```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
plt.style.use('ggplot')
```

AFTER NUMEROUS ERRORS , I REALIZED THAT THE Y IN THE DATE SHOULD BE CAPITALIZED

```
pd.set_option('display.max_rows', 85)
pd.set_option('display.max_columns', 85)
```

```
td_date = lambda x: pd.datetime.strptime(x, '%m/%d/%Y')
pb = pd.read_csv(r'purchase_behaviour.csv')
td = pd.read_csv(r'transaction_data.csv', parse_dates=['DATE'],
date_parser=td_date)
```

```
C:\Users\Fortune\AppData\Local\Temp\ipykernel_2400\212081143.py:1:
FutureWarning: The pandas.datetime class is deprecated and will be
removed from pandas in a future version. Import from datetime module
instead.
  td_date = lambda x: pd.datetime.strptime(x, '%m/%d/%Y')
```

PLEASE NOTE THAT THE DATE FORMAT HAS ALREADY BEEN CONVERTED IN EXCEL

```
td
```

```
             DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0      2018-10-17          1            1000       1         5
1      2019-05-14          1            1307     348        66
2      2019-05-20          1            1343     383        61
3      2018-08-17          2            2373     974        69
4      2018-08-18          2            2426    1038       108
...           ...        ...             ...     ...       ...
264831 2019-03-09        272          272319  270088        89
264832 2018-08-13        272          272358  270154        74
264833 2018-11-06        272          272379  270187        51
264834 2018-12-27        272          272379  270188        42
264835 2018-09-22        272          272380  270189        74

                                       PROD_NAME  PROD_QTY  TOT_SALES
0         Natural Chip        Compny SeaSalt175g         2        6.0
1                      CCs Nacho Cheese    175g         3        6.3
2         Smiths Crinkle Cut  Chips Chicken 170g         2        2.9
3         Smiths Chip Thinly  S/Cream&Onion 175g         5       15.0
4       Kettle Tortilla ChpsHny&Jlpno Chili 150g         3       13.8
```

```
...                                          ...       ...        ...

264831   Kettle Sweet Chilli And Sour Cream 175g         2       10.8

264832             Tostitos Splash Of  Lime 175g         1        4.4

264833                  Doritos Mexicana    170g         2        8.8

264834   Doritos Corn Chip Mexican Jalapeno 150g         2        7.8

264835             Tostitos Splash Of  Lime 175g         2        8.8


[264836 rows x 8 columns]
```

THERE ARE NO MISSING VALUES IN THE TRANSACTION DATA

```
for col in td.columns:
    pct_missing = np.mean(td[col].isnull())
    print('{} --> {}'.format(col, round(pct_missing)))
```

```
DATE --> 0
STORE_NBR --> 0
LYLTY_CARD_NBR --> 0
TXN_ID --> 0
PROD_NBR --> 0
PROD_NAME --> 0
PROD_QTY --> 0
TOT_SALES --> 0
```

THERE ARE NO MISSING VALUES IN THE PURCHASE BEHAVIOUR DATA

```
    for col in pb.columns:
        pct_missing = np.mean(pb[col].isnull())
        print('{} --> {}'.format(col, round(pct_missing)))
```

```
LYLTY_CARD_NBR --> 0
LIFESTAGE --> 0
PREMIUM_CUSTOMER --> 0
```

```
td.dtypes
```

```
DATE              datetime64[ns]
STORE_NBR                  int64
LYLTY_CARD_NBR             int64
TXN_ID                     int64
PROD_NBR                   int64
PROD_NAME                 object
PROD_QTY                   int64
TOT_SALES                float64
dtype: object
```

```
pb.dtypes
```

```
LYLTY_CARD_NBR       int64
LIFESTAGE           object
PREMIUM_CUSTOMER    object
dtype: object
```

```
td['PROD_NAME'].describe()
```

```
count                                      264836
unique                                        114
top       Kettle Mozzarella   Basil & Pesto 175g
freq                                         3304
Name: PROD_NAME, dtype: object
```

I REALIZED THAT SOME PART OF THE PROD_NAME IS MISPELT , CHP INSTEAD OF CHIPS

```
# filt1 = td['PROD_NAME'].str.contains('Chp', na=False)
# td = td.loc[filt1]
td['PROD_NAME'] = td['PROD_NAME'].str.replace('Chp','Chip')
td.head()
```

```
        DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0 2018-10-17          1            1000       1         5
1 2019-05-14          1            1307     348        66
2 2019-05-20          1            1343     383        61
3 2018-08-17          2            2373     974        69
4 2018-08-18          2            2426    1038       108

                                PROD_NAME  PROD_QTY  TOT_SALES
0     Natural Chip        Compny SeaSalt175g         2        6.0
1                   CCs Nacho Cheese    175g         3        6.3
2     Smiths Crinkle Cut  Chips Chicken 170g         2        2.9
3     Smiths Chip Thinly  S/Cream&Onion 175g         5       15.0
4  Kettle Tortilla ChipsHny&Jlpno Chili 150g         3       13.8
```

Let's remove correct mispellings in the data

```
# filt2 = td['PROD_NAME'].str.contains('&', na=False)
# td = td.loc[filt2]
td['PROD_NAME'] = td['PROD_NAME'].str.replace('&',' and ')
td['PROD_NAME'] = td['PROD_NAME'].str.replace('  ',' ')
td['PROD_NAME'] = td['PROD_NAME'].str.replace('   ',' ')
```

WE NEED JUST THE CHIPS

```
filt = td['PROD_NAME'].str.contains('Chip', na=False)

chips = td.loc[filt]

chips.head()
```

```
        DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0 2018-10-17          1            1000       1         5
2 2019-05-20          1            1343     383        61
3 2018-08-17          2            2373     974        69
4 2018-08-18          2            2426    1038       108
6 2019-05-16          4            4149    3333        16

                                      PROD_NAME  PROD_QTY  TOT_SALES
0               Natural Chip  Compny SeaSalt175g         2        6.0
2          Smiths Crinkle Cut Chips Chicken 170g         2        2.9
3      Smiths Chip Thinly S/Cream and Onion 175g         5       15.0
4  Kettle Tortilla ChipsHny and Jlpno Chili 150g         3       13.8
6     Smiths Crinkle Chips Salt and Vinegar 330g         1        5.7
```

```
chips['PROD_NAME'].unique().shape
```

```
(37,)
```

