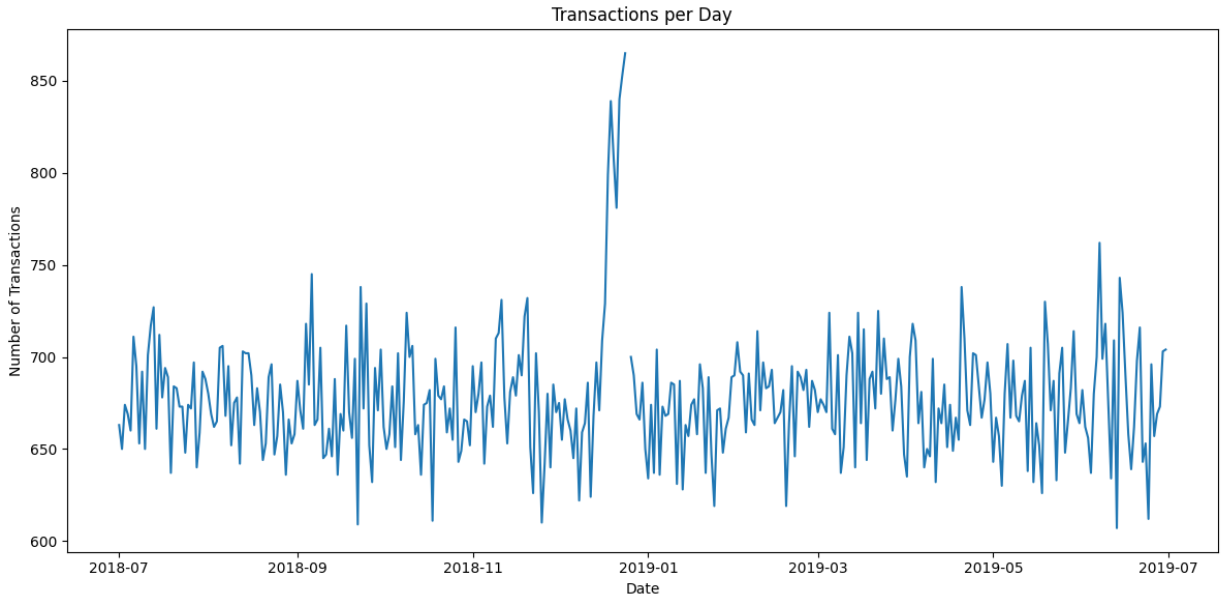
plt.title('Transactions per Day')

plt.xlabel('Date')

plt.ylabel('Number of Transactions')

plt.tight_layout()

plt.show()



EXTRACTING PACKET SIZE:

import re

transaction_df['PACK_SIZE']= transaction_df['PROD_NAME'].str.extract(r'(\d+)[gG]')

transaction_df['PACK_SIZE']= pd.to_numeric(transaction_df['PACK_SIZE'], errors='coerce')

transaction_df['PACK_SIZE'].describe(include='all')

	PACK_SIZE
count	246740.000000
mean	175.583521
std	59.432118
min	70.000000
25%	150.000000
50%	170.000000
75%	175.000000
max	380.000000

dtype: float64

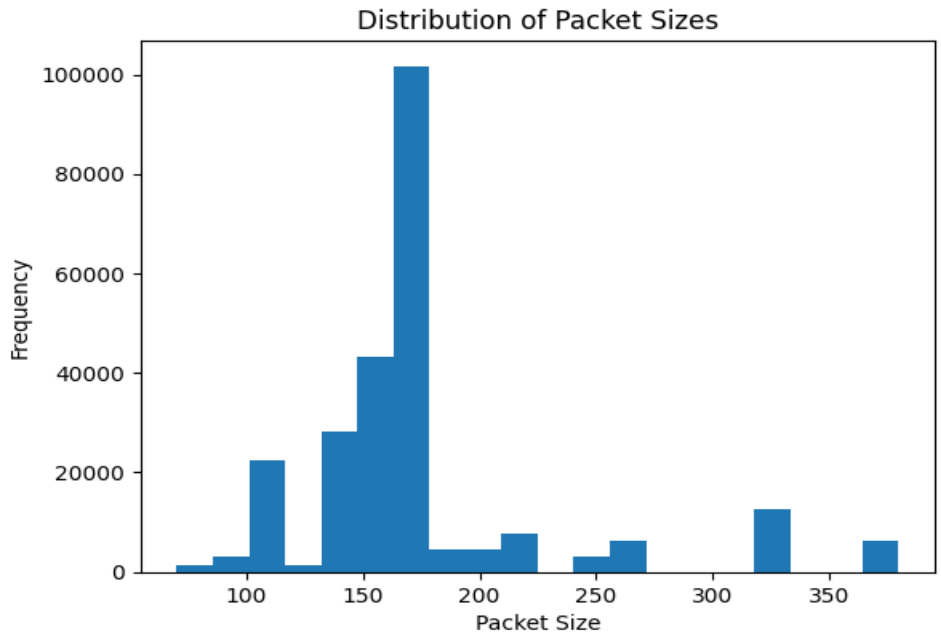
plt.hist(transaction_df['PACK_SIZE'], bins=20)

