In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

LOAD DATASET

In [2]:

```
#Loading the first sales dataset
raw_sale_data = pd.read_excel('QVI_transaction_data.xlsx')
raw_sale_data.head()
```

Out[2]:

	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 [3]:

```
df_sale = raw_sale_data.copy()
```

In [4]:

```
df_sale.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
```

HENCE NO NULL VALUES IN ALL THE COLUMNS

In [5]:

```
df_sale.head(10)
```

Out[5]:

	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
5	43604	4	4074	2982	57	Old El Paso Salsa Dip Tomato Mild 300g	1	5.1
6	43601	4	4149	3333	16	Smiths Crinkle Chips Salt & Vinegar 330g	1	5.7
7	43601	4	4196	3539	24	Grain Waves Sweet Chilli 210g	1	3.6
8	43332	5	5026	4525	42	Doritos Corn Chip Mexican Jalapeno 150g	1	3.9
9	43330	7	7150	6900	52	Grain Waves Sour Cream&Chives 210G	2	7.2

Converting date into yyyy/mm/dd format

In [6]:

```
df_sale['DATE'][0]
```

Out[6]:

```
np.int64(43390)
```

In [7]:

```
df_sale['DATE'] = pd.to_datetime(df_sale['DATE'], origin = '01/01/1900', unit = 'D')
```

In [8]:

```
df_sale.head()
```

Out[8]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8

In [9]:

```
#store number column
df_sale['STORE_NBR'].unique()
#no missing value and store number is less than 300
```

Out[9]:

```
array([  1,   2,   4,   5,   7,   8,   9,  13,  19,  20,  22,  23,  25,
        33,  36,  38,  39,  41,  43,  45,  51,  54,  55,  56,  58,  59,
        60,  62,  63,  67,  71,  72,  74,  75,  80,  81,  82,  83,  84,
        88,  94,  96,  97, 101, 102, 104, 106, 109, 110, 111, 112, 114,
       115, 116, 118, 119, 120, 122, 125, 128, 129, 130, 133, 149, 151,
       152, 153, 156, 157, 160, 161, 164, 166, 167, 168, 169, 172, 173,
       175, 178, 181, 184, 186, 187, 191, 194, 196, 197, 200, 205, 207,
       208, 209, 212, 214, 215, 216, 217, 219, 222, 223, 225, 226, 227,
       235, 236, 237, 241, 243, 246, 247, 248, 250, 253, 255, 256, 257,
       262, 265, 266, 269, 271,  77,   3,   6,  10,  12,  15,  16,  17,
        18,  21,  24,  26,  27,  28,  29,  30,  32,  34,  35,  37,  40,
        46,  47,  48,  49,  50,  52,  53,  57,  61,  64,  65,  66,  68,
        69,  70,  73,  78,  79,  86,  87,  89,  90,  91,  93,  95,  98,
       100, 103, 105, 107, 108, 113, 117, 121, 123, 124, 126, 127, 131,
       132, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147,
       148, 150, 154, 155, 158, 162, 163, 165, 170, 171, 174, 176, 177,
       179, 180, 182, 183, 185, 188, 189, 190, 192, 195, 199, 201, 202,
       203, 210, 213, 218, 220, 221, 224, 228, 229, 230, 231, 232, 233,
       234, 238, 239, 240, 242, 244, 245, 249, 251, 254, 259, 260, 261,
       263, 264, 267, 268, 270, 272,  14,  42,  44,  92,  99, 139, 146,
       159, 198, 204, 258, 211,  31,  85,  76,  11, 252, 193, 206])
```

```
In [10]: df_sale['LYLTY_CARD_NBR'].unique()
         #same number of values as much as in the customer behaviour columns
```

```
Out[10]: array([  1000,   1307,   1343, ..., 272358, 272379, 272380],
               shape=(72637,))
```

```
In [11]: df_sale['PROD_NBR'].unique()
```

```
Out[11]: array([  5,  66,  61,  69, 108,  57,  16,  24,  42,  52, 114,  15,  92,
                 44,  54,  94,  98,  93,  56,   7,  31,  32, 111,  46,  13,  99,
                 26,  64,  22,  48,  37,  36,  51, 107, 106,   4, 113,  45,  39,
                102, 104,   3,  82,  88,  40,  73,  87,  84,  70,  89, 101,  63,
                 25,  47,  71,  65,  33,  35,  12,   8,  75, 100,  29,  59,  30,
                 81,  67, 110,  28,   2,  14,  77,  17,  83,  68,  96,  79,  23,
                 50,  78,   1,  86,  53,  72,  74,  76,   9,  91, 105,  90, 109,
                 27,  62, 112,  55,  18,  34,  49,  60,  38, 103,  85,  95,  97,
                 20,  19,  21,   6,  80,  58,  10,  11,  43,  41])
```

```
In [12]: df_sale['TOT_SALES'].unique()
```

```
Out[12]: array([  6.  ,   6.3 ,   2.9 ,  15.  ,  13.8 ,   5.1 ,   5.7 ,   3.6 ,
                  3.9 ,   7.2 ,  23.  ,   9.2 ,   1.7 ,   3.3 ,   2.1 ,   3.  ,
                  3.8 ,   5.4 ,   2.7 ,   3.7 ,  14.8 ,   4.4 ,   6.6 ,   2.6 ,
                  3.25,   4.6 ,   5.8 ,  15.5 ,   7.8 ,   4.2 ,   7.4 ,   7.6 ,
                  8.4 ,   6.5 ,   4.3 ,  28.5 ,   7.5 ,   3.4 ,  19.  ,  11.8 ,
                 17.6 ,   9.  ,  13.2 ,   1.9 ,  10.2 ,  13.  ,  15.2 ,  11.4 ,
                 14.5 ,   5.6 ,  10.8 ,  10.4 ,   1.5 ,  16.5 ,   1.8 ,   5.2 ,
                  5.9 ,  18.4 ,   8.8 ,  18.5 ,   6.2 ,   4.8 ,   8.6 ,   2.8 ,
                  2.3 ,   3.1 ,   2.4 ,  15.6 ,  19.5 ,  27.  ,   9.9 ,  16.2 ,
                 13.5 ,  21.6 ,  23.6 ,  29.5 ,  12.6 ,   8.1 ,  15.3 ,  11.1 ,
                 22.  ,   9.5 ,  16.25,  20.4 ,  11.7 ,  22.8 ,   9.6 ,   8.5 ,
                 10.5 ,  21.  ,  12.  ,  14.4 ,   9.75,  16.8 ,  25.5 ,  17.7 ,
                 17.2 ,  17.1 ,   4.5 ,   6.8 ,  18.  ,  12.9 ,  11.5 ,   8.7 ,
                 14.  ,  11.6 ,  12.4 , 650.  ,  21.5 ,   9.3 ,  11.2 ,   6.9 ])
```

```
In [13]: df_sale['PROD_NAME'].unique()
```

```
Out[13]: 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 [14]: #extracting pack size and brand name from product name to analyse their impacts on sale
         df_sale['PACK_SIZE(g)'] = df_sale['PROD_NAME'].str.extract(r'(\d+)')
```

```
In [15]: df_sale['PROD_NAME'].str.split()
```

```
Out[15]: 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]
                                        ...
         264831    [Kettle, Sweet, Chilli, And, Sour, Cream, 175g]
         264832                 [Tostitos, Splash, Of, Lime, 175g]
         264833                          [Doritos, Mexicana, 170g]
         264834     [Doritos, Corn, Chip, Mexican, Jalapeno, 150g]
         264835                 [Tostitos, Splash, Of, Lime, 175g]
         Name: PROD_NAME, Length: 264836, dtype: object
```

```
In [16]: df_sale['BRAND_NAME'] = [i[0] for i in df_sale['PROD_NAME'].str.split()]
```

```
In [17]: df_sale.head()
```