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

```
array(['Natural Chip  Compny SeaSalt175g',
       'Smiths Crinkle Cut Chips Chicken 170g',
       'Smiths Chip Thinly S/Cream and Onion 175g',
       'Kettle Tortilla ChipsHny and Jlpno Chili 150g',
       'Smiths Crinkle Chips Salt and Vinegar 330g',
       'Doritos Corn Chip Mexican Jalapeno 150g',
       'Thins Chips Light and  Tangy 175g',
       'Doritos Corn Chip Southern Chicken 150g',
       'Smiths Chip Thinly Cut Original 175g',
       'Thins Chips   Originl saltd 175g',
       'Natural ChipCo Hony Soy Chckn175g',
       'Dorito Corn Chip Supreme 380g',
       'Thins Chips Seasonedchicken 175g',
       'Doritos Corn Chips Original 170g',
       'Cobs Popd Swt/Chlli and Sr/Cream Chips 110g',
       'Natural Chip Co Tmato Hrb and Spce 175g',
       'Smiths Crinkle Cut Chips Original 170g',
       'Cobs Popd Sea Salt Chips 110g',
       'Smiths Crinkle Cut Chips Chs and Onion170g',
       'French Fries Potato Chips 175g',
       'Doritos Corn Chips Cheese Supreme 170g',
       'WW Original Corn  Chips 200g',
       'Thins Potato Chips Hot and Spicy 175g',
       'Cobs Popd Sour Crm  and Chives Chips 110g',
       'Smiths Crnkle Chip Orgnl Big Bag 380g',
```

```
       'Doritos Corn Chips Nacho Cheese 170g',
       'WW D/Style Chip Sea Salt 200g', 'WW Original Stacked Chips
160g',
       'Smiths Chip Thinly CutSalt/Vinegr175g',
       'Thins Chips Salt and  Vinegar 175g',
       'Smiths Crinkle Cut Chips Barbecue 170g',
       'Kettle Tortilla ChipsBtroot and Ricotta 150g',
       'Tostitos Smoked Chipotle 175g',
       'WW Supreme Cheese  Corn Chips 200g',
       'Kettle Tortilla ChipsFeta and Garlic 150g',
       'WW Sour Cream and OnionStacked Chips 160g',
       'Natural ChipCo Sea Salt and Vinegr 175g'], dtype=object)
```

```
chips.sort_values(['PROD_QTY'], ascending=False)
```

```
             DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
69762  2018-08-19        226          226000  226201         4
69763  2019-05-20        226          226000  226210         4
17077  2018-08-20        153          153161  152587        30
228570 2019-05-18         79           79169   77499       108
99458  2018-08-17        138          138085  141016        40
...           ...        ...             ...     ...       ...
82501  2019-05-12         20           20443   17453        69
204161 2018-08-15         94           94162   93482       108
204155 2019-05-15         94           94132   93289       106
22963  2019-05-29        195          195352  195255       110
32404  2019-05-20        106          106092  107312         4

                                          PROD_NAME  PROD_QTY
TOT_SALES
69762                   Dorito Corn Chip Supreme 380g       200
650.00
69763                   Dorito Corn Chip Supreme 380g       200
650.00
17077          Doritos Corn Chips Cheese Supreme 170g         5
22.00
228570  Kettle Tortilla ChipsHny and Jlpno Chili 150g         5
23.00
99458                Thins Chips Seasonedchicken 175g         5
16.50
...                                             ...       ...
...
82501       Smiths Chip Thinly S/Cream and Onion 175g         1
3.00
204161  Kettle Tortilla ChipsHny and Jlpno Chili 150g         1
4.60
204155              Natural ChipCo Hony Soy Chckn175g         1
3.00
22963                    WW Original Corn  Chips 200g         1
1.90
```

```
32404                  Dorito Corn Chip Supreme 380g         1
3.25

[87335 rows x 8 columns]
```

```
chips['LYLTY_CARD_NBR'] = chips['LYLTY_CARD_NBR'].astype(float)
```

```
C:\Users\Fortune\AppData\Local\Temp\ipykernel_2400\4186162864.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#
returning-a-view-versus-a-copy
  chips['LYLTY_CARD_NBR'] = chips['LYLTY_CARD_NBR'].astype(float)
```

```
pb.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
```

```
Merged = pd.merge(chips, pb, how='inner',on = 'LYLTY_CARD_NBR')
```

```
Merged.sort_values(['PROD_QTY'], ascending=False)
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
23191 2019-05-20        226        226000.0  226210         4
23190 2018-08-19        226        226000.0  226201         4
67512 2018-08-15        223        223025.0  223075         8
44644 2018-08-19         62         62015.0   57858        75
67247 2019-05-14         40         40129.0   36720        78
...          ...        ...             ...     ...       ...
78336 2019-04-15        268        268310.0  264746        22
78337 2018-08-01        268        268311.0  264747        78
7623  2018-12-02        195        195044.0  194875         4
78339 2019-03-29        268        268358.0  264791        28
10740 2018-08-18         43         43025.0   38740       108

                                        PROD_NAME  PROD_QTY
TOT_SALES  \
23191                  Dorito Corn Chip Supreme 380g       200
650.0
23190                  Dorito Corn Chip Supreme 380g       200
650.0
67512         Smiths Crinkle Cut Chips Original 170g         5
14.5
```

```
44644                  Cobs Popd Sea Salt Chips 110g         5
19.0
67247             Thins Chips Salt and  Vinegar 175g         5
16.5
...                                            ...       ...
...
78336               Thins Chips   Originl saltd 175g         1
3.3
78337             Thins Chips Salt and  Vinegar 175g         1
3.3
7623                   Dorito Corn Chip Supreme 380g         1
6.5
78339          Thins Potato Chips Hot and Spicy 175g         1
3.3
10740  Kettle Tortilla ChipsHny and Jlpno Chili 150g         1
4.6

                     LIFESTAGE PREMIUM_CUSTOMER
23191          OLDER FAMILIES          Premium
23190          OLDER FAMILIES          Premium
67512          YOUNG FAMILIES       Mainstream
44644                RETIREES           Budget
67247          YOUNG FAMILIES       Mainstream
...                        ...              ...
78336   YOUNG SINGLES/COUPLES           Budget
78337   YOUNG SINGLES/COUPLES           Budget
7623   MIDAGE SINGLES/COUPLES          Premium
78339   YOUNG SINGLES/COUPLES           Budget
10740          OLDER FAMILIES           Budget

[87335 rows x 10 columns]
```

APPARENTLY WE HAVE AN OUTLIER , CUSTOMER WITH LYLTY_CARD_NBR=226000.0 HAS TWO PURCHASES OF PROD_QTY = 200 WHICH IS UP TO 4000 PERCENT LARGER THAN THE SECOND HIGHEST PRODUCE , SO WE HAVE TO EXCLUDE THIS CUSTOMER FOR THE REST OF OUR ANALYSIS TO AVOID SKEWED RESULT

```
lyt_check = Merged['LYLTY_CARD_NBR'] == 226000.0
lyt_check = Merged.loc[lyt_check].head()
lyt_check.sort_values('PROD_QTY', ascending=False)
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
23190 2018-08-19        226        226000.0  226201         4
23191 2019-05-20        226        226000.0  226210         4

                           PROD_NAME  PROD_QTY  TOT_SALES
LIFESTAGE  \
23190  Dorito Corn Chip Supreme 380g       200      650.0  OLDER
FAMILIES
23191  Dorito Corn Chip Supreme 380g       200      650.0  OLDER
```