plt.xlabel('Packet Size')

plt.ylabel('Frequency')

plt.title('Distribution of Packet Sizes')

plt.show()



CREATING COLUMN-BRAND NAME:

transaction_df['BRAND_NAME']= transaction_df['PROD_NAME'].str.split().str[0]

transaction_df['PROD_NAME'].unique()

""Brand Names contain inconsistencies so we map them accordingly.""

```
'Smiths Crinkle Cut  Chips Chs&Onion170g',
'French Fries Potato Chips 175g',
'Doritos Corn Chips  Cheese Supreme 170g',
'Pringles Original   Crisps 134g',
'RRD Chilli&         Coconut 150g',
'WW Original Corn    Chips 200g',
'Thins Potato Chips  Hot & Spicy 175g',
'Cobs Popd Sour Crm  &Chives Chips 110g',
'Smiths Crnkle Chip  Orgnl Big Bag 380g',
'Doritos Corn Chips  Nacho Cheese 170g',
'Kettle Sensations   BBQ&Maple 150g',
'WW D/Style Chip     Sea Salt 200g',
'Pringles Chicken    Salt Crips 134g',
'WW Original Stacked Chips 160g',
'Smiths Chip Thinly  CutSalt/Vinegr175g', 'Cheezels Cheese 330g',
'Tostitos Lightly    Salted 175g',
'Thins Chips Salt &  Vinegar 175g',
'Smiths Crinkle Cut  Chips Barbecue 170g', 'Cheetos Puffs 165g',
'RRD Sweet Chilli &  Sour Cream 165g',
'WW Crinkle Cut      Original 175g',
'Tostitos Splash Of  Lime 175g',
'Kettle Tortilla ChpsBtroot&Ricotta 150g',
'CCs Tasty Cheese    175g', 'Woolworths Cheese   Rings 190g',
'Tostitos Smoked     Chipotle 175g', 'Pringles Barbeque   134g',
'WW Supreme Cheese   Corn Chips 200g',
'Pringles Mystery    Flavour 134g',
'Tyrrells Crisps     Ched & Chives 165g',
'Snbts Whlgrn Crisps Cheddr&Mstrd 90g',
'Cheetos Chs & Bacon Balls 190g', 'Pringles Slt Vingar 134g',
'Infuzions SourCream&Herbs Veg Strws 110g',
'Kettle Tortilla ChpsFeta&Garlic 150g',
'Infuzions Mango     Chutny Papadums 70g',
'RRD Steak &         Chimuchurri 150g',
'RRD Honey Soy       Chicken 165g',
'Sunbites Whlegrn    Crisps Frch/Onin 90g',
'RRD Salt & Vinegar  165g', 'Doritos Cheese      Supreme 330g',
```

brand_mapping = {
'RRD': 'Red Rock Deli',
'RED': 'Red Rock Deli',
'WW': 'Woolworths',
'Snbts': 'Sunbites',
'Infzns': 'Infuzions',
'Infz': 'Infuzions',
'NCC': 'Natural Chip Co',
'Dorito': 'Doritos'}

transaction_df['BRAND_NAME']= transaction_df['BRAND_NAME'].replace(brand_mapping)

EXAMINING PURCHASE BEHAVIOUR DATA:

purchase_df.info() #Correct Data Types

purchase_df.isna().sum() # No null values

	0
LYLTY_CARD_NBR	0
LIFESTAGE	0
PREMIUM_CUSTOMER	0

dtype: int64

purchase_df['LIFESTAGE'].value_counts()

purchase_df['PREMIUM_CUSTOMER'].value_counts()

pd.crosstab(purchase_df['PREMIUM_CUSTOMER'], purchase_df['LIFESTAGE'])

