In [10]:

```
import pandas as pd
```

In [11]:

```
#Loading the datasets
transactions = pd.read_excel('QVI_transaction_data.xlsx')
customers = pd.read_csv('QVI_purchase_behaviour.csv')

# Displaying a few rows
transactions.head()
```

Out[11]:

| | 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 [12]:

```
transactions.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  int64  
 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: float64(1), int64(6), object(1)
memory usage: 16.2+ MB
```

In [13]:

```
#The date is not readable for our analysis, I am therefore changing its datatype to a more readable data type for analysis.
```

In [14]:

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

transactions.head()
```

Out[14]:

| | DATE | STORE_NBR | LYLTY_CARD_NBR | TXN_ID | PROD_NBR | PROD_NAME | PROD_QTY | TOT_SALES |
|---|---|---|---|---|---|---|---|---|
| **0** | 2018-10-17 | 1 | 1000 | 1 | 5 | Natural Chip Compny SeaSalt175g | 2 | 6.0 |
| **1** | 2019-05-14 | 1 | 1307 | 348 | 66 | CCs Nacho Cheese 175g | 3 | 6.3 |
| **2** | 2019-05-20 | 1 | 1343 | 383 | 61 | Smiths Crinkle Cut Chips Chicken 170g | 2 | 2.9 |
| **3** | 2018-08-17 | 2 | 2373 | 974 | 69 | Smiths Chip Thinly S/Cream&Onion 175g | 5 | 15.0 |
| **4** | 2018-08-18 | 2 | 2426 | 1038 | 108 | Kettle Tortilla ChpsHny&Jlpno Chili 150g | 3 | 13.8 |

In [15]:

```
transactions['PROD_NAME'].unique()
```

```
Out[15]: array(['Natural Chip        Compny SeaSalt175g',
                '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',
                'Tyrrells Crisps     Lightly Salted 165g',
                'Kettle Sweet Chilli And Sour Cream 175g',
                'Doritos Salsa       Medium 300g', 'Kettle 135g Swt Pot Sea Salt',
                'Pringles SourCream  Onion 134g',
                'Doritos Corn Chips  Original 170g',
                'Twisties Cheese     Burger 250g',
                'Old El Paso Salsa   Dip Chnky Tom Ht300g',
                'Cobs Popd Swt/Chlli &Sr/Cream Chips 110g',
                'Woolworths Mild     Salsa 300g',
                'Natural Chip Co     Tmato Hrb&Spce 175g',
                'Smiths Crinkle Cut  Chips Original 170g',
                'Cobs Popd Sea Salt  Chips 110g',
                'Smiths Crinkle Cut  Chips Chs&Onion170g',
                'French Fries Potato Chips 175g',
                'Old El Paso Salsa   Dip Tomato Med 300g',
                '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', 'Woolworths Medium   Salsa 300g',
                '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',
                'Smiths Crinkle Cut  Snag&Sauce 150g',
                'WW Sour Cream &OnionStacked Chips 160g',
                'RRD Lime & Pepper   165g',
                'Natural ChipCo Sea  Salt & Vinegr 175g',
                'Red Rock Deli Chikn&Garlic Aioli 150g',
                'RRD SR Slow Rst     Pork Belly 150g', 'RRD Pc Sea Salt     165g',
                'Smith Crinkle Cut   Bolognese 150g', 'Doritos Salsa Mild  300g'],
               dtype=object)
```

```
In [16]: #To remove salsa products
         transactions = transactions [ ~transactions['PROD_NAME'].str.lower().str.contains('salsa')]
         len(transactions)
```