FAMILIES

```
      PREMIUM_CUSTOMER
23190          Premium
23191          Premium
```

```
NewMerged = Merged['LYLTY_CARD_NBR'] != 226000.0
NewMerged = Merged.loc[NewMerged].copy()
NewMerged.sort_values(['PROD_NAME', 'PROD_QTY'], ascending=[True,
False])
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
10787 2019-05-17         56         56063.0   50363        75
39148 2018-08-16        238        238083.0  242207        75
44644 2018-08-19         62         62015.0   57858        75
50217 2018-08-14        268        268095.0  264505        75
75407 2019-05-16        103        103333.0  103467        75
...          ...        ...             ...     ...       ...
86429 2019-06-17        151        151141.0  149852        27
86514 2018-11-07        167        167092.0  168889        27
86685 2019-03-26        186        186273.0  188668        27
86705 2018-09-24        189        189122.0  189964        27
87180 2019-01-24        249        249485.0  251432        27

                                PROD_NAME  PROD_QTY  TOT_SALES  \
10787       Cobs Popd Sea Salt Chips 110g         5       19.0
39148       Cobs Popd Sea Salt Chips 110g         5       19.0
44644       Cobs Popd Sea Salt Chips 110g         5       19.0
50217       Cobs Popd Sea Salt Chips 110g         5       19.0
75407       Cobs Popd Sea Salt Chips 110g         5       19.0
...                                   ...       ...        ...
86429  WW Supreme Cheese  Corn Chips 200g         1        1.9
86514  WW Supreme Cheese  Corn Chips 200g         1        1.9
86685  WW Supreme Cheese  Corn Chips 200g         1        1.9
86705  WW Supreme Cheese  Corn Chips 200g         1        1.9
87180  WW Supreme Cheese  Corn Chips 200g         1        1.9

                  LIFESTAGE PREMIUM_CUSTOMER
10787         OLDER FAMILIES           Budget
39148  OLDER SINGLES/COUPLES          Premium
44644               RETIREES           Budget
50217               RETIREES       Mainstream
75407  YOUNG SINGLES/COUPLES           Budget
...                      ...              ...
86429  YOUNG SINGLES/COUPLES          Premium
86514  YOUNG SINGLES/COUPLES          Premium
86685  YOUNG SINGLES/COUPLES          Premium
86705  YOUNG SINGLES/COUPLES          Premium
87180  YOUNG SINGLES/COUPLES          Premium
```

```
[87333 rows x 10 columns]
```

```
# from google.colab import files

# NewMerged.to_csv('/content/NewMerged.csv', encoding = 'utf-8-sig')
# files.download('NewMerged.csv')
```

```
NewMerged['PROD_NAME'].value_counts()
```

```
Kettle Tortilla ChipsHny and Jlpno Chili 150g    3296
Cobs Popd Swt/Chlli and Sr/Cream Chips 110g      3269
Cobs Popd Sea Salt Chips 110g                    3265
Smiths Crnkle Chip Orgnl Big Bag 380g            3233
Thins Potato Chips Hot and Spicy 175g            3229
Doritos Corn Chips Cheese Supreme 170g           3217
Doritos Corn Chip Mexican Jalapeno 150g          3204
Smiths Crinkle Chips Salt and Vinegar 330g       3197
Thins Chips Light and  Tangy 175g                3188
Dorito Corn Chip Supreme 380g                    3183
Doritos Corn Chip Southern Chicken 150g          3172
Doritos Corn Chips Nacho Cheese 170g             3160
Cobs Popd Sour Crm  and Chives Chips 110g        3159
Kettle Tortilla ChipsBtroot and Ricotta 150g     3146
Tostitos Smoked Chipotle 175g                    3145
Kettle Tortilla ChipsFeta and Garlic 150g        3138
Doritos Corn Chips Original 170g                 3121
Thins Chips Seasonedchicken 175g                 3114
Thins Chips Salt and  Vinegar 175g               3103
Smiths Chip Thinly Cut Original 175g             1614
Natural Chip Co Tmato Hrb and Spce 175g          1572
Natural ChipCo Sea Salt and Vinegr 175g          1550
WW Supreme Cheese  Corn Chips 200g               1509
WW Original Corn  Chips 200g                     1495
Smiths Crinkle Cut Chips Barbecue 170g           1489
WW Original Stacked Chips 160g                   1487
Smiths Crinkle Cut Chips Chicken 170g            1484
WW Sour Cream and OnionStacked Chips 160g        1483
Smiths Crinkle Cut Chips Chs and Onion170g       1481
Smiths Chip Thinly S/Cream and Onion 175g        1473
WW D/Style Chip Sea Salt 200g                    1469
Natural Chip  Compny SeaSalt175g                 1468
Smiths Crinkle Cut Chips Original 170g           1461
Natural ChipCo Hony Soy Chckn175g                1460
Thins Chips   Originl saltd 175g                 1441
Smiths Chip Thinly CutSalt/Vinegr175g            1440
French Fries Potato Chips 175g                   1418
Name: PROD_NAME, dtype: int64
```

1. TOP 5 MOST SOLD PRODUCTS

```
NewMerged.head()
```

```
        DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0 2018-10-17          1          1000.0       1         5
1 2019-05-20          1          1343.0     383        61
2 2018-08-17          2          2373.0     974        69
3 2018-08-18          2          2426.0    1038       108
4 2019-05-16          4          4149.0    3333        16

                                      PROD_NAME  PROD_QTY  TOT_SALES
\
0               Natural Chip  Compny SeaSalt175g         2        6.0

1          Smiths Crinkle Cut Chips Chicken 170g         2        2.9

2      Smiths Chip Thinly S/Cream and Onion 175g         5       15.0

3  Kettle Tortilla ChipsHny and Jlpno Chili 150g         3       13.8

4     Smiths Crinkle Chips Salt and Vinegar 330g         1        5.7


                LIFESTAGE PREMIUM_CUSTOMER
0   YOUNG SINGLES/COUPLES          Premium
1  MIDAGE SINGLES/COUPLES           Budget
2  MIDAGE SINGLES/COUPLES           Budget
3  MIDAGE SINGLES/COUPLES           Budget
4  MIDAGE SINGLES/COUPLES           Budget
```

```
NewMerged1 = NewMerged.copy()

NewMerged1['TOP'] =
NewMerged1.groupby('PROD_NAME').TOT_SALES.transform(np.sum)

NewMerged1.head()
```

```
        DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0 2018-10-17          1          1000.0       1         5
1 2019-05-20          1          1343.0     383        61
2 2018-08-17          2          2373.0     974        69
3 2018-08-18          2          2426.0    1038       108
4 2019-05-16          4          4149.0    3333        16

                                      PROD_NAME  PROD_QTY  TOT_SALES
\
0               Natural Chip  Compny SeaSalt175g         2        6.0

1          Smiths Crinkle Cut Chips Chicken 170g         2        2.9

2      Smiths Chip Thinly S/Cream and Onion 175g         5       15.0

3  Kettle Tortilla ChipsHny and Jlpno Chili 150g         3       13.8
```

```
4     Smiths Crinkle Chips Salt and Vinegar 330g         1        5.7


                LIFESTAGE PREMIUM_CUSTOMER      TOP
0   YOUNG SINGLES/COUPLES          Premium   8331.0
1  MIDAGE SINGLES/COUPLES           Budget   8183.8
2  MIDAGE SINGLES/COUPLES           Budget   8313.0
3  MIDAGE SINGLES/COUPLES           Budget  29021.4
4  MIDAGE SINGLES/COUPLES           Budget  34804.2
```