LIFESTAGE	MIDAGE SINGLES/COUPLES	NEW FAMILIES	OLDER FAMILIES	OLDER SINGLES/COUPLES	RETIREES	YOUNG FAMILIES	YOUNG SINGLES/COUPLES
PREMIUM_CUSTOMER							
Budget	1504	1112	4675	4929	4454	4017	3779
Mainstream	3340	849	2831	4930	6479	2728	8088
Premium	2431	588	2274	4750	3872	2433	2574

purchase_df['LYLTY_CARD_NBR'].duplicated().sum() # No duplicates found

MERGE BOTH FILES:

merge_df= pd.merge(transaction_df, purchase_df, on='LYLTY_CARD_NBR', how='left')

	0
DATE	0
STORE_NBR	0
LYLTY_CARD_NBR	0
TXN_ID	0
PROD_NBR	0
PROD_NAME	0
PROD_QTY	0
TOT_SALES	0
PACK_SIZE	0
BRAND_NAME	0
LIFESTAGE	0
PREMIUM_CUSTOMER	0

dtype: int64

merge_df.isna().sum() # No nulls in merged data

sales_summary= merge_df.groupby(['LIFESTAGE','PREMIUM_CUSTOMER'])['TOT_SALES'].sum()

BAR-PLOTS:

import seaborn as sns

import matplotlib.pyplot as plt

plt.figure(figsize=(15,6))

sns.barplot(data=sales_summary.reset_index(), x='LIFESTAGE', y='TOT_SALES', hue='PREMIUM_CUSTOMER')

plt.title('Total Sales by Life Stage and Premium Customer')

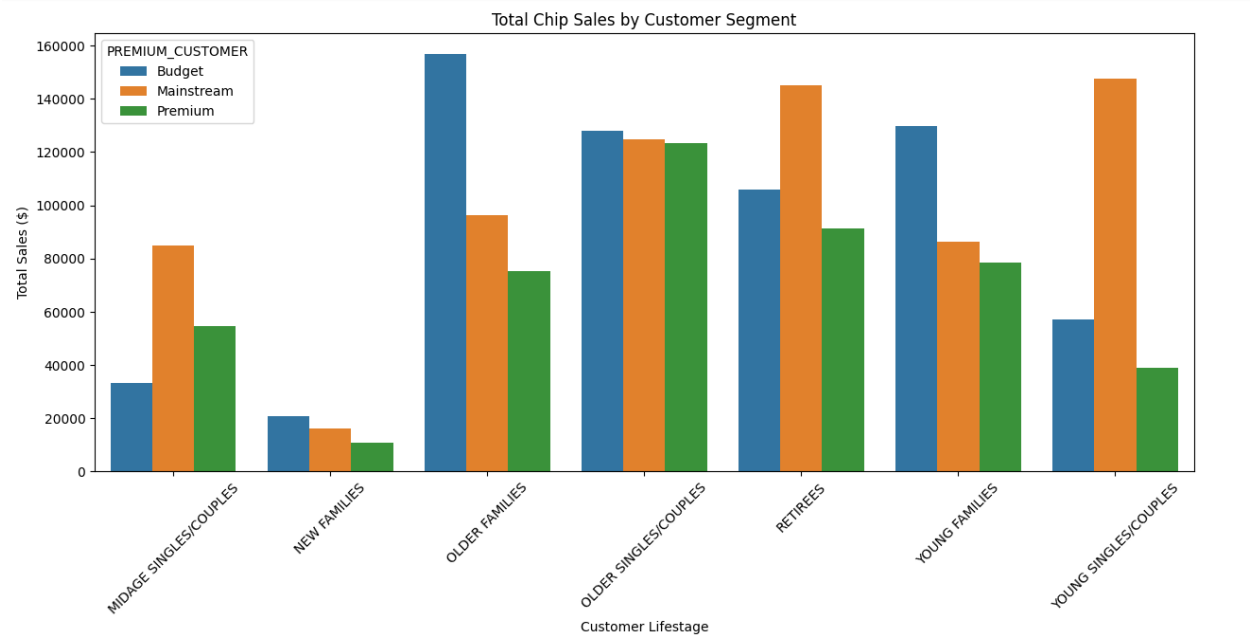
plt.title('Total Chip Sales by Customer Segment')

plt.ylabel('Total Sales ($)')

plt.xlabel('Customer Lifestage')

plt.xticks(rotation=45)

plt.show()