```
Out[16]: 246742
```

```
In [17]: #finding the outlier based on how many packets were bought
         transactions.sort_values(by= "PROD_QTY" , ascending = False).head(10)
```

Out[17]:

| | DATE | STORE_NBR | LYLTY_CARD_NBR | TXN_ID | PROD_NBR | PROD_NAME | PROD_QTY | TOT_SALES |
|---|---|---|---|---|---|---|---|---|
| **69763** | 2019-05-20 | 226 | 226000 | 226210 | 4 | Dorito Corn Chp Supreme 380g | 200 | 650.0 |
| **69762** | 2018-08-19 | 226 | 226000 | 226201 | 4 | Dorito Corn Chp Supreme 380g | 200 | 650.0 |
| **135225** | 2019-05-15 | 46 | 46296 | 42138 | 81 | Pringles Original Crisps 134g | 5 | 18.5 |
| **69523** | 2019-05-15 | 71 | 71142 | 69852 | 96 | WW Original Stacked Chips 160g | 5 | 9.5 |
| **69502** | 2018-08-18 | 55 | 55144 | 49328 | 44 | Thins Chips Light& Tangy 175g | 5 | 16.5 |
| **69496** | 2018-08-15 | 49 | 49303 | 45789 | 14 | Smiths Crnkle Chip Orgnl Big Bag 380g | 5 | 29.5 |
| **69486** | 2019-05-16 | 45 | 45006 | 40460 | 37 | Smiths Thinly Swt Chli&S/Cream175G | 5 | 15.0 |
| **69483** | 2018-08-15 | 43 | 43126 | 39445 | 25 | Pringles SourCream Onion 134g | 5 | 18.5 |
| **69474** | 2018-08-18 | 33 | 33138 | 30332 | 68 | Pringles Chicken Salt Crips 134g | 5 | 18.5 |
| **69472** | 2018-08-17 | 32 | 32193 | 29196 | 110 | WW Original Corn Chips 200g | 5 | 9.5 |

```
In [18]: #removing the outlier by eliminating the customer with 200 purchases of chips
         transactions = transactions[transactions['LYLTY_CARD_NBR'] != 226000]

         transactions.sort_values(by="PROD_QTY", ascending=False).head()
```

Out[18]:

| | DATE | STORE_NBR | LYLTY_CARD_NBR | TXN_ID | PROD_NBR | PROD_NAME | PROD_QTY | TOT_SALES |
|---|---|---|---|---|---|---|---|---|
| **80732** | 2019-05-18 | 49 | 49309 | 45816 | 30 | Doritos Corn Chips Cheese Supreme 170g | 5 | 22.0 |
| **17145** | 2018-08-16 | 202 | 202289 | 202104 | 42 | Doritos Corn Chip Mexican Jalapeno 150g | 5 | 19.5 |
| **117547** | 2019-05-19 | 81 | 81120 | 80285 | 46 | Kettle Original 175g | 5 | 27.0 |
| **99458** | 2018-08-17 | 138 | 138085 | 141016 | 40 | Thins Chips Seasonedchicken 175g | 5 | 16.5 |
| **28135** | 2018-08-20 | 51 | 51263 | 46961 | 3 | Kettle Sensations Camembert & Fig 150g | 5 | 23.0 |

```
In [19]: len(transactions)
```

Out[19]:
```
246740
```

In [20]:
```
#looking for a missing date in the dataset
transactions['DATE'].nunique()
```

Out[20]:
```
364
```

In [21]:
```
#One day is missing, but which day is it? Group the data by date so to count how many transactions happened each day
daily_sales = transactions.groupby('DATE').size()

#To show the days with the least number of transactions
daily_sales.sort_values().head()
```

Out[21]:
```
DATE
2019-06-13    607
2018-09-22    609
2018-11-25    610
2018-10-18    611
2019-06-24    612
dtype: int64
```

In [22]:
```
customers.head()
```

Out[22]:

| | 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 [23]:
```
#To see all the different types of lifestages of the customers we have
customers['LIFESTAGE'].value_counts()
```

Out[23]:
```
LIFESTAGE
RETIREES                  14805
OLDER SINGLES/COUPLES     14609
YOUNG SINGLES/COUPLES     14441
OLDER FAMILIES             9780
YOUNG FAMILIES             9178
MIDAGE SINGLES/COUPLES     7275
NEW FAMILIES               2549
Name: count, dtype: int64
```

In [24]:

```
# To See the spending categories in numbers
customers['PREMIUM_CUSTOMER'].value_counts()
```

Out[24]:

```
PREMIUM_CUSTOMER
Mainstream    29245
Budget        24470
Premium       18922
Name: count, dtype: int64
```

In [25]:

```
#In this part, I join the two datasets based on the loyalty card number as this is what both datasets have in common.

data = pd.merge(transactions, customers, on='LYLTY_CARD_NBR', how='left')