1. MOST PROFITABLE CHIPS

```
TopProd = NewMerged1.copy()

TopProd = TopProd.drop_duplicates('PROD_NAME')

TopProd.head()
```

```
        DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0 2018-10-17          1          1000.0       1         5
1 2019-05-20          1          1343.0     383        61
2 2018-08-17          2          2373.0     974        69
3 2018-08-18          2          2426.0    1038       108
4 2019-05-16          4          4149.0    3333        16

                                      PROD_NAME  PROD_QTY  TOT_SALES
\
0               Natural Chip  Compny SeaSalt175g         2        6.0

1          Smiths Crinkle Cut Chips Chicken 170g         2        2.9

2      Smiths Chip Thinly S/Cream and Onion 175g         5       15.0

3  Kettle Tortilla ChipsHny and Jlpno Chili 150g         3       13.8

4     Smiths Crinkle Chips Salt and Vinegar 330g         1        5.7


                LIFESTAGE PREMIUM_CUSTOMER      TOP
0   YOUNG SINGLES/COUPLES          Premium   8331.0
1  MIDAGE SINGLES/COUPLES           Budget   8183.8
2  MIDAGE SINGLES/COUPLES           Budget   8313.0
3  MIDAGE SINGLES/COUPLES           Budget  29021.4
4  MIDAGE SINGLES/COUPLES           Budget  34804.2
```

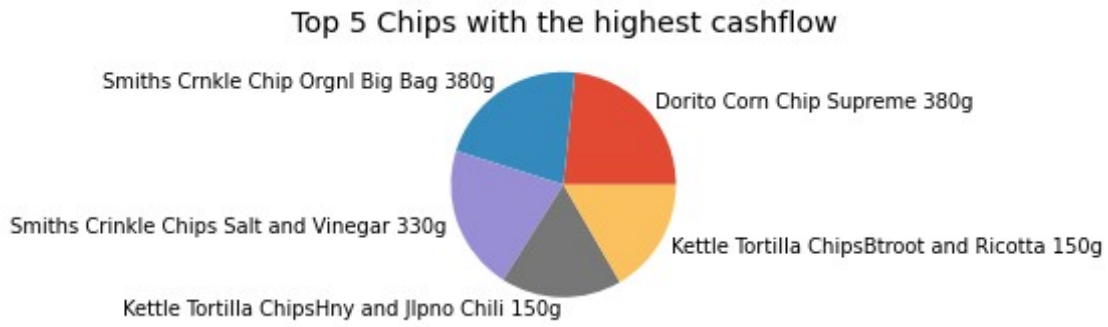
```
TopProd =TopProd.drop(['DATE'    ,'STORE_NBR',
     'LYLTY_CARD_NBR','TXN_ID'   ,'PROD_NBR', 'PROD_QTY','TOT_SALES',
     'LIFESTAGE',    'PREMIUM_CUSTOMER'], axis=1)

Top5 = TopProd.sort_values('TOP', ascending=False).head(5).copy()
```

```
Top5 = Top5.reset_index()
Top5 = Top5.drop(['index'], axis=1)

Top5.sort_values('TOP', ascending=False)
```

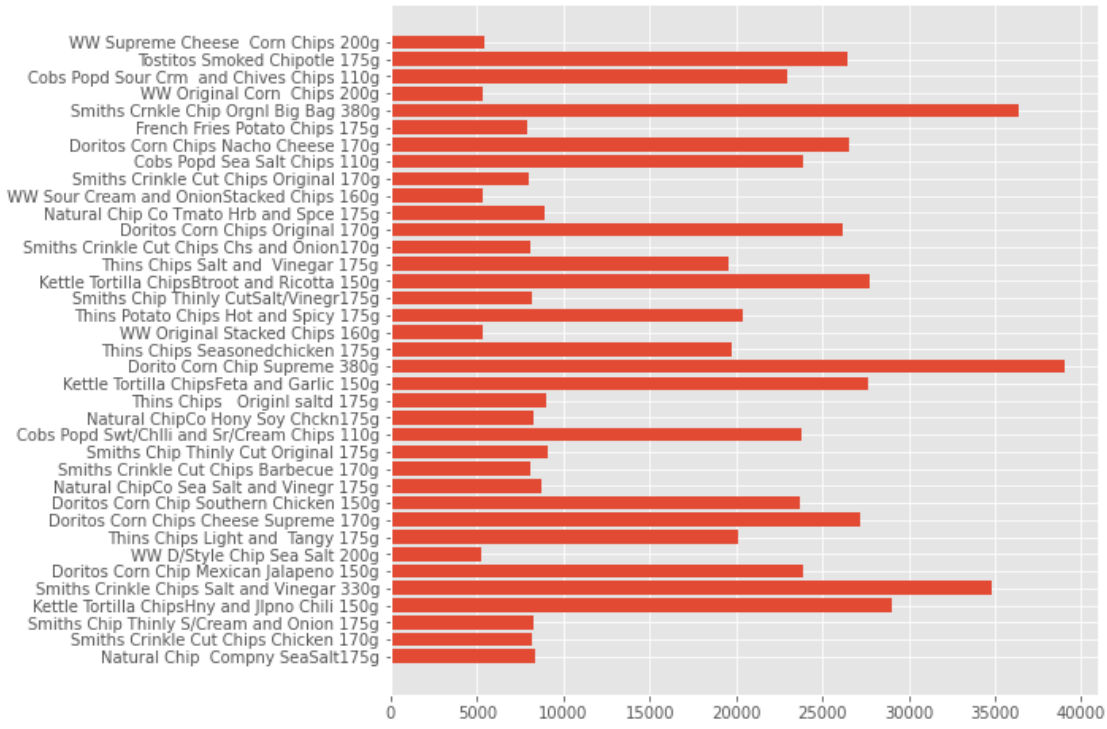
	PROD_NAME	TOP
0	Dorito Corn Chip Supreme 380g	39052.0
1	Smiths Crnkle Chip Orgnl Big Bag 380g	36367.6
2	Smiths Crinkle Chips Salt and Vinegar 330g	34804.2
3	Kettle Tortilla ChipsHny and Jlpno Chili 150g	29021.4
4	Kettle Tortilla ChipsBtroot and Ricotta 150g	27770.2

DORITO CORN CHIP SUPREME 380G HAS THE MOST SALE FOR THE CHIPS CATEGORY

```
plt.style.use('ggplot')
mylabels = ['Dorito Corn Chip Supreme 380g','Smiths Crnkle Chip Orgnl
Big Bag 380g', 'Smiths Crinkle Chips Salt and Vinegar 330g',
          'Kettle Tortilla ChipsHny and Jlpno Chili 150g', 'Kettle
Tortilla ChipsBtroot and Ricotta 150g']
plt.pie( Top5['TOP'], labels = mylabels)
plt.title('Top 5 Chips with the highest cashflow')
plt.tight_layout()
```




```
plt.figure(figsize=(8, 8))
plt.barh(TopProd['PROD_NAME'], TopProd['TOP'])
```




```
<BarContainer object of 37 artists>
```