customers_summary= merge_df.groupby(['LIFESTAGE','PREMIUM_CUSTOMER'])['LYLTY_CARD_NBR'].nunique()

plt.figure(figsize=(14, 6))

sns.barplot(

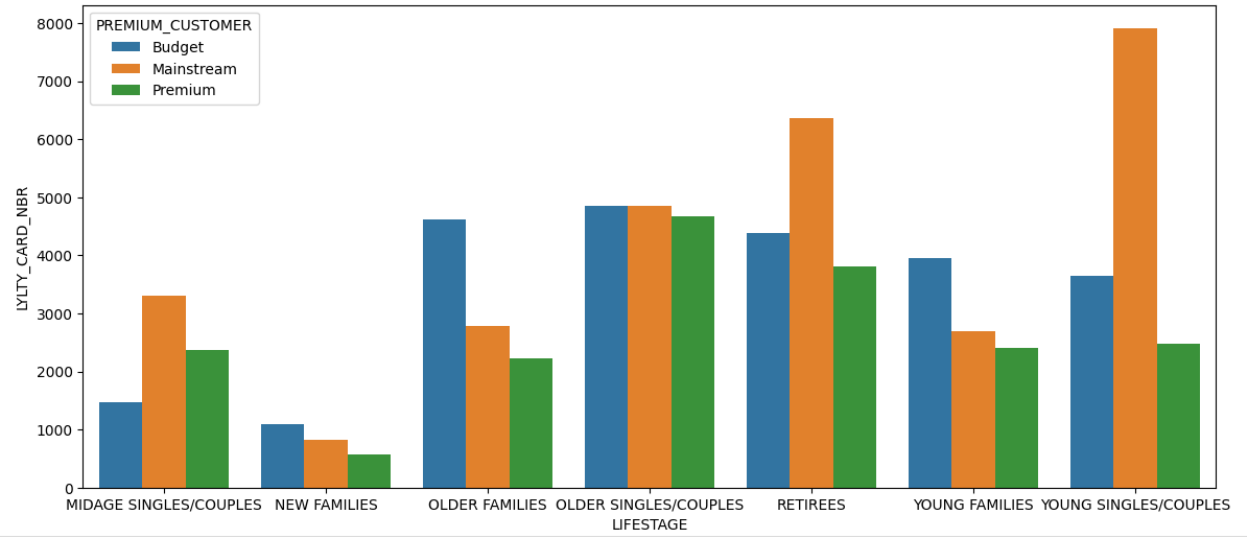
  data=customers_summary.reset_index(),

  x='LIFESTAGE',

  y='LYLTY_CARD_NBR',

  hue='PREMIUM_CUSTOMER'

)



print(sales_summary.dtypes)

print(customers_summary.dtypes)

AVERAGE NUMBER OF UNITS PER CUSTOMER:

units_summary= merge_df.groupby(['LIFESTAGE','PREMIUM_CUSTOMER'])['PROD_QTY'].sum()

avg_units_per_customer= (units_summary /customers_summary).reset_index(name='AVG_UNITS BY CUSTOMER')

print(avg_units_per_customer)

	LIFESTAGE	PREMIUM_CUSTOMER	AVG_UNITS BY CUSTOMER
0	MIDAGE SINGLES/COUPLES	Budget	6.026459
1	MIDAGE SINGLES/COUPLES	Mainstream	6.432080
2	MIDAGE SINGLES/COUPLES	Premium	6.078514
3	NEW FAMILIES	Budget	4.821527
4	NEW FAMILIES	Mainstream	4.891566
5	NEW FAMILIES	Premium	4.815652
6	OLDER FAMILIES	Budget	9.076773
7	OLDER FAMILIES	Mainstream	9.255380
8	OLDER FAMILIES	Premium	9.071717
9	OLDER SINGLES/COUPLES	Budget	6.781398
10	OLDER SINGLES/COUPLES	Mainstream	6.712021
11	OLDER SINGLES/COUPLES	Premium	6.769543
12	RETIREES	Budget	6.141847
13	RETIREES	Mainstream	5.925920
14	RETIREES	Premium	6.103358
15	YOUNG FAMILIES	Budget	8.722995
16	YOUNG FAMILIES	Mainstream	8.638361
17	YOUNG FAMILIES	Premium	8.716013
18	YOUNG SINGLES/COUPLES	Budget	4.250069
19	YOUNG SINGLES/COUPLES	Mainstream	4.575597
20	YOUNG SINGLES/COUPLES	Premium	4.264113