# Showing dthe first few rows of our new joined dataset
data.head()
```

Out[25]:

| | DATE | STORE_NBR | LYLTY_CARD_NBR | TXN_ID | PROD_NBR | PROD_NAME | PROD_QTY | TOT_SALES | LIFESTAGE | PREMIUM_CUSTOMER |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 2018-10-17 | 1 | 1000 | 1 | 5 | Natural Chip Compny SeaSalt175g | 2 | 6.0 | YOUNG SINGLES/COUPLES | Premium |
| **1** | 2019-05-14 | 1 | 1307 | 348 | 66 | CCs Nacho Cheese 175g | 3 | 6.3 | MIDAGE SINGLES/COUPLES | Budget |
| **2** | 2019-05-20 | 1 | 1343 | 383 | 61 | Smiths Crinkle Cut Chips Chicken 170g | 2 | 2.9 | MIDAGE SINGLES/COUPLES | Budget |
| **3** | 2018-08-17 | 2 | 2373 | 974 | 69 | Smiths Chip Thinly S/Cream&Onion 175g | 5 | 15.0 | MIDAGE SINGLES/COUPLES | Budget |
| **4** | 2018-08-18 | 2 | 2426 | 1038 | 108 | Kettle Tortilla ChpsHny&Jlpno Chili 150g | 3 | 13.8 | MIDAGE SINGLES/COUPLES | Budget |

In [26]:

```
data.isnull().sum()
```

Out[26]:

```
DATE                0
STORE_NBR           0
LYLTY_CARD_NBR      0
TXN_ID              0
PROD_NBR            0
PROD_NAME           0
PROD_QTY            0
TOT_SALES           0
LIFESTAGE           0
PREMIUM_CUSTOMER    0
dtype: int64
```

In [27]:

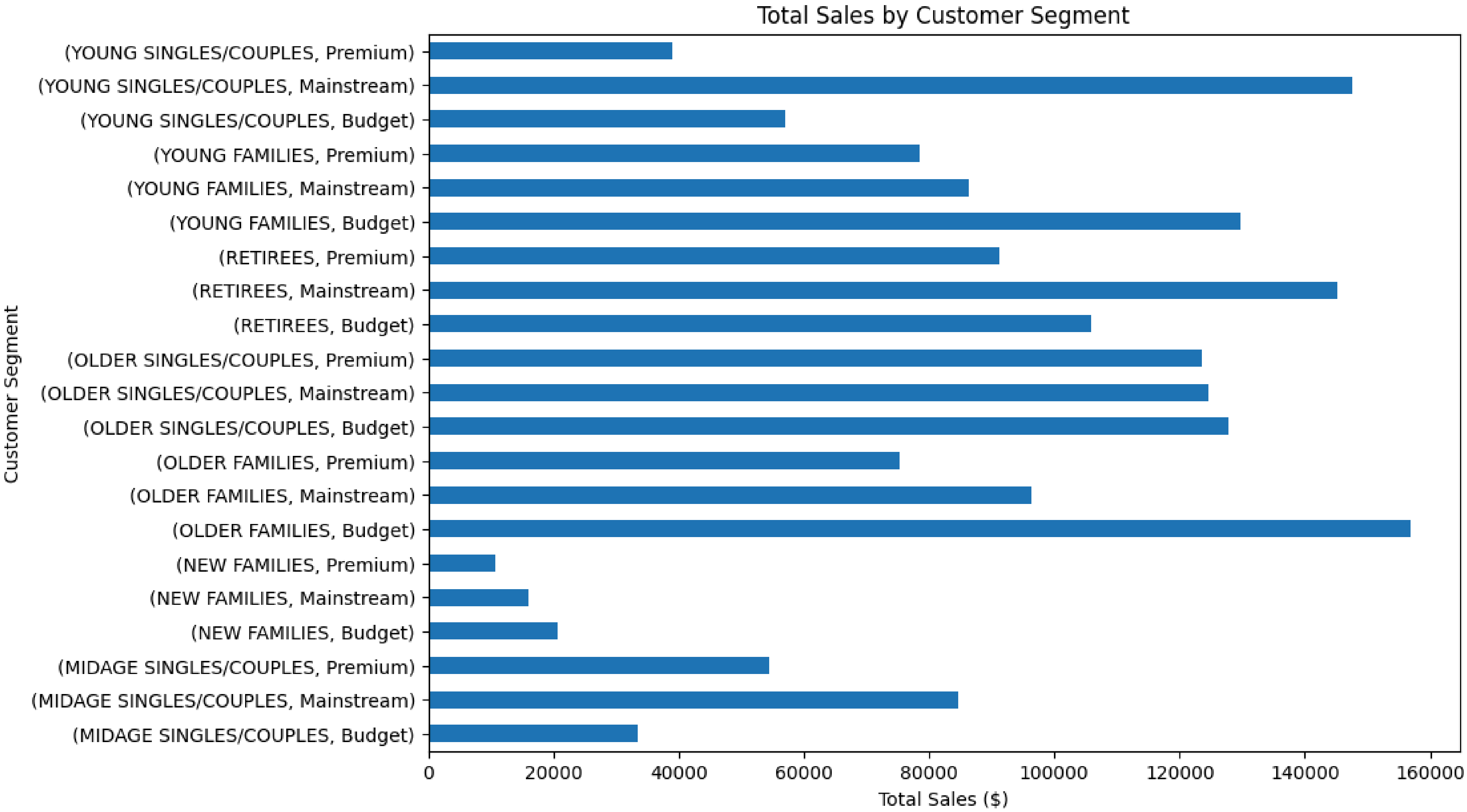
```
# Grouping by the customer types and sum up their total sales
sales_summary = data.groupby(['LIFESTAGE', 'PREMIUM_CUSTOMER'])['TOT_SALES'].sum().reset_index()