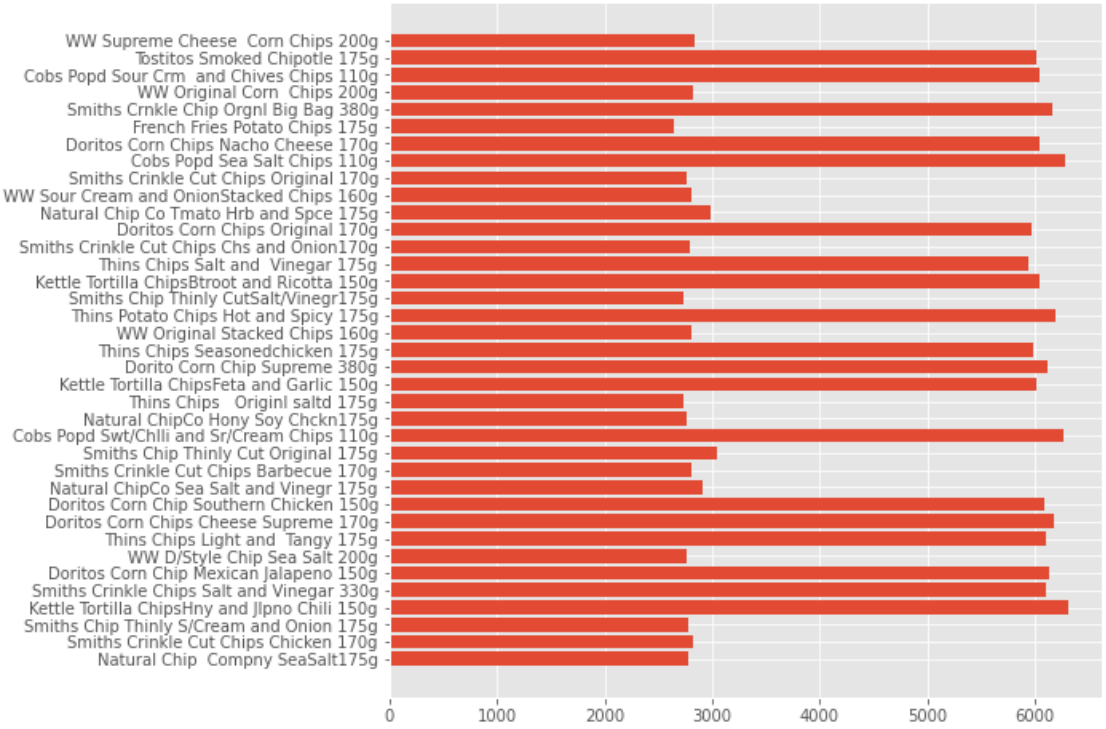
1. MOST SOLD CHIPS

```
MostSold = NewMerged.copy()

MostSold['SoldFreq'] =
MostSold.groupby('PROD_NAME').PROD_QTY.transform(np.sum)

MostSold = MostSold.drop_duplicates('PROD_NAME')

MostSold = MostSold.drop(['DATE' ,'STORE_NBR',
     'LYLTY_CARD_NBR','TXN_ID'  ,'PROD_NBR', 'PROD_QTY','TOT_SALES',
     'LIFESTAGE',    'PREMIUM_CUSTOMER'], axis=1)

MostSold = MostSold.reset_index()

MostSold.drop(['index'], axis=1, inplace=True)

MostSold.sort_values('SoldFreq', ascending=False).head(5)
```

	PROD_NAME	SoldFreq
3	Kettle Tortilla ChipsHny and Jlpno Chili 150g	6309
29	Cobs Popd Sea Salt Chips 110g	6277
13	Cobs Popd Swt/Chlli and Sr/Cream Chips 110g	6256
20	Thins Potato Chips Hot and Spicy 175g	6185
8	Doritos Corn Chips Cheese Supreme 170g	6180

Kettle Tortilla ChipsHny and Jlpno Chili 150g is the most sold chips

```
plt.figure(figsize=(8, 8))
plt.barh(MostSold['PROD_NAME'], MostSold['SoldFreq'])
```




```
<BarContainer object of 37 artists>
```

3. AMOUNT MADE WITH TIME

```
ChipTime = NewMerged.copy()

ChipTime['MONTH'] = pd.DatetimeIndex(ChipTime['DATE']).month

ChipTime['MONTH'] = ChipTime.MONTH.apply(lambda x:
str(int(x)).zfill(2))

ChipTime['YEAR'] = pd.DatetimeIndex(ChipTime['DATE']).year

ChipTime['MONTH'] = ChipTime['MONTH'].astype(str)
ChipTime['YEAR'] = ChipTime['YEAR'].astype(str)

# ChipTime['MONTH_YEAR'] = ChipTime[['YEAR', 'MONTH']].apply(lambda x:
'/'.join(x), axis=1)
ChipTime['YEAR_MONTH'] = ChipTime['YEAR'] + '/' + ChipTime['MONTH']

ChipTime = ChipTime.sort_values('YEAR_MONTH')
```

WE WANT TO FIND THE TOTAL AMOUNT CHIPS MADE IN EACH MONTH

```
TimeAmount =ChipTime.copy()

TimeAmount.head(2)
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
48035 2018-07-23        180        180197.0  182272       106
14719 2018-07-31        128        128005.0  130495        28

                                  PROD_NAME  PROD_QTY  TOT_SALES  \
48035      Natural ChipCo Hony Soy Chckn175g         2        6.0
14719  Thins Potato Chips Hot and Spicy 175g         2        6.6

            LIFESTAGE PREMIUM_CUSTOMER MONTH  YEAR YEAR_MONTH
48035        RETIREES           Budget    07  2018    2018/07
14719  OLDER FAMILIES           Budget    07  2018    2018/07
```

```
TimeAmount['AMOUNT_MADE'] =
TimeAmount.groupby('YEAR_MONTH').TOT_SALES.transform(np.sum)

TimeAmount.head(2)
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
48035 2018-07-23        180        180197.0  182272       106
14719 2018-07-31        128        128005.0  130495        28

                                  PROD_NAME  PROD_QTY  TOT_SALES  \
48035      Natural ChipCo Hony Soy Chckn175g         2        6.0
14719  Thins Potato Chips Hot and Spicy 175g         2        6.6

            LIFESTAGE PREMIUM_CUSTOMER MONTH  YEAR YEAR_MONTH
AMOUNT_MADE
48035        RETIREES           Budget    07  2018    2018/07
55401.4
14719  OLDER FAMILIES           Budget    07  2018    2018/07
55401.4
```

```
TimeAmount = TimeAmount.drop_duplicates('YEAR_MONTH')

TimeAmount.head(5)
```

```
            DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
48035 2018-07-23        180        180197.0  182272       106
10779 2018-08-20         55         55009.0   48501        69
63577 2018-09-29        102        102242.0  103000        90
11404 2018-10-28        247        247036.0  248808        61
41501 2018-11-19        114        114236.0  118395        60

                                      PROD_NAME  PROD_QTY  TOT_SALES
\
48035          Natural ChipCo Hony Soy Chckn175g         2        6.0

10779  Smiths Chip Thinly S/Cream and Onion 175g         1        3.0

63577              Tostitos Smoked Chipotle 175g         2        8.8
```

```
11404      Smiths Crinkle Cut Chips Chicken 170g         2        5.8

41501  Kettle Tortilla ChipsFeta and Garlic 150g         2        9.2


                   LIFESTAGE PREMIUM_CUSTOMER MONTH  YEAR
YEAR_MONTH  \
48035               RETIREES           Budget    07  2018    2018/07

10779         OLDER FAMILIES           Budget    08  2018    2018/08

63577         YOUNG FAMILIES           Budget    09  2018    2018/09

11404         OLDER FAMILIES           Budget    10  2018    2018/10

41501  OLDER SINGLES/COUPLES          Premium    11  2018    2018/11


       AMOUNT_MADE
48035     55401.40
10779     51490.95
63577     52184.10
11404     54439.00
41501     52642.10
```

```
TimeAmount['AMOUNT_MADE'] = TimeAmount['AMOUNT_MADE'].astype(int)

TimeAmount =
TimeAmount.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NB
R','PROD_NAME','PROD_QTY','TOT_SALES','LIFESTAGE','PREMIUM_CUSTOMER',
'MONTH','YEAR'], axis=1)

TimeAmount.head(3)
```