AVERAGE SALES PER CUSTOMER:

avg_sales_per_customer= (sales_summary /customers_summary).reset_index(name='AVG_SALES BY CUSTOMER')

print(avg_sales_per_customer)

	LIFESTAGE	PREMIUM_CUSTOMER	AVG_SALES BY CUSTOMER
0	MIDAGE SINGLES/COUPLES	Budget	22.622592
1	MIDAGE SINGLES/COUPLES	Mainstream	25.692617
2	MIDAGE SINGLES/COUPLES	Premium	22.981786
3	NEW FAMILIES	Budget	18.958096
4	NEW FAMILIES	Mainstream	19.252651
5	NEW FAMILIES	Premium	18.714435
6	OLDER FAMILIES	Budget	34.019464
7	OLDER FAMILIES	Mainstream	34.581618
8	OLDER FAMILIES	Premium	33.725952
9	OLDER SINGLES/COUPLES	Budget	26.362879
10	OLDER SINGLES/COUPLES	Mainstream	25.658399
11	OLDER SINGLES/COUPLES	Premium	26.385636
12	RETIREES	Budget	24.154230
13	RETIREES	Mainstream	22.832487
14	RETIREES	Premium	23.949803
15	YOUNG FAMILIES	Budget	32.815065
16	YOUNG FAMILIES	Mainstream	32.155773
17	YOUNG FAMILIES	Premium	32.765513
18	YOUNG SINGLES/COUPLES	Budget	15.662764
19	YOUNG SINGLES/COUPLES	Mainstream	18.641177
20	YOUNG SINGLES/COUPLES	Premium	15.746895

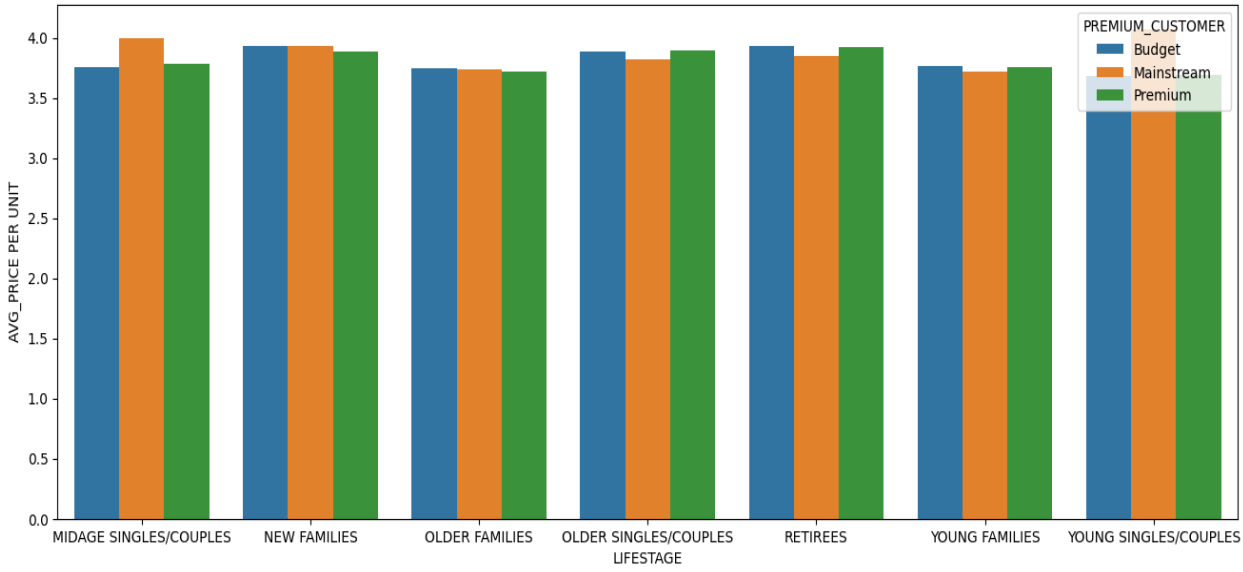
AVERAGE PRICE PER UNIT:

avg_price_per_unit= (sales_summary / units_summary).reset_index(name='AVG_PRICE PER UNIT')

print(avg_price_per_unit)