# Sorting it so the people who spend the most are at the top
sales_summary.sort_values(by='TOT_SALES', ascending=False)
```

Out[27]:

| | LIFESTAGE | PREMIUM_CUSTOMER | TOT_SALES |
|---|---|---|---|
| 6 | OLDER FAMILIES | Budget | 156863.75 |
| 19 | YOUNG SINGLES/COUPLES | Mainstream | 147582.20 |
| 13 | RETIREES | Mainstream | 145168.95 |
| 15 | YOUNG FAMILIES | Budget | 129717.95 |
| 9 | OLDER SINGLES/COUPLES | Budget | 127833.60 |
| 10 | OLDER SINGLES/COUPLES | Mainstream | 124648.50 |
| 11 | OLDER SINGLES/COUPLES | Premium | 123537.55 |
| 12 | RETIREES | Budget | 105916.30 |
| 7 | OLDER FAMILIES | Mainstream | 96413.55 |
| 14 | RETIREES | Premium | 91296.65 |
| 16 | YOUNG FAMILIES | Mainstream | 86338.25 |
| 1 | MIDAGE SINGLES/COUPLES | Mainstream | 84734.25 |
| 17 | YOUNG FAMILIES | Premium | 78571.70 |
| 8 | OLDER FAMILIES | Premium | 75242.60 |
| 18 | YOUNG SINGLES/COUPLES | Budget | 57122.10 |
| 2 | MIDAGE SINGLES/COUPLES | Premium | 54443.85 |
| 20 | YOUNG SINGLES/COUPLES | Premium | 39052.30 |
| 0 | MIDAGE SINGLES/COUPLES | Budget | 33345.70 |
| 3 | NEW FAMILIES | Budget | 20607.45 |
| 4 | NEW FAMILIES | Mainstream | 15979.70 |
| 5 | NEW FAMILIES | Premium | 10760.80 |

In [28]:

```
#To plot the Lifestage and Premium category together
import matplotlib.pyplot as plt

data.groupby(['LIFESTAGE', 'PREMIUM_CUSTOMER'])['TOT_SALES'].sum().plot(kind='barh', figsize=(10, 7))