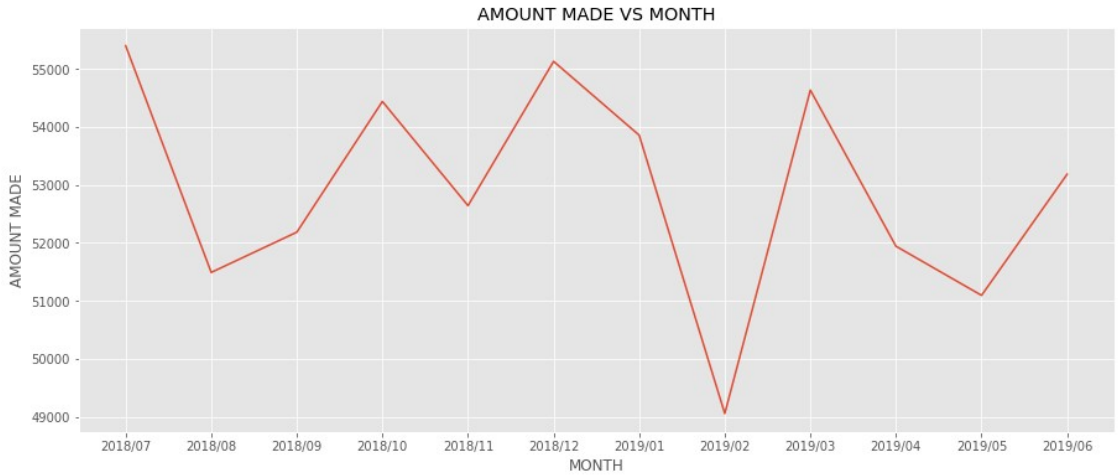
```
      YEAR_MONTH  AMOUNT_MADE
48035    2018/07        55401
10779    2018/08        51490
63577    2018/09        52184
```

```
TimeAmount = TimeAmount.reset_index()

TimeAmount = TimeAmount.drop(['index'], axis=1)

TimeAmount.sort_values('YEAR_MONTH')
```

```
   YEAR_MONTH  AMOUNT_MADE
0     2018/07        55401
1     2018/08        51490
2     2018/09        52184
3     2018/10        54439
4     2018/11        52642
```

```
5     2018/12        55131
6     2019/01        53857
7     2019/02        49056
8     2019/03        54635
9     2019/04        51942
10    2019/05        51094
11    2019/06        53184
```

```
plt.figure(figsize=(15,6))
plt.xlabel('MONTH')
plt.ylabel('AMOUNT MADE')
plt.title('AMOUNT MADE VS MONTH')
plt.plot(TimeAmount['YEAR_MONTH'], TimeAmount['AMOUNT_MADE'])
```




```
[<matplotlib.lines.Line2D at 0x269e34bcf10>]
```

4. CHIPS SOLD WITH TIME

```
sp = ChipTime.copy()
```

```
sp['TOTAL_SOLD'] = sp.groupby('YEAR_MONTH').PROD_QTY.transform(np.sum)
```

```
sp = sp.drop_duplicates('YEAR_MONTH')
```

```
sp =
sp.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NBR','PROD
_NAME','PROD_QTY','TOT_SALES','LIFESTAGE','PREMIUM_CUSTOMER',
'MONTH','YEAR'], axis=1)
```

```
sp = sp.reset_index()
```

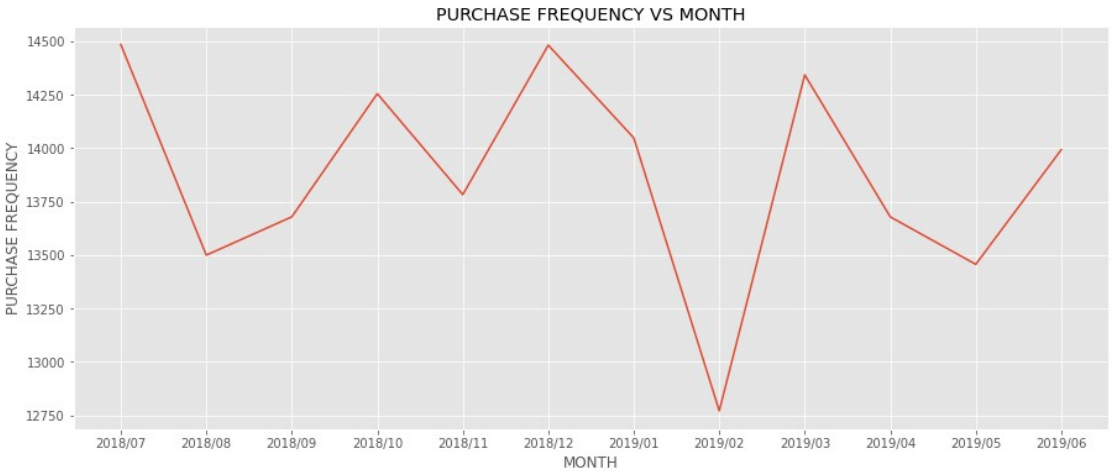
```
sp = sp.drop(['index'], axis=1)
```

```
sp
```

```
   YEAR_MONTH  TOTAL_SOLD
0     2018/07       14484
1     2018/08       13499
```

```
2     2018/09       13678
3     2018/10       14254
4     2018/11       13782
5     2018/12       14481
6     2019/01       14047
7     2019/02       12771
8     2019/03       14342
9     2019/04       13678
10    2019/05       13456
11    2019/06       13992
```

```
plt.figure(figsize=(15,6))
plt.xlabel('MONTH')
plt.ylabel('PURCHASE FREQUENCY')
plt.title('PURCHASE FREQUENCY VS MONTH')
plt.plot(sp['YEAR_MONTH'], sp['TOTAL_SOLD'])
```




```
[<matplotlib.lines.Line2D at 0x269e39c3e50>]
```