	LIFESTAGE	PREMIUM_CUSTOMER	AVG_PRICE PER UNIT
0	MIDAGE SINGLES/COUPLES	Budget	3.753878
1	MIDAGE SINGLES/COUPLES	Mainstream	3.994449
2	MIDAGE SINGLES/COUPLES	Premium	3.780823
3	NEW FAMILIES	Budget	3.931969
4	NEW FAMILIES	Mainstream	3.935887
5	NEW FAMILIES	Premium	3.886168
6	OLDER FAMILIES	Budget	3.747969
7	OLDER FAMILIES	Mainstream	3.736380
8	OLDER FAMILIES	Premium	3.717703
9	OLDER SINGLES/COUPLES	Budget	3.887529
10	OLDER SINGLES/COUPLES	Mainstream	3.822753
11	OLDER SINGLES/COUPLES	Premium	3.897698
12	RETIREES	Budget	3.932731
13	RETIREES	Mainstream	3.852986
14	RETIREES	Premium	3.924037
15	YOUNG FAMILIES	Budget	3.761903
16	YOUNG FAMILIES	Mainstream	3.722439
17	YOUNG FAMILIES	Premium	3.759232
18	YOUNG SINGLES/COUPLES	Budget	3.685297
19	YOUNG SINGLES/COUPLES	Mainstream	4.074043
20	YOUNG SINGLES/COUPLES	Premium	3.692889

```
plt.figure(figsize=(16, 6))
sns.barplot(
   data=avg_price_per_unit,
   x='LIFESTAGE',
   y='AVG_PRICE PER UNIT',
   hue='PREMIUM_CUSTOMER'
)
```



PERFORMING T-TEST:

```
## from scipy.stats import ttest_ind
## merge_df['PRICE_PER_UNIT'] = merge_df['TOT_SALES'] / merge_df['PROD_QTY']

## mainstream_prices = merge_df[merge_df['PREMIUM_CUSTOMER'] ==
'Mainstream']['PRICE_PER_UNIT']
## premium_prices = merge_df[merge_df['PREMIUM_CUSTOMER'] ==
'Premium']['PRICE_PER_UNIT']
```

```
## t_stat_1, p_val_1 = ttest_ind(mainstream_prices, premium_prices, equal_var=False)

## print("Mainstream vs Premium:")

## print("T-statistic:", t_stat_1)

## print("P-value:", p_val_1)
```

```
Mainstream vs Premium:
T-statistic: 11.05723574336507
P-value: 2.0788364041187993e-28
```

```
## budget_young_midage = merge_df[

  (merge_df['LIFESTAGE'].isin(['YOUNG SINGLES/COUPLES', 'MIDAGE SINGLES/COUPLES'])) &

  (merge_df['PREMIUM_CUSTOMER'] == 'Budget')

]['PRICE_PER_UNIT']


## all_other_customers = merge_df[

  ~((merge_df['LIFESTAGE'].isin(['YOUNG SINGLES/COUPLES', 'MIDAGE SINGLES/COUPLES'])) &

    (merge_df['PREMIUM_CUSTOMER'] == 'Budget'))

]['PRICE_PER_UNIT']


## t_stat_2, p_val_2 = ttest_ind(budget_young_midage, all_other_customers, equal_var=False)

##print("\nBudget - Young & Midage Singles/Couples vs Others:")

##print("T-statistic:", t_stat_2)

## print("P-value:", p_val_2)
```

```
Budget - Young & Midage Singles/Couples vs Others:
T-statistic: -15.67751711716724
P-value: 5.977489696404423e-55
```

AFFINITY TESTING:

mainstream_young_df= merge_df[(merge_df['PREMIUM_CUSTOMER']=='Mainstream') & (merge_df['LIFESTAGE']=='YOUNG SINGLES/COUPLES')]

segment_brand_qty= mainstream_young_df.groupby('BRAND_NAME')['PROD_QTY'].sum()

Quantity calculated for each brand

overall_qty= merge_df.groupby('BRAND_NAME')['PROD_QTY'].sum() # Quantity calculated for all brands

segment_brand_share = segment_brand_qty / segment_brand_qty.sum()

overall_brand_share = overall_qty / overall_qty.sum()

lift = (segment_brand_share / overall_brand_share).sort_values(ascending=False)

print(lift.head(10)) # Top 10 over-indexed brands for this segment

```
BRAND_NAME
Tyrrells     1.206896
Twisties     1.199068
Doritos      1.194811
Kettle       1.178124
Tostitos     1.177959
Pringles     1.169853
Grain        1.145267
Cobs         1.130662
Infuzions    1.121906
Thins        1.054597
Name: PROD_QTY, dtype: float64
```