plt.title('Total Sales by Customer Segment')
plt.xlabel('Total Sales ($)')
plt.ylabel('Customer Segment')
plt.show()
```

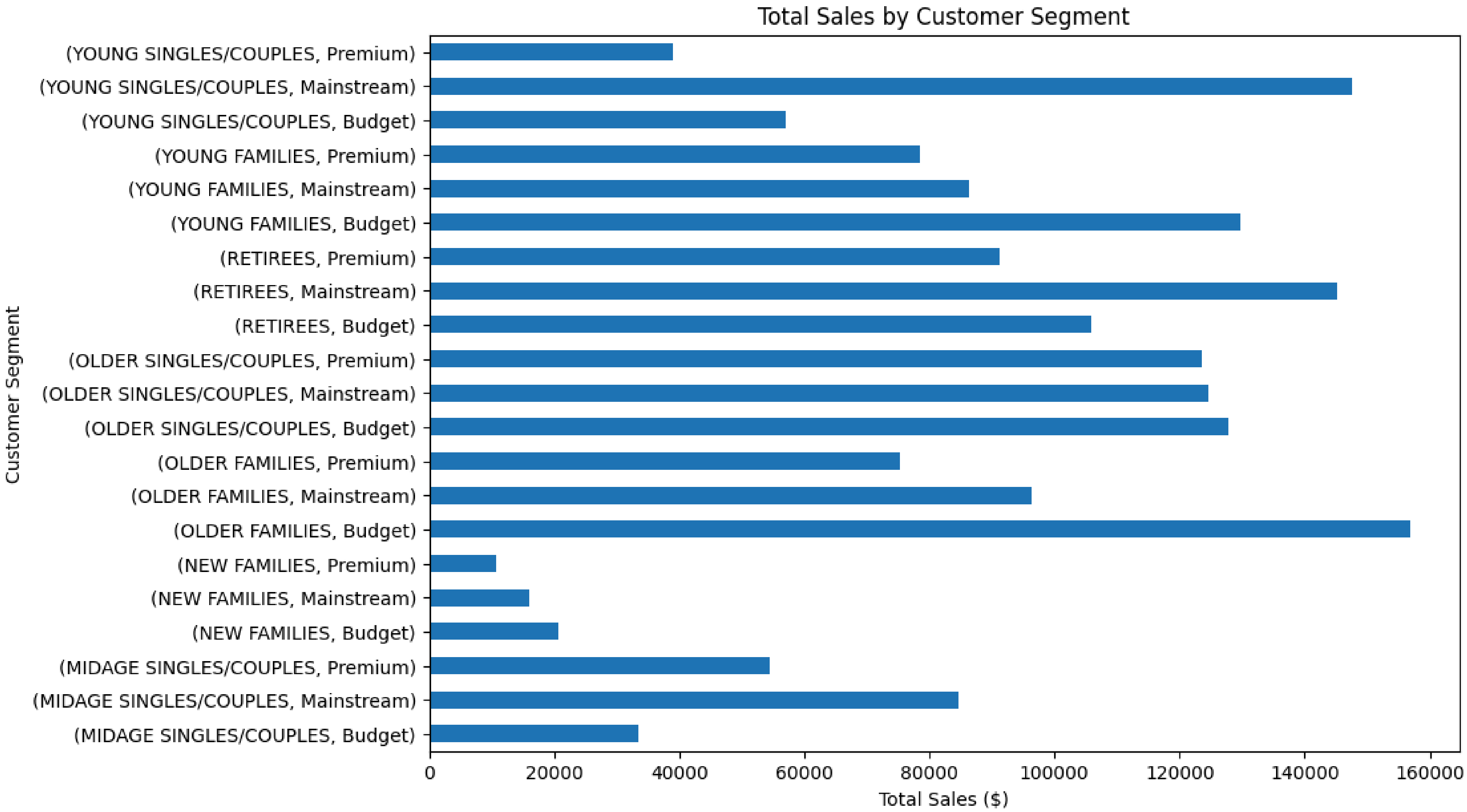


```
In [29]: %pip install matplotlib
```

```
Requirement already satisfied: matplotlib in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (3.10.8)
Requirement already satisfied: contourpy>=1.0.1 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from
matplotlib) (1.3.3)
Requirement already satisfied: cycler>=0.10 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from matp
lotlib) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from
matplotlib) (4.61.1)
Requirement already satisfied: kiwisolver>=1.3.1 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from
matplotlib) (1.4.9)
Requirement already satisfied: numpy>=1.23 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from matpl
otlib) (2.4.0)
Requirement already satisfied: packaging>=20.0 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from m
atplotlib) (25.0)
Requirement already satisfied: pillow>=8 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from matplot
lib) (12.1.0)
Requirement already satisfied: pyparsing>=3 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from matp
lotlib) (3.3.1)
Requirement already satisfied: python-dateutil>=2.7 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (f
rom matplotlib) (2.9.0.post0)
Requirement already satisfied: six>=1.5 in /Library/Frameworks/Python.framework/Versions/3.14/lib/python3.14/site-packages (from python-d
ateutil>=2.7->matplotlib) (1.17.0)
Note: you may need to restart the kernel to use updated packages.
```

In [30]:

```
#To plot the Lifestage and Premium category together
import matplotlib.pyplot as plt

data.groupby(['LIFESTAGE', 'PREMIUM_CUSTOMER'])['TOT_SALES'].sum().plot(kind='barh', figsize=(10, 7))

plt.title('Total Sales by Customer Segment')
plt.xlabel('Total Sales ($)')
plt.ylabel('Customer Segment')
plt.show()
```



In [33]:

```
#To know which brand is bought the most, the PROD_NAME column is used by splitting it into words, and grabbing the first word
data['BRAND'] = data['PROD_NAME'].str.split().str[0]


data[['PROD_NAME', 'BRAND']].head(10)
```

Out[33]:

|   | PROD_NAME | BRAND |
|---|---|---|
| **0** | Natural Chip Compny SeaSalt175g | Natural |
| **1** | CCs Nacho Cheese 175g | CCs |
| **2** | Smiths Crinkle Cut Chips Chicken 170g | Smiths |
| **3** | Smiths Chip Thinly S/Cream&Onion 175g | Smiths |
| **4** | Kettle Tortilla ChpsHny&Jlpno Chili 150g | Kettle |
| **5** | Smiths Crinkle Chips Salt & Vinegar 330g | Smiths |
| **6** | Grain Waves Sweet Chilli 210g | Grain |
| **7** | Doritos Corn Chip Mexican Jalapeno 150g | Doritos |
| **8** | Grain Waves Sour Cream&Chives 210G | Grain |
| **9** | Smiths Crinkle Chips Salt & Vinegar 330g | Smiths |

In [34]:

```
# This will show a list of every unique brand name created
data['BRAND'].unique()
```

Out[34]:

```
array(['Natural', 'CCs', 'Smiths', 'Kettle', 'Grain', 'Doritos',
       'Twisties', 'WW', 'Thins', 'Burger', 'NCC', 'Cheezels', 'Infzns',
       'Red', 'Pringles', 'Dorito', 'Infuzions', 'Smith', 'GrnWves',
       'Tyrrells', 'Cobs', 'French', 'RRD', 'Tostitos', 'Cheetos',
       'Woolworths', 'Snbts', 'Sunbites'], dtype=object)
```

In [35]:

```
#There are duplicates in the data, so they need to be removed
```

In [36]:

```
data['BRAND'] = data['BRAND'].replace('Red', 'Red Rock Deli')
data['BRAND'] = data['BRAND'].replace('RRD', 'Red Rock Deli')
data['BRAND'] = data['BRAND'].replace('Smith', 'Smiths')
data['BRAND'] = data['BRAND'].replace('Dorito', 'Doritos')
data['BRAND'] = data['BRAND'].replace('Infzns', 'Infuzions')
data['BRAND'] = data['BRAND'].replace('GrnWves', 'Grain Waves')
data['BRAND'] = data['BRAND'].replace('Grain', 'Grain Waves')
data['BRAND'] = data['BRAND'].replace('Snbts', 'Sunbites')
data['BRAND'] = data['BRAND'].replace('WW', 'Woolworths')
data['BRAND'] = data['BRAND'].replace('NCC', 'Natural Chip Co')
data['BRAND'] = data['BRAND'].replace('Natural', 'Natural Chip Co')

data['BRAND'].unique()
```

Out[36]:
```
array(['Natural Chip Co', 'CCs', 'Smiths', 'Kettle', 'Grain Waves',
       'Doritos', 'Twisties', 'Woolworths', 'Thins', 'Burger', 'Cheezels',
       'Infuzions', 'Red Rock Deli', 'Pringles', 'Tyrrells', 'Cobs',
       'French', 'Tostitos', 'Cheetos', 'Sunbites'], dtype=object)
```

In [38]:
```
#This is to see what the Mainstream Young Singles/Couples actually prefer.
#recreating the target group to make sure it uses our clean BRAND column
target_group = data[(data['LIFESTAGE'] == 'YOUNG SINGLES/COUPLES') & (data['PREMIUM_CUSTOMER'] == 'Mainstream')]

#To see their Top 5 Brands
print("Top Brands for Young Singles")
print(target_group['BRAND'].value_counts().head(5))
```