5. TOTAL SALES VS LIFESTAGE (WHO SPENDS THE MOST ON CHIPS?)

```
mp = NewMerged.copy()
```

```
mp['SUM_LIFESTAGE'] =
mp.groupby('LIFESTAGE').TOT_SALES.transform(np.sum)
```

```
mp.drop_duplicates('LIFESTAGE', inplace=True)
```

```
mp =
mp.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NBR','PROD
_NAME','PROD_QTY','TOT_SALES','PREMIUM_CUSTOMER'], axis=1)
```

```
mp = mp.reset_index()
```

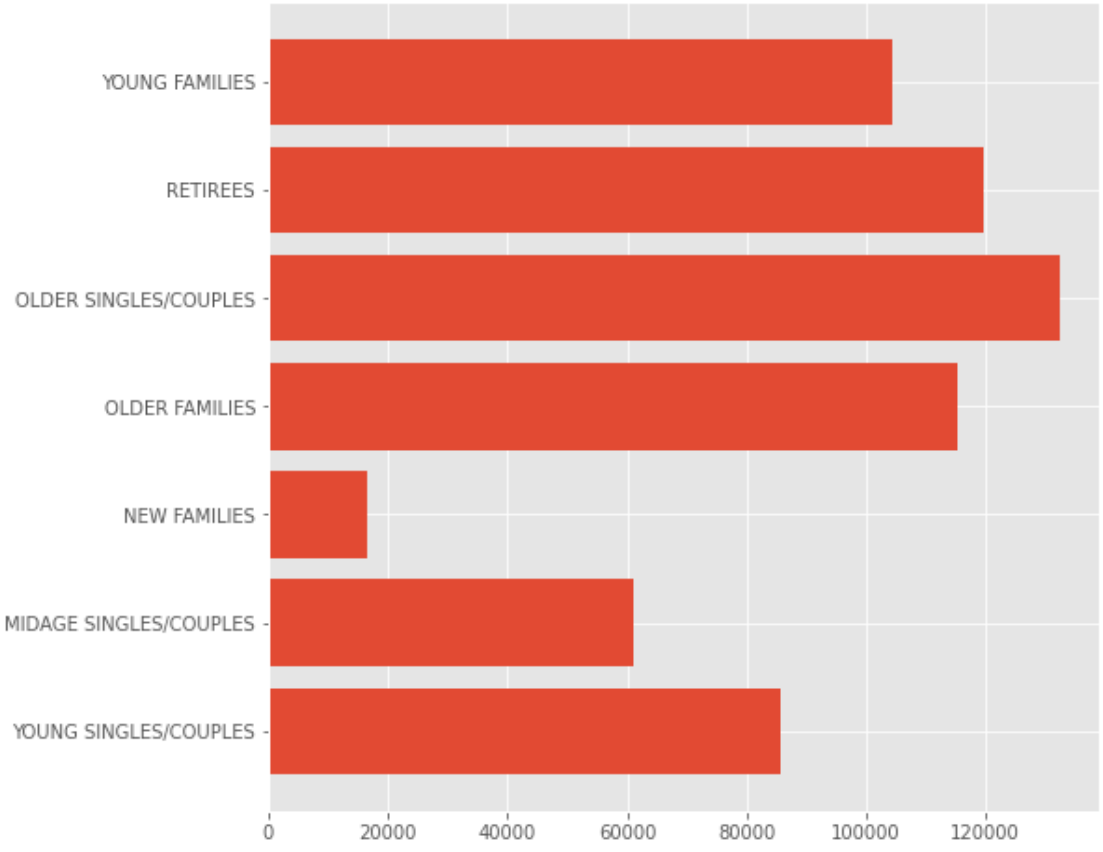
```
mp.drop(['index'], axis=1)
```

```
                LIFESTAGE  SUM_LIFESTAGE
0   YOUNG SINGLES/COUPLES       85776.20
1  MIDAGE SINGLES/COUPLES       61000.20
2             NEW FAMILIES       16457.55
3          OLDER FAMILIES      115369.60
4   OLDER SINGLES/COUPLES      132464.35
5                 RETIREES      119553.70
6          YOUNG FAMILIES      104437.90
```

```
NewMerged['LIFESTAGE'].value_counts()
```

```
OLDER SINGLES/COUPLES     18043
RETIREES                  16363
OLDER FAMILIES            15894
YOUNG FAMILIES            14391
YOUNG SINGLES/COUPLES     12026
MIDAGE SINGLES/COUPLES     8335
NEW FAMILIES               2281
Name: LIFESTAGE, dtype: int64
```

```
plt.figure(figsize=(8, 8))
plt.barh(mp['LIFESTAGE'], mp['SUM_LIFESTAGE'])
```




```
<BarContainer object of 7 artists>
```

OLDER SINGLES/COUPLES HAS SPENT THE MOST AMOUNT ON CHIPS

6. PREMIUM CUSTOMERS VS TOTAL SALES(WHICH CATEGORY HAS SPENT TH EMOST AMOUNT OF MONEY ON CHIPS?)

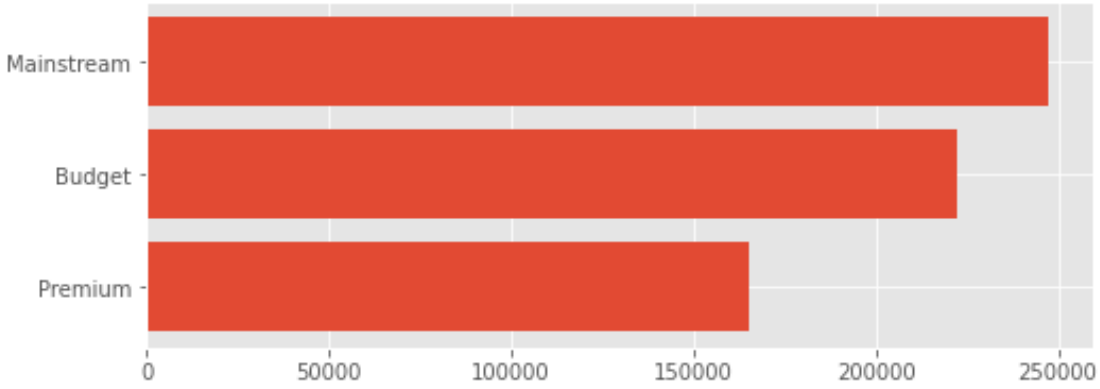
```
lm = NewMerged.copy()

lm['SOLD_SEGMENT'] =
lm.groupby('PREMIUM_CUSTOMER').TOT_SALES.transform(np.sum)

lm.drop_duplicates('PREMIUM_CUSTOMER', inplace=True)

lm =
lm.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NBR','PROD
_NAME','PROD_QTY','TOT_SALES','LIFESTAGE'], axis=1)

lm
```

```
     PREMIUM_CUSTOMER  SOLD_SEGMENT
0             Premium     165338.45
1              Budget     222228.55
1703       Mainstream     247492.50
```

```
lm = lm.reset_index()
lm = lm.drop(['index'], axis=1)

lm
```

```
  PREMIUM_CUSTOMER  SOLD_SEGMENT
0          Premium     165338.45
1           Budget     222228.55
2       Mainstream     247492.50
```

```
plt.figure(figsize=(8, 3))
plt.barh(lm['PREMIUM_CUSTOMER'], lm['SOLD_SEGMENT'])
```




```
<BarContainer object of 3 artists>
```

```
NewMerged['PREMIUM_CUSTOMER'].value_counts()
```

```
Mainstream    33671
Budget        30772
Premium       22890
Name: PREMIUM_CUSTOMER, dtype: int64
```

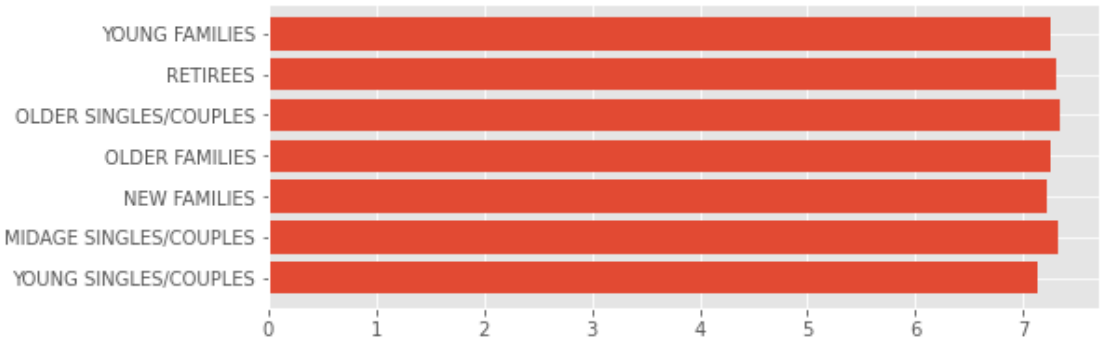
THE MAINSTREAM CUSTOMERS HAS BROUGHT MORE REVENUE , THIS MIGHT BE DUE TO THE FACT THAT THEY ARE MORE IN NUMBERS COMPARED TO THE OTHER TWO CUSTOMER SEGMENT

7. AVERAGE CHIPS PRICE PER CUSTOMER SEGMENT(LIFESTAGE)

```
lmean = NewMerged.copy()

lmean['MEAN_LIFESTAGE'] =
lmean.groupby('LIFESTAGE').TOT_SALES.transform(np.mean)

lmean.drop_duplicates('LIFESTAGE', inplace=True)

lmean =
lmean.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NBR','P
ROD_NAME','PROD_QTY','TOT_SALES','PREMIUM_CUSTOMER'], axis=1)

lmean = lmean.reset_index()
lmean = lmean.drop(['index'], axis=1)

lmean
```

	LIFESTAGE	MEAN_LIFESTAGE
0	YOUNG SINGLES/COUPLES	7.132563
1	MIDAGE SINGLES/COUPLES	7.318560
2	NEW FAMILIES	7.215059
3	OLDER FAMILIES	7.258689
4	OLDER SINGLES/COUPLES	7.341592
5	RETIREES	7.306344
6	YOUNG FAMILIES	7.257168

```
plt.figure(figsize=(8, 3))
plt.barh(lmean['LIFESTAGE'], lmean['MEAN_LIFESTAGE'])
```




```
<BarContainer object of 7 artists>
```

THE AVERAGE VALUE OF THE LIFESTAGES ARE QUITE SIMILAR TO EACH OTHER

8. AVERAGE CHIPS PRICE PER CUSTOMER SEGMENT(PREMIUM_CUSTOMER)

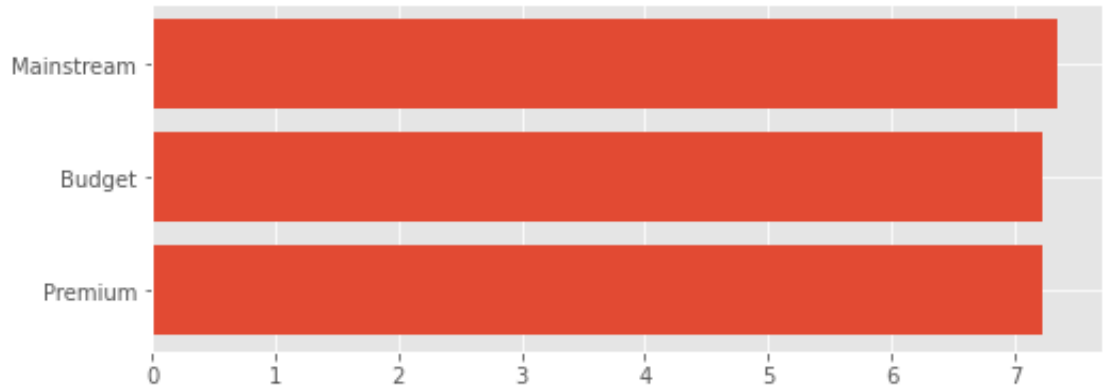
```
pmean = NewMerged.copy()

pmean['MEAN_CUSTOMER'] =
pmean.groupby('PREMIUM_CUSTOMER').TOT_SALES.transform(np.mean)

pmean.drop_duplicates('PREMIUM_CUSTOMER', inplace=True)

pmean
```

```
           DATE  STORE_NBR  LYLTY_CARD_NBR  TXN_ID  PROD_NBR  \
0    2018-10-17          1          1000.0       1         5
1    2019-05-20          1          1343.0     383        61
1703 2019-05-18          3          3159.0    1759        77

                                  PROD_NAME  PROD_QTY  TOT_SALES  \
0          Natural Chip  Compny SeaSalt175g         2        6.0
1     Smiths Crinkle Cut Chips Chicken 170g         2        2.9
1703   Doritos Corn Chips Nacho Cheese 170g         2        8.8

                   LIFESTAGE PREMIUM_CUSTOMER  MEAN_CUSTOMER
0      YOUNG SINGLES/COUPLES          Premium       7.223174
1     MIDAGE SINGLES/COUPLES           Budget       7.221778
1703  MIDAGE SINGLES/COUPLES       Mainstream       7.350316
```

```
pmean =
pmean.drop(['DATE','STORE_NBR','LYLTY_CARD_NBR','TXN_ID','PROD_NBR','P
ROD_NAME','PROD_QTY','TOT_SALES','LIFESTAGE'], axis=1)

pmean = pmean.reset_index()
pmean = pmean.drop(['index'], axis=1)

pmean
```

```
  PREMIUM_CUSTOMER  MEAN_CUSTOMER
0          Premium       7.223174
1           Budget       7.221778
2       Mainstream       7.350316
```

```
plt.figure(figsize=(8, 3))
plt.barh(pmean['PREMIUM_CUSTOMER'], pmean['MEAN_CUSTOMER'])
```




```
<BarContainer object of 3 artists>
```

THE AVERAGE TOTAL SALES OF PREMIUM CUSTOMERS ARE ASLO SIMILAR TO ONE ANOTHER