Out[17]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle

In [18]:
```
df_sale[df_sale['PROD_QTY']== 200]
```

Out[18]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME
69762	2018-08-21	226	226000	226201	4	Dorito Corn Chp Supreme 380g	200	650.0	380	Dorito
69763	2019-05-22	226	226000	226210	4	Dorito Corn Chp Supreme 380g	200	650.0	380	Dorito

In [19]:
```
df_sale['PROD_QTY'].value_counts()
```

Out[19]:
```
PROD_QTY
2      236039
1       27518
5         450
3         430
4         397
200         2
Name: count, dtype: int64
```

In [20]:
```
#considering the prod_qty = 200 as outlier and has not much significance in the data so dropping it.
df_sale = df_sale[df_sale['PROD_QTY'] != 200]
```

In [21]:
```
df_sale['TOT_SALES'].describe()
```

Out[21]:
```
count    264834.000000
mean          7.299346
std           2.527241
min           1.500000
25%           5.400000
50%           7.400000
75%           9.200000
max          29.500000
Name: TOT_SALES, dtype: float64
```

In [22]:
```
#Loading second data
raw_customer_behaviour = pd.read_csv('QVI_purchase_behaviour.csv')
raw_customer_behaviour.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]:
```
df_cust_behav = raw_customer_behaviour.copy()
```

In [24]:
```
df_cust_behav.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 72637 entries, 0 to 72636
Data columns (total 3 columns):
 #   Column            Non-Null Count  Dtype 
---  ------            --------------  ----- 
 0   LYLTY_CARD_NBR    72637 non-null  int64 
 1   LIFESTAGE         72637 non-null  object
 2   PREMIUM_CUSTOMER  72637 non-null  object
dtypes: int64(1), object(2)
memory usage: 1.7+ MB
```

NO NULL VALUES IN THIS TABLE. LETS LOOK FOR OUTLIERS OR OTHER WRONG VALUES IN THE COLUMNS

In [25]:
```
df_cust_behav['LYLTY_CARD_NBR'].unique()
```

Out[25]:
```
array([   1000,    1002,    1003, ..., 2370751, 2370961, 2373711],
      shape=(72637,))
```

In [26]:
```
df_cust_behav['LIFESTAGE'].unique()
```

Out[26]:
```
array(['YOUNG SINGLES/COUPLES', 'YOUNG FAMILIES', 'OLDER SINGLES/COUPLES',
       'MIDAGE SINGLES/COUPLES', 'NEW FAMILIES', 'OLDER FAMILIES',
       'RETIREES'], dtype=object)
```

In [27]:
```
df_cust_behav['PREMIUM_CUSTOMER'].unique()
```

Out[27]:
```
array(['Premium', 'Mainstream', 'Budget'], dtype=object)
```

In [28]:
```
#combining both datasets into one on the basis of loyalty card number column
df_merged = pd.merge(df_sale,df_cust_behav, how = 'left', on = 'LYLTY_CARD_NBR')
```

In [29]:
```
df_merged.head(10)
```

Out[29]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
5	2019-05-21	4	4074	2982	57	Old El Paso Salsa Dip Tomato Mild 300g	1	5.1	300	Old	MIDAGE SINGLES/COUPLES	Budget
6	2019-05-18	4	4149	3333	16	Smiths Crinkle Chips Salt & Vinegar 330g	1	5.7	330	Smiths	MIDAGE SINGLES/COUPLES	Budget
7	2019-05-18	4	4196	3539	24	Grain Waves Sweet Chilli 210g	1	3.6	210	Grain	MIDAGE SINGLES/COUPLES	Budget
8	2018-08-22	5	5026	4525	42	Doritos Corn Chip Mexican Jalapeno 150g	1	3.9	150	Doritos	MIDAGE SINGLES/COUPLES	Budget
9	2018-08-20	7	7150	6900	52	Grain Waves Sour Cream&Chives 210G	2	7.2	210	Grain	MIDAGE SINGLES/COUPLES	Budget

In [30]:

```
#saving the cleaned and preprocessed file ready for analysis into a csv file
df_merged.to_csv('Sales Data Merged and Preprocessed.csv', index = False)
```

In [31]:

```
#readimmg the saved merged csv file
df_complete = pd.read_csv("Sales Data Merged and Preprocessed.csv")
df_complete.head()
```

Out[31]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget

Q. WHAT IS THE BEST SELLING PRODUCT BRAND?

In [32]:

```
sale_by_brand = df_complete.groupby('BRAND_NAME')['TOT_SALES'].sum(numeric_only=True)
```

In [33]:

```
sale_by_brand.index
```

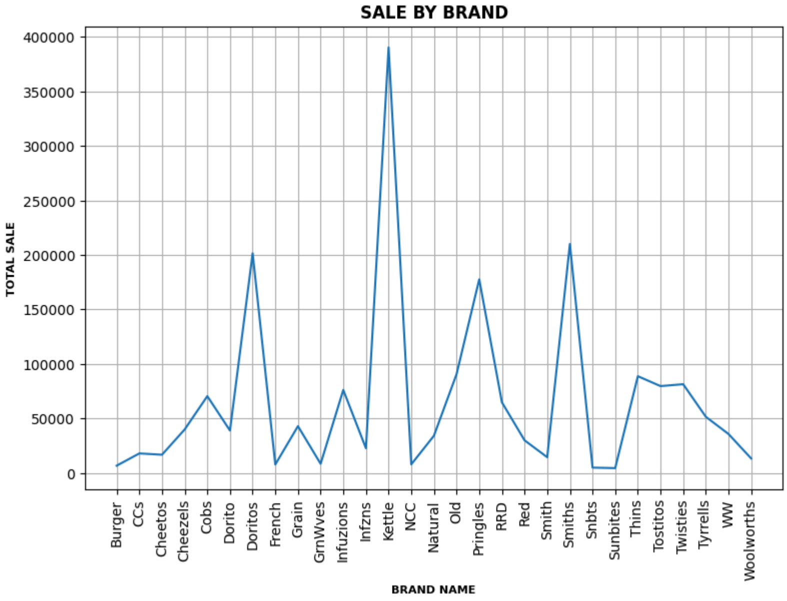
Out[33]:

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

In [34]:

```
plt.figure(figsize = (9, 6))

plt.plot(sale_by_brand.index, sale_by_brand.values)
plt.xticks(sale_by_brand.index, rotation = 'vertical')
plt.xlabel("BRAND NAME", fontsize = 8, fontweight = 'bold')
plt.ylabel("TOTAL SALE", fontsize = 8, fontweight = 'bold')
plt.title("SALE BY BRAND", fontsize = 12, fontweight = 'bold')
plt.grid(True)
plt.show()
```



In [35]:

```
df_complete[df_complete['BRAND_NAME']== 'Kettle']
```

Out[35]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
11	2018-08-22	8	8294	8221	114	Kettle Sensations Siracha Lime 150g	5	23.0	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
23	2018-08-21	36	36302	33188	32	Kettle Sea Salt And Vinegar 175g	1	5.4	175	Kettle	MIDAGE SINGLES/COUPLES	Budget
24	2018-08-17	38	38142	34181	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	2	9.2	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
27	2019-05-17	41	41423	38393	46	Kettle Original 175g	1	5.4	175	Kettle	MIDAGE SINGLES/COUPLES	Budget
...	...	...	...	...	...	...	...	...	...	...	...	...
264817	2019-06-17	272	272053	269703	46	Kettle Original 175g	2	10.8	175	Kettle	YOUNG SINGLES/COUPLES	Premium
264819	2019-05-31	272	272105	269792	32	Kettle Sea Salt And Vinegar 175g	2	10.8	175	Kettle	YOUNG SINGLES/COUPLES	Premium
264821	2019-03-19	272	272156	269855	63	Kettle 135g Swt Pot Sea Salt	2	8.4	135	Kettle	YOUNG SINGLES/COUPLES	Premium
264822	2019-03-15	272	272193	269906	9	Kettle Tortilla ChpsBtroot&Ricotta 150g	1	4.6	150	Kettle	YOUNG SINGLES/COUPLES	Premium
264829	2019-03-11	272	272319	270088	89	Kettle Sweet Chilli And Sour Cream 175g	2	10.8	175	Kettle	YOUNG SINGLES/COUPLES	Premium

41288 rows × 12 columns

Q. WHAT IS THE IMPACT OF PACK SIZE ON BRAND SALE?

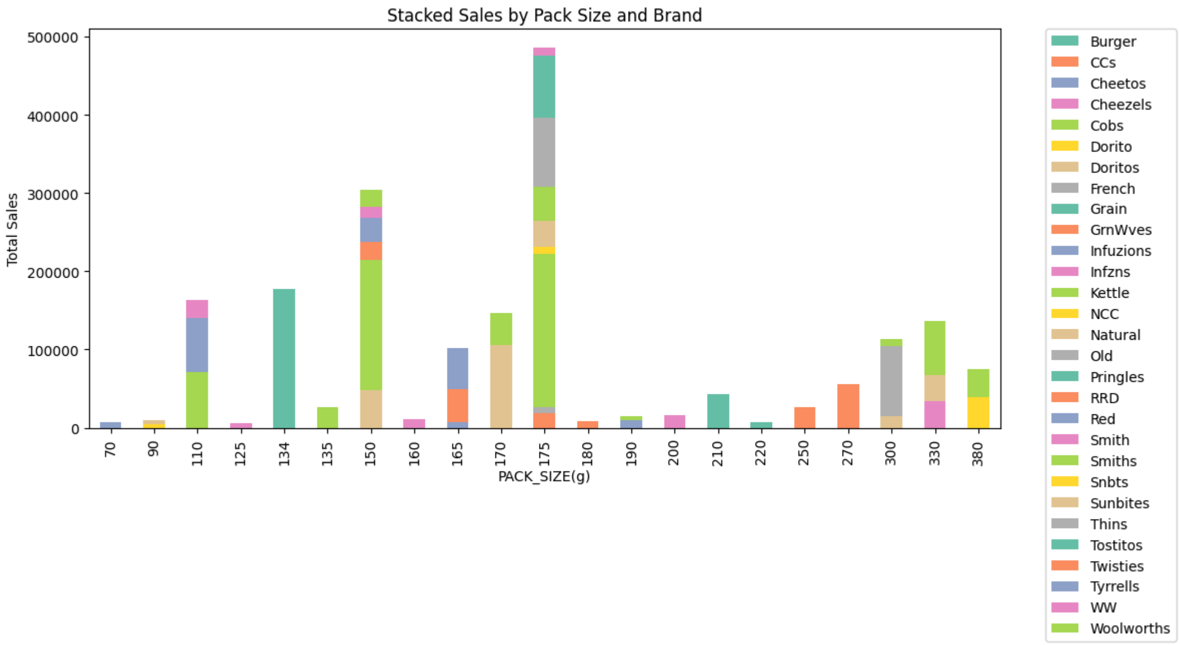
In [36]:

```
s= df_complete.groupby(["PACK_SIZE(g)","BRAND_NAME"])['TOT_SALES'].sum()
```

In [37]:

```
s_unstacked = s.unstack()   # columns = BRAND_NAME, index = PACK_SIZE(g)

colors = sns.color_palette("Set2", n_colors=s_unstacked.shape[1])
s_unstacked.plot(kind="bar", stacked=True, figsize=(12,6), color = colors)
plt.title("Stacked Sales by Pack Size and Brand")
plt.ylabel("Total Sales")
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', borderaxespad=0.)
plt.tight_layout()
plt.show()
```



In [ ]:

In [38]:

```
df_complete.head()
```

Out[38]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget

Q. RECOGNISING TOP BEST AND WORST PERFORMING STORES FOR THE YEAR.

In [39]:

```
top_20_store = df_complete.groupby('STORE_NBR')['TOT_SALES'].sum().sort_values(ascending = False)[:20]
```

In [40]:

```
least_sale_stores =  df_complete.groupby('STORE_NBR')['TOT_SALES'].sum().sort_values()[:20]
least_sale_stores
```

Out[40]:

```
STORE_NBR
211      5.20
76       6.00
11       6.70
252      7.40
206      7.60
92       9.20
193     13.10
85      13.90
31      14.80
117    161.80
177    211.20
99     221.90
140    244.90
198    252.70
42     257.80
146    275.10
267    275.40
263    300.50
244    331.75
161    335.20
Name: TOT_SALES, dtype: float64
```

In [41]:

```
df_complete.groupby('STORE_NBR')['TOT_SALES'].mean().sort_values(ascending = False)
```

Out[41]:

```
STORE_NBR
92     9.200000
96     8.862020
174    8.837452
246    8.834125
26     8.822744
         ...
266    3.653459
117    3.517391
99     3.467188
11     3.350000
211    2.600000
Name: TOT_SALES, Length: 272, dtype: float64
```

In [42]:

```
top_20_store
```

Out[42]:

```
STORE_NBR
226    17605.45
88     16333.25
165    15973.75
40     15559.50
237    15539.50
58     15251.45
199    14797.00
4      14647.65
203    14551.60
26     14469.30
81     14361.95
201    14298.70
130    14289.65
72     14204.40
181    14108.45
217    13993.60
95     13915.50
261    13859.75
238    13708.40
210    13689.25
Name: TOT_SALES, dtype: float64
```

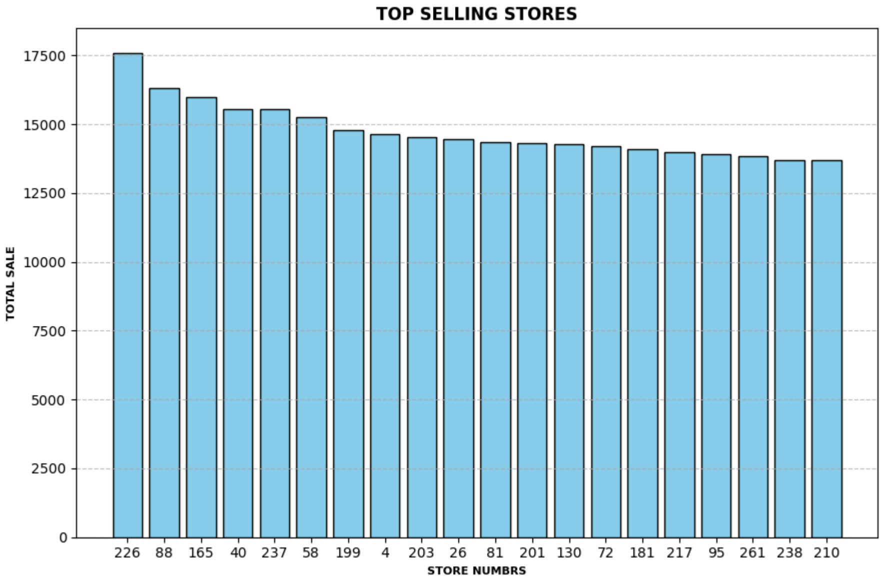
THE AVERAGE SALE IS NOT VERY DIFFERENT FOR THE STORES. HENCE SIMILAR ORDER VALUE IN EACH ORDER BUT FREQUENCY OF ORDER IS WAY MORE IN SOME STORES SHOWN BY TOTAL SALES.

In [43]:

```
#PLOTTING TOP 20 STORES BASED ON SALES-
plt.figure(figsize = (9, 6))

plt.bar(top_20_store.index.astype(str), top_20_store.values, color="skyblue", edgecolor="black")
plt.xticks(top_20_store.index.astype(str), rotation = 'horizontal')
plt.xlabel("STORE NUMBRS", fontsize = 8, fontweight = 'bold')
plt.ylabel("TOTAL SALE", fontsize = 8, fontweight = 'bold')
plt.title("TOP SELLING STORES", fontsize = 12, fontweight = 'bold')
plt.grid(axis="y", linestyle="--", alpha=0.7)

plt.tight_layout()
plt.show()
```

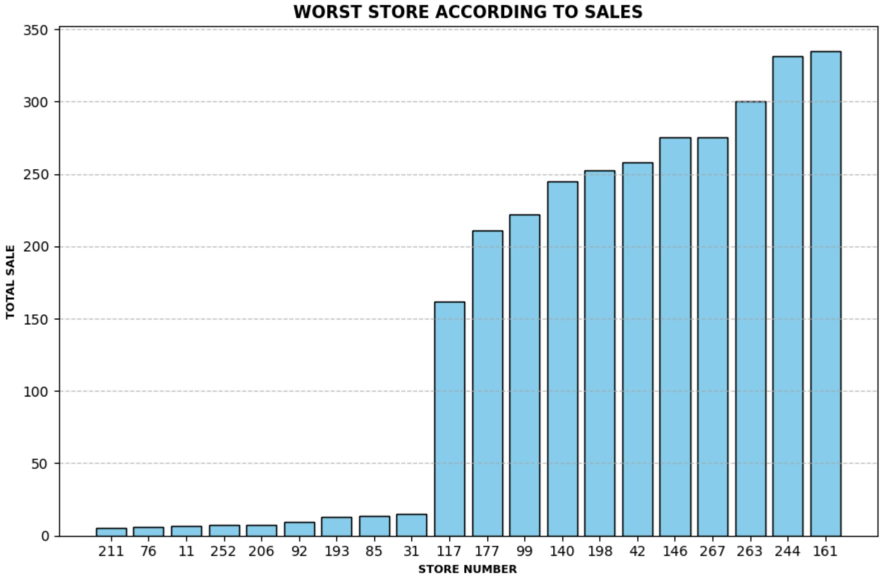


In [44]:

```
#PLOTTING worst 20 STORES BASED ON SALES-
plt.figure(figsize = (9, 6))

plt.bar(least_sale_stores.index.astype(str), least_sale_stores.values, color="skyblue", edgecolor="black")
plt.xticks(least_sale_stores.index.astype(str), rotation = 'horizontal')
plt.xlabel("STORE NUMBER", fontsize = 8, fontweight = 'bold')
plt.ylabel("TOTAL SALE", fontsize = 8, fontweight = 'bold')
plt.title("WORST STORE ACCORDING TO SALES", fontsize = 12, fontweight = 'bold')
plt.grid(axis="y", linestyle="--", alpha=0.7)

plt.tight_layout()
plt.show()
```



THESE WORST 20 STORES HAVE MINIMAL SALES AND BOTTOM 9 STORE HAVE ONLY 2-3 TRANSACTIONS WHICH COULD BE CLOSED TO CUT DOWN ON COST AND TOP 20 STORES MUST BE PUSHED FOR SALE OF NEW PRODUCTS

In [45]:
```
df_complete.head()
```

Out[45]:

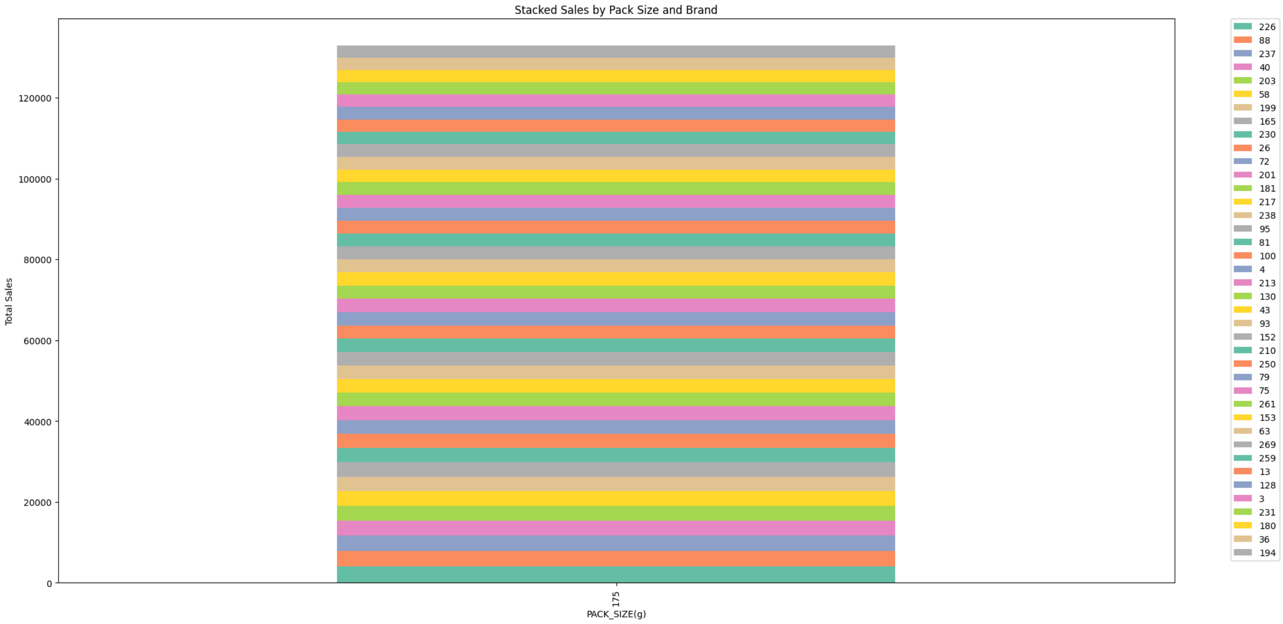
	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget

Q. TOP 40 SELLING PACK SIZE AND ITS PLOT

In [46]:
```
store_pack_analysis = df_complete.groupby(['PACK_SIZE(g)','STORE_NBR'])['TOT_SALES'].sum().sort_values(ascending = False)[:40]
```

In [47]:
```
store_and_pack= store_pack_analysis.unstack()   # columns = BRAND_NAME, index = PACK_SIZE(g)

colors = sns.color_palette("Set2", n_colors=store_and_pack.shape[1])
store_and_pack.plot(kind="bar", stacked=True, figsize=(20,10), color = colors)
plt.title("Stacked Sales by Pack Size and Brand")
plt.ylabel("Total Sales")
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', borderaxespad=0.)
plt.tight_layout()
plt.show()
```



HENCE THE TOP PRODUCT AMONG THE STORES IS 175g PACK.

Q. WHICH LIFESTAGE CUSTOMERS SPENS THE MOST AND IN WHAT TYPE OF PRODUCTS THEY SPEND MOST.

In [48]:
```
df_complete
```

Out[48]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
...	...	...	...	...	...	...	...	...	...	...	...	...
264829	2019-03-11	272	272319	270088	89	Kettle Sweet Chilli And Sour Cream 175g	2	10.8	175	Kettle	YOUNG SINGLES/COUPLES	Premium
264830	2018-08-15	272	272358	270154	74	Tostitos Splash Of Lime 175g	1	4.4	175	Tostitos	YOUNG SINGLES/COUPLES	Premium
264831	2018-11-08	272	272379	270187	51	Doritos Mexicana 170g	2	8.8	170	Doritos	YOUNG SINGLES/COUPLES	Premium
264832	2018-12-29	272	272379	270188	42	Doritos Corn Chip Mexican Jalapeno 150g	2	7.8	150	Doritos	YOUNG SINGLES/COUPLES	Premium
264833	2018-09-24	272	272380	270189	74	Tostitos Splash Of Lime 175g	2	8.8	175	Tostitos	YOUNG SINGLES/COUPLES	Premium

264834 rows × 12 columns

In [49]:
```
df_complete.groupby('LIFESTAGE')['TOT_SALES'].sum()
```

Out[49]:
```
LIFESTAGE
MIDAGE SINGLES/COUPLES    184751.30
NEW FAMILIES               50433.45
OLDER FAMILIES            352467.20
OLDER SINGLES/COUPLES     402426.75
RETIREES                  366470.90
YOUNG FAMILIES            316160.10
YOUNG SINGLES/COUPLES     260405.30
Name: TOT_SALES, dtype: float64
```

In [50]:
```
lifestage_brand =df_complete.groupby(['LIFESTAGE', 'BRAND_NAME'])['TOT_SALES'].sum().reset_index()
```

In [51]:
```
lifestage_brand[lifestage_brand['LIFESTAGE']=='NEW FAMILIES'].sort_values(by = 'TOT_SALES', ascending = False)
```

Out[51]:

	LIFESTAGE	BRAND_NAME	TOT_SALES
41	NEW FAMILIES	Kettle	10846.20
35	NEW FAMILIES	Doritos	5604.80
49	NEW FAMILIES	Smiths	4929.40
45	NEW FAMILIES	Pringles	4898.80
44	NEW FAMILIES	Old	2371.50
52	NEW FAMILIES	Thins	2326.50
53	NEW FAMILIES	Tostitos	2288.00
33	NEW FAMILIES	Cobs	2059.60
39	NEW FAMILIES	Infuzions	2038.60
54	NEW FAMILIES	Twisties	1998.90
55	NEW FAMILIES	Tyrrells	1486.80
46	NEW FAMILIES	RRD	1320.60
37	NEW FAMILIES	Grain	1256.40
34	NEW FAMILIES	Dorito	1088.75
32	NEW FAMILIES	Cheezels	998.10
56	NEW FAMILIES	WW	783.20
43	NEW FAMILIES	Natural	696.00
47	NEW FAMILIES	Red	664.20
40	NEW FAMILIES	Infzns	657.40
48	NEW FAMILIES	Smith	364.00
30	NEW FAMILIES	CCs	352.80
31	NEW FAMILIES	Cheetos	325.30
57	NEW FAMILIES	Woolworths	254.40
36	NEW FAMILIES	French	168.00
38	NEW FAMILIES	GrnWves	167.40
29	NEW FAMILIES	Burger	161.00
42	NEW FAMILIES	NCC	150.00
50	NEW FAMILIES	Snbts	91.80
51	NEW FAMILIES	Sunbites	85.00

In [52]:
```
df_complete['LIFESTAGE'].unique()
```

Out[52]:
```
array(['YOUNG SINGLES/COUPLES', 'MIDAGE SINGLES/COUPLES', 'NEW FAMILIES',
       'OLDER FAMILIES', 'OLDER SINGLES/COUPLES', 'RETIREES',
       'YOUNG FAMILIES'], dtype=object)
```

In [53]:
```
top_10_per_stage = (
    lifestage_brand
    .sort_values(by="TOT_SALES", ascending=False)
    .groupby("LIFESTAGE")
    .head(10)
)
top_10_per_stage
```

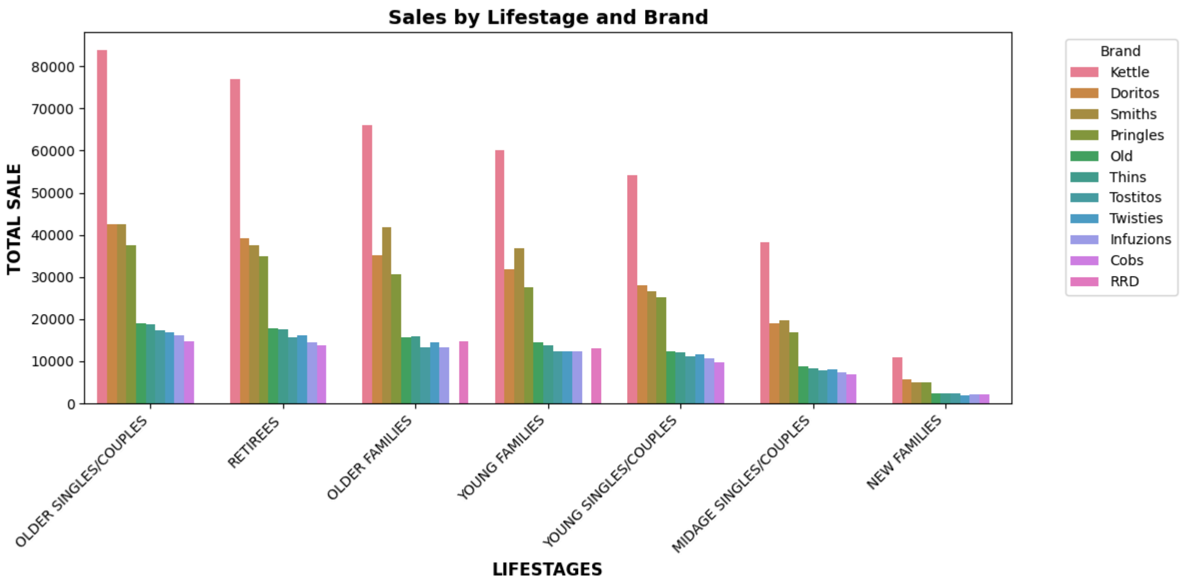
Out[53]:

	LIFESTAGE	BRAND_NAME	TOT_SALES
99	OLDER SINGLES/COUPLES	Kettle	83862.6
128	RETIREES	Kettle	76914.8
70	OLDER FAMILIES	Kettle	65984.0
157	YOUNG FAMILIES	Kettle	60033.0
186	YOUNG SINGLES/COUPLES	Kettle	54241.0
...	...	...	...
52	NEW FAMILIES	Thins	2326.5
53	NEW FAMILIES	Tostitos	2288.0
33	NEW FAMILIES	Cobs	2059.6
39	NEW FAMILIES	Infuzions	2038.6
54	NEW FAMILIES	Twisties	1998.9

70 rows × 3 columns

In [54]:

```
plt.figure(figsize=(12,6))
sns.barplot(
    data=top_10_per_stage,
    x="LIFESTAGE",
    y="TOT_SALES",
    hue="BRAND_NAME",
    estimator=sum
)
plt.title("Sales by Lifestage and Brand", fontsize=14, fontweight="bold")
plt.xticks(rotation=45, ha="right")
plt.xlabel("LIFESTAGES", fontsize=12, fontweight="bold")
plt.ylabel("TOTAL SALE", fontsize=12, fontweight="bold")
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', title="Brand")
plt.tight_layout()
plt.show()
```



In [55]:

```
df_complete
```

Out[55]:

	DATE	STORE_NBR	LYLTY_CARD_NBR	TXN_ID	PROD_NBR	PROD_NAME	PROD_QTY	TOT_SALES	PACK_SIZE(g)	BRAND_NAME	LIFESTAGE	PREMIUM_CUSTOMER
0	2018-10-19	1	1000	1	5	Natural Chip Compny SeaSalt175g	2	6.0	175	Natural	YOUNG SINGLES/COUPLES	Premium
1	2019-05-16	1	1307	348	66	CCs Nacho Cheese 175g	3	6.3	175	CCs	MIDAGE SINGLES/COUPLES	Budget
2	2019-05-22	1	1343	383	61	Smiths Crinkle Cut Chips Chicken 170g	2	2.9	170	Smiths	MIDAGE SINGLES/COUPLES	Budget
3	2018-08-19	2	2373	974	69	Smiths Chip Thinly S/Cream&Onion 175g	5	15.0	175	Smiths	MIDAGE SINGLES/COUPLES	Budget
4	2018-08-20	2	2426	1038	108	Kettle Tortilla ChpsHny&Jlpno Chili 150g	3	13.8	150	Kettle	MIDAGE SINGLES/COUPLES	Budget
...	...	...	...	...	...	...	...	...	...	...	...	...
264829	2019-03-11	272	272319	270088	89	Kettle Sweet Chilli And Sour Cream 175g	2	10.8	175	Kettle	YOUNG SINGLES/COUPLES	Premium
264830	2018-08-15	272	272358	270154	74	Tostitos Splash Of Lime 175g	1	4.4	175	Tostitos	YOUNG SINGLES/COUPLES	Premium
264831	2018-11-08	272	272379	270187	51	Doritos Mexicana 170g	2	8.8	170	Doritos	YOUNG SINGLES/COUPLES	Premium
264832	2018-12-29	272	272379	270188	42	Doritos Corn Chip Mexican Jalapeno 150g	2	7.8	150	Doritos	YOUNG SINGLES/COUPLES	Premium
264833	2018-09-24	272	272380	270189	74	Tostitos Splash Of Lime 175g	2	8.8	175	Tostitos	YOUNG SINGLES/COUPLES	Premium

264834 rows × 12 columns

ANALYSIS BY THE CUSTOMER TYPE

In [56]:

```
customer_brand =df_complete.groupby(['PREMIUM_CUSTOMER', 'BRAND_NAME'])['TOT_SALES'].sum().reset_index()
customer_brand
```

Out[56]:

	PREMIUM_CUSTOMER	BRAND_NAME	TOT_SALES
0	Budget	Burger	2527.7
1	Budget	CCs	6657.0
2	Budget	Cheetos	6071.6
3	Budget	Cheezels	13983.9
4	Budget	Cobs	23780.4
...	...	...	...
82	Premium	Tostitos	21128.8
83	Premium	Twisties	21123.1
84	Premium	Tyrrells	13377.0
85	Premium	WW	9914.6
86	Premium	Woolworths	3712.5

87 rows × 3 columns

In [57]:

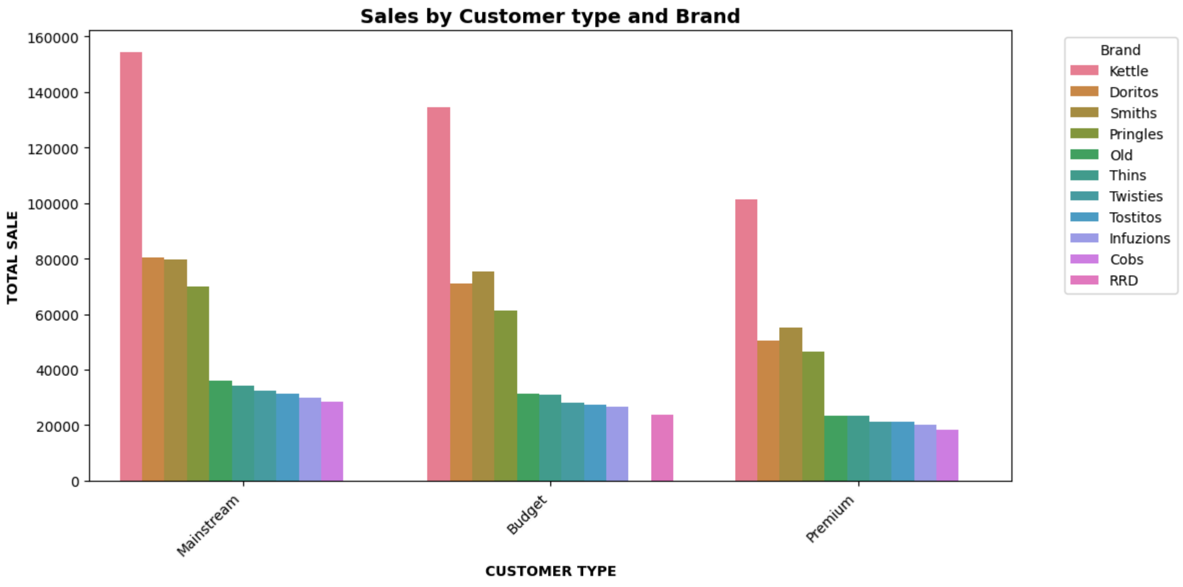
```
top_10_per_customer = (
    customer_brand
    .sort_values(by="TOT_SALES", ascending=False)
    .groupby('PREMIUM_CUSTOMER')
    .head(10)
)
top_10_per_customer
```

Out[57]:

	PREMIUM_CUSTOMER	BRAND_NAME	TOT_SALES
41	Mainstream	Kettle	154477.0
12	Budget	Kettle	134407.8
70	Premium	Kettle	101355.0
35	Mainstream	Doritos	80272.9
49	Mainstream	Smiths	79560.0
20	Budget	Smiths	75219.0
6	Budget	Doritos	70893.0
45	Mainstream	Pringles	69785.7
16	Budget	Pringles	61201.7
78	Premium	Smiths	55297.8
64	Premium	Doritos	50373.0
74	Premium	Pringles	46668.1
44	Mainstream	Old	36148.8
52	Mainstream	Thins	34326.6
54	Mainstream	Twisties	32439.0
53	Mainstream	Tostitos	31407.2
15	Budget	Old	31298.7
23	Budget	Thins	31066.2
39	Mainstream	Infuzions	29746.4
33	Mainstream	Cobs	28363.2
25	Budget	Twisties	27960.0
24	Budget	Tostitos	27253.6
10	Budget	Infuzions	26501.0
17	Budget	RRD	23874.6
81	Premium	Thins	23459.7
73	Premium	Old	23337.6
82	Premium	Tostitos	21128.8
83	Premium	Twisties	21123.1
68	Premium	Infuzions	20000.2
62	Premium	Cobs	18426.2

In [58]:

```
plt.figure(figsize=(12,6))
sns.barplot(
    data=top_10_per_customer,
    x="PREMIUM_CUSTOMER",
    y="TOT_SALES",
    hue="BRAND_NAME",
    estimator=sum
)
plt.title("Sales by Customer type and Brand", fontsize=14, fontweight="bold")
plt.xticks(rotation=45, ha="right")
plt.xlabel("CUSTOMER TYPE", fontsize=10, fontweight="bold")
plt.ylabel("TOTAL SALE", fontsize=10, fontweight="bold")
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', title="Brand")
plt.tight_layout()
plt.show()
```



In [59]:

```
customer_brand_avg =df_complete.groupby(['PREMIUM_CUSTOMER', 'BRAND_NAME'])['TOT_SALES'].mean().reset_index()
customer_brand_avg
```

Out[59]:

	PREMIUM_CUSTOMER	BRAND_NAME	TOT_SALES
0	Budget	Burger	4.365630
1	Budget	CCs	3.964860
2	Budget	Cheetos	5.776974
3	Budget	Cheezels	8.600185
4	Budget	Cobs	7.263409
...	...	...	...
82	Premium	Tostitos	8.458287
83	Premium	Twisties	8.657008
84	Premium	Tyrrells	8.039062
85	Premium	WW	3.475149
86	Premium	Woolworths	3.030612

87 rows × 3 columns

In [60]:

```
top_10_per_customer_avg = (
    customer_brand_avg
    .sort_values(by="TOT_SALES", ascending=False)
    .groupby('PREMIUM_CUSTOMER')
    .head(10)
)
top_10_per_customer_avg
```

Out[60]:

	PREMIUM_CUSTOMER	BRAND_NAME	TOT_SALES
5	Budget	Dorito	12.375237
34	Mainstream	Dorito	12.263368
63	Premium	Dorito	12.148455
15	Budget	Old	9.771683
73	Premium	Old	9.740234
44	Mainstream	Old	9.704376
12	Budget	Kettle	9.496100
70	Premium	Kettle	9.462702
41	Mainstream	Kettle	9.406138
32	Mainstream	Cheezels	8.820346
25	Budget	Twisties	8.659028
83	Premium	Twisties	8.657008
61	Premium	Cheezels	8.649517
3	Budget	Cheezels	8.600185
54	Mainstream	Twisties	8.570410
82	Premium	Tostitos	8.458287
24	Budget	Tostitos	8.422002
53	Mainstream	Tostitos	8.404389
6	Budget	Doritos	8.090961
35	Mainstream	Doritos	8.076557
26	Budget	Tyrrells	8.061321
64	Premium	Doritos	8.045520
84	Premium	Tyrrells	8.039062
55	Mainstream	Tyrrells	7.965854
49	Mainstream	Smiths	7.375545
33	Mainstream	Cobs	7.293186
62	Premium	Cobs	7.283083
11	Budget	Infzns	7.283037
69	Premium	Infzns	7.269767
4	Budget	Cobs	7.263409

EVEN PREMIUM CUSTOMERS HAVE AVERAGE SALES COMPARABLE TO BUDGET OR MAINSTREAM CUSTOMERS AND IN TERMS OF TOTAL SALE THE PREMIUM CUSTOMER ARE EVEN LESS IN TERMS OF SALE. PACK SIZE IS ALSO NOT BIG DIFFERENTITOR THE 175g PACK OVERPOWERS ALL OTHER CATEGORIES