```
Top Brands for Young Singles
BRAND
Kettle       3844
Doritos      2379
Pringles     2315
Smiths       1921
Infuzions    1250
Name: count, dtype: int64
```

In [40]:
```
# Creating a new column called PACK_SIZE to know the size of the packets being bought, we look at PROD_NAME and extract the numbers
data['PACK_SIZE'] = data['PROD_NAME'].str.extract(r'(\d+)').astype(float)

data[['PROD_NAME', 'PACK_SIZE']].head()
```

Out[40]:

| | PROD_NAME | PACK_SIZE |
|---|---|---|
| **0** | Natural Chip Compny SeaSalt175g | 175.0 |
| **1** | CCs Nacho Cheese 175g | 175.0 |
| **2** | Smiths Crinkle Cut Chips Chicken 170g | 170.0 |
| **3** | Smiths Chip Thinly S/Cream&Onion 175g | 175.0 |
| **4** | Kettle Tortilla ChpsHny&Jlpno Chili 150g | 150.0 |

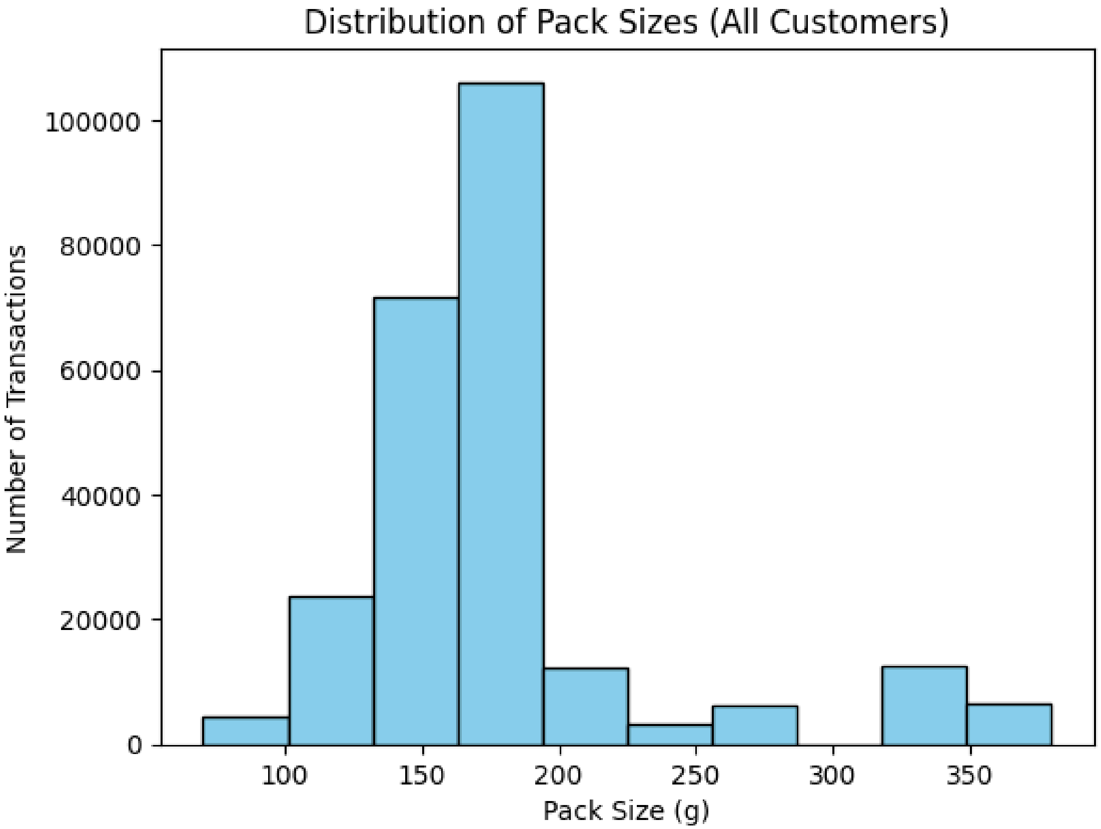
In [41]:
```
# Filtering for the target group again
target_group = data[(data['LIFESTAGE'] == 'YOUNG SINGLES/COUPLES') & (data['PREMIUM_CUSTOMER'] == 'Mainstream')]

# Counting the pack sizes they buy most often
target_group['PACK_SIZE'].value_counts().head(5)
```

Out[41]:

```
PACK_SIZE
175.0    4997
150.0    3080
134.0    2315
110.0    2051
170.0    1575
Name: count, dtype: int64
```

In [42]:

```
#Creating a histogram to see the spread of bag sizes across the whole store
plt.hist(data['PACK_SIZE'], bins=10, color='skyblue', edgecolor='black')
plt.title('Distribution of Pack Sizes (All Customers)')
plt.xlabel('Pack Size (g)')
plt.ylabel('Number of Transactions')
plt.show()
```



In [ ]: