A. Importing the libraries and Dataset

Importing the Libraries

```
# importing the required libraries for calculation

import numpy as np
import pandas as pd

# importing the required libraries for visualisation

import matplotlib.pyplot as plt
import seaborn as sns

# importing the required libraries for prediction

from sklearn.metrics import accuracy_score
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
```

Importing the Dataset

```
data = pd.read_csv ("Downloads\cereal.csv")
```

Copying the dataset for further Analysis

```
brk_cr = data.copy()
brk_cr
```

```
                          name mfr type  calories  protein  fat  sodium
fiber  \
0                    100% Bran   N    C        70        4    1     130
10.0
1            100% Natural Bran   Q    C       120        3    5      15
2.0
2                     All-Bran   K    C        70        4    1     260
9.0
3   All-Bran with Extra Fiber   K    C        50        4    0     140
14.0
4              Almond Delight   R    C       110        2    2     200
1.0
..                        ...  ..  ...       ...      ...  ...     ...
...
72                    Triples   G    C       110        2    1     250
0.0
73                       Trix   G    C       110        1    1     140
0.0
74                 Wheat Chex   R    C       100        3    1     230
3.0
75                   Wheaties   G    C       100        3    1     200
3.0
```

```
76        Wheaties Honey Gold   G    C       110        2    1     200
1.0

    carbo  sugars  potass  vitamins  shelf  weight  cups     rating
0     5.0       6     280        25      3     1.0  0.33  68.402973
1     8.0       8     135         0      3     1.0  1.00  33.983679
2     7.0       5     320        25      3     1.0  0.33  59.425505
3     8.0       0     330        25      3     1.0  0.50  93.704912
4    14.0       8      -1        25      3     1.0  0.75  34.384843
..    ...     ...     ...       ...    ...     ...   ...        ...
72   21.0       3      60        25      3     1.0  0.75  39.106174
73   13.0      12      25        25      2     1.0  1.00  27.753301
74   17.0       3     115        25      1     1.0  0.67  49.787445
75   17.0       3     110        25      1     1.0  1.00  51.592193
76   16.0       8      60        25      1     1.0  0.75  36.187559

[77 rows x 16 columns]
```

Exploring the Data

```
# Finding the total records and features provided in the dataset

brk_cr.shape
```

```
(77, 16)
```

```
# Memory storage used for each column

brk_cr.memory_usage(index = False,deep = True)
```

```
name        5531
mfr         4466
type        4466
calories     616
protein      616
fat          616
sodium       616
fiber        616
carbo        616
sugars       616
potass       616
vitamins     616
shelf        616
weight       616
cups         616
rating       616
dtype: int64
```

```
# Getting information regarding all columns

brk_cr.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 77 entries, 0 to 76
Data columns (total 16 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   name      77 non-null     object
 1   mfr       77 non-null     object
 2   type      77 non-null     object
 3   calories  77 non-null     int64
 4   protein   77 non-null     int64
 5   fat       77 non-null     int64
 6   sodium    77 non-null     int64
 7   fiber     77 non-null     float64
 8   carbo     77 non-null     float64
 9   sugars    77 non-null     int64
 10  potass    77 non-null     int64
 11  vitamins  77 non-null     int64
 12  shelf     77 non-null     int64
 13  weight    77 non-null     float64
 14  cups      77 non-null     float64
 15  rating    77 non-null     float64
dtypes: float64(5), int64(8), object(3)
memory usage: 9.8+ KB
```

```
# Gettinng statistical information of all numeric features of dataset

brk_cr.describe()
```

```
         calories    protein        fat      sodium      fiber
carbo  \
count   77.000000  77.000000  77.000000   77.000000  77.000000
77.000000
mean   106.883117   2.545455   1.012987  159.675325   2.151948
14.597403
std     19.484119   1.094790   1.006473   83.832295   2.383364
4.278956
min     50.000000   1.000000   0.000000    0.000000   0.000000  -
1.000000
25%    100.000000   2.000000   0.000000  130.000000   1.000000
12.000000
50%    110.000000   3.000000   1.000000  180.000000   2.000000
14.000000
75%    110.000000   3.000000   2.000000  210.000000   3.000000
17.000000
max    160.000000   6.000000   5.000000  320.000000  14.000000
23.000000

          sugars      potass    vitamins      shelf     weight
cups  \
count  77.000000   77.000000   77.000000  77.000000  77.000000
```

```
77.000000
mean    6.922078   96.077922   28.246753   2.207792   1.029610
0.821039
std     4.444885   71.286813   22.342523   0.832524   0.150477
0.232716
min    -1.000000   -1.000000    0.000000   1.000000   0.500000
0.250000
25%     3.000000   40.000000   25.000000   1.000000   1.000000
0.670000
50%     7.000000   90.000000   25.000000   2.000000   1.000000
0.750000
75%    11.000000  120.000000   25.000000   3.000000   1.000000
1.000000
max    15.000000  330.000000  100.000000   3.000000   1.500000
1.500000
```

```
          rating
count  77.000000
mean   42.665705
std    14.047289
min    18.042851
25%    33.174094
50%    40.400208
75%    50.828392
max    93.704912
```

B. Data Cleaning and Data Wrangling

Checking for Null Value

```
brk_cr.isnull().sum()
```

```
name        0
mfr         0
type        0
calories    0
protein     0
fat         0
sodium      0
fiber       0
carbo       0
sugars      0
potass      0
vitamins    0
shelf       0
weight      0
cups        0
rating      0
dtype: int64
```

-- There is No missing values in the dataset

Changing the Values

```
#Changing the values in column 'mfr' into their expanded form Using
replace function

brk_cr.mfr = brk_cr.mfr.replace ({'A':'American Home Food
Products','G':'General Mills','K':'Kelloggs','N':'Nabisco',
                          'P':'Post','Q':'Quaker Oats','R':'Ralston
Purina'})

# Changing the values in column 'type' into their expanded form using
replace function

brk_cr.type = brk_cr.type.replace({'C':'Cold','H':'Hot'})

brk_cr.head(5)
```

```
                        name             mfr  type  calories  protein
fat  \
0                  100% Bran         Nabisco  Cold        70        4
1
1          100% Natural Bran     Quaker Oats  Cold       120        3
5
2                   All-Bran        Kelloggs  Cold        70        4
1
3  All-Bran with Extra Fiber        Kelloggs  Cold        50        4
0
4             Almond Delight  Ralston Purina  Cold       110        2
2

   sodium  fiber  carbo  sugars  potass  vitamins  shelf  weight  cups
\
0     130   10.0    5.0       6     280        25      3     1.0  0.33

1      15    2.0    8.0       8     135         0      3     1.0  1.00

2     260    9.0    7.0       5     320        25      3     1.0  0.33

3     140   14.0    8.0       0     330        25      3     1.0  0.50

4     200    1.0   14.0       8      -1        25      3     1.0  0.75


      rating
0  68.402973
1  33.983679
2  59.425505
3  93.704912
4  34.384843
```

Adding the new Columns

```
# Defining function for calculating the percentage of fat in calorie

def perc(a,b):
    return round((a/b)*100,2)

#Creating new column and applying function

brk_cr['perc_fat_in_calorie'] = brk_cr.apply(lambda X: perc(X['fat'],
X['calories']), axis = 1)

# Defining function for creating sodium levels

def sod(a):
    if a>= 500:
        return 'High'
    elif a <= 140:
        return 'Low'
    elif a == 0:
        return 'No Sodium'
    else:
        return 'Good'

# Applying the def to new column

brk_cr['sodium_status'] = brk_cr['sodium'].apply(sod)

# Defining function for finding the levels of fiber source

def fib(a):
    if a > 4.9:
        return 'Excellent'
    elif a < 2.4:
        return 'Good'
    else:
        return 'Average'

# Applying the def to new column

brk_cr['fiber_source'] = brk_cr['fiber'].apply(fib)

# Defining function for creating pottasium content

def pott(a):
    if a > 500:
        return 'High'
    elif (a < 500) and (a > 300):
        return 'Safe'
    else:
        return 'Low'
```

```
# Applying the def to new column

brk_cr['Potass_status'] = brk_cr['potass'].apply(pott)
brk_cr
```

```
                         name             mfr  type  calories  protein
fat  \
0                   100% Bran         Nabisco  Cold        70        4
1
1           100% Natural Bran     Quaker Oats  Cold       120        3
5
2                    All-Bran        Kelloggs  Cold        70        4
1
3   All-Bran with Extra Fiber        Kelloggs  Cold        50        4
0
4              Almond Delight  Ralston Purina  Cold       110        2
2
..                        ...             ...   ...       ...      ...
...
72                   Triples   General Mills  Cold       110        2
1
73                      Trix   General Mills  Cold       110        1
1
74                Wheat Chex  Ralston Purina  Cold       100        3
1
75                  Wheaties   General Mills  Cold       100        3
1
76        Wheaties Honey Gold   General Mills  Cold       110        2
1

    sodium  fiber  carbo  sugars  potass  vitamins  shelf  weight
cups  \
0      130   10.0    5.0       6     280        25      3     1.0
0.33
1       15    2.0    8.0       8     135         0      3     1.0
1.00
2      260    9.0    7.0       5     320        25      3     1.0
0.33
3      140   14.0    8.0       0     330        25      3     1.0
0.50
4      200    1.0   14.0       8      -1        25      3     1.0
0.75
..     ...    ...    ...     ...     ...       ...    ...     ...   ..
.
72     250    0.0   21.0       3      60        25      3     1.0
0.75
73     140    0.0   13.0      12      25        25      2     1.0
1.00
74     230    3.0   17.0       3     115        25      1     1.0
0.67
```

```
75     200    3.0   17.0       3     110        25      1     1.0
1.00
76     200    1.0   16.0       8      60        25      1     1.0
0.75

       rating  perc_fat_in_calorie sodium_status fiber_source
Potass_status
0   68.402973                 1.43           Low    Excellent
Low
1   33.983679                 4.17           Low         Good
Low
2   59.425505                 1.43          Good    Excellent
Safe
3   93.704912                 0.00           Low    Excellent
Safe
4   34.384843                 1.82          Good         Good
Low
..        ...                  ...           ...          ...
...
72  39.106174                 0.91          Good         Good
Low
73  27.753301                 0.91           Low         Good
Low
74  49.787445                 1.00          Good      Average
Low
75  51.592193                 1.00          Good      Average
Low
76  36.187559                 0.91          Good         Good
Low

[77 rows x 20 columns]
```

C. Analysis and Visualisation

>Statistical Information of Data

```
brk_cr.describe().transpose()

                     count        mean        std        min
25%  \
calories              77.0  106.883117  19.484119  50.000000
100.000000
protein               77.0    2.545455   1.094790   1.000000
2.000000
fat                   77.0    1.012987   1.006473   0.000000
0.000000
sodium                77.0  159.675325  83.832295   0.000000
130.000000
fiber                 77.0    2.151948   2.383364   0.000000
1.000000
```

```
carbo                  77.0   14.597403   4.278956  -1.000000
12.000000
sugars                 77.0    6.922078   4.444885  -1.000000
3.000000
potass                 77.0   96.077922  71.286813  -1.000000
40.000000
vitamins               77.0   28.246753  22.342523   0.000000
25.000000
shelf                  77.0    2.207792   0.832524   1.000000
1.000000
weight                 77.0    1.029610   0.150477   0.500000
1.000000
cups                   77.0    0.821039   0.232716   0.250000
0.670000
rating                 77.0   42.665705  14.047289  18.042851
33.174094
perc_fat_in_calorie    77.0    0.890519   0.844767   0.000000
0.000000

                            50%         75%         max
calories             110.000000  110.000000  160.000000
protein                3.000000    3.000000    6.000000
fat                    1.000000    2.000000    5.000000
sodium               180.000000  210.000000  320.000000
fiber                  2.000000    3.000000   14.000000
carbo                 14.000000   17.000000   23.000000
sugars                 7.000000   11.000000   15.000000
potass                90.000000  120.000000  330.000000
vitamins              25.000000   25.000000  100.000000
shelf                  2.000000    3.000000    3.000000
weight                 1.000000    1.000000    1.500000
cups                   0.750000    1.000000    1.500000
rating                40.400208   50.828392   93.704912
perc_fat_in_calorie    0.910000    1.430000    4.170000
```

>Nutritional Breakdown of a few Cereals

```
brk_cr[brk_cr.name == '100% Natural Bran']
```

```
                name          mfr  type  calories  protein  fat
sodium  \
1  100% Natural Bran  Quaker Oats  Cold       120        3    5
15

   fiber  carbo  sugars  potass  vitamins  shelf  weight  cups
rating  \
1    2.0    8.0       8     135         0      3     1.0   1.0
33.983679
```

```
   perc_fat_in_calorie sodium_status fiber_source Potass_status
1                 4.17           Low         Good           Low
```

```
brk_cr[brk_cr.name == 'All-Bran with Extra Fiber']
```

```
                        name       mfr  type  calories  protein  fat
sodium  \
3  All-Bran with Extra Fiber  Kelloggs  Cold        50        4    0
140

   fiber  carbo  sugars  potass  vitamins  shelf  weight  cups
rating  \
3   14.0    8.0       0     330        25      3     1.0   0.5
93.704912

   perc_fat_in_calorie sodium_status fiber_source Potass_status
3                 0.0           Low    Excellent          Safe
```

```
brk_cr[brk_cr.name == 'Frosted Mini-Wheats']
```

```
                    name       mfr  type  calories  protein  fat
sodium  \
26  Frosted Mini-Wheats  Kelloggs  Cold       100        3    0
0

    fiber  carbo  sugars  potass  vitamins  shelf  weight  cups
rating  \
26    3.0   14.0       7     100        25      2     1.0   0.8
58.345141

    perc_fat_in_calorie sodium_status fiber_source Potass_status
26                  0.0           Low      Average           Low
```

>Numerical Analysis and Visualisation of Data

1. Number of Cereals in the market

```
brk_cr['name'].count()
```

```
77
```

--> There are 77 Cereals available in the market for analysis

2. Who are the manufactures producing cereals

```
brk_cr['mfr'].unique()
```

```
array(['Nabisco', 'Quaker Oats', 'Kelloggs', 'Ralston Purina',
       'General Mills', 'Post', 'American Home Food Products'],
      dtype=object)
```

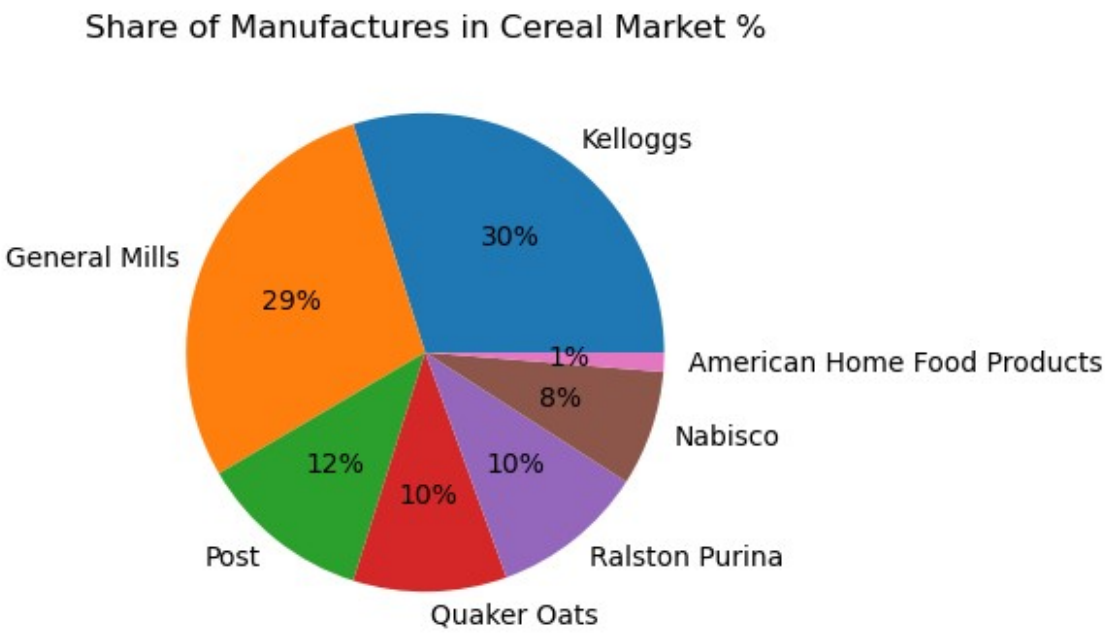
--> A total of 7 manufactures are producing cereals. Some of them are widley known and advertised brands.

3. How many products are produced by each Manufacturer

```
ag= brk_cr['mfr'].value_counts()

ag
```

```
Kelloggs                      23
General Mills                 22
Post                           9
Quaker Oats                    8
Ralston Purina                 8
Nabisco                        6
American Home Food Products    1
Name: mfr, dtype: int64
```

```
# pie chart of Manufactures producing Cereals (%)

plt.figure(figsize=(5,4))

plt.pie(ag, labels=['Kelloggs','General Mills','Post','Quaker
Oats','Ralston Purina','Nabisco','American Home Food Products'],
autopct = '%0.0f%%')
plt.title ("Share of Manufactures in Cereal Market %")

plt.savefig("1.png", bbox_inches='tight')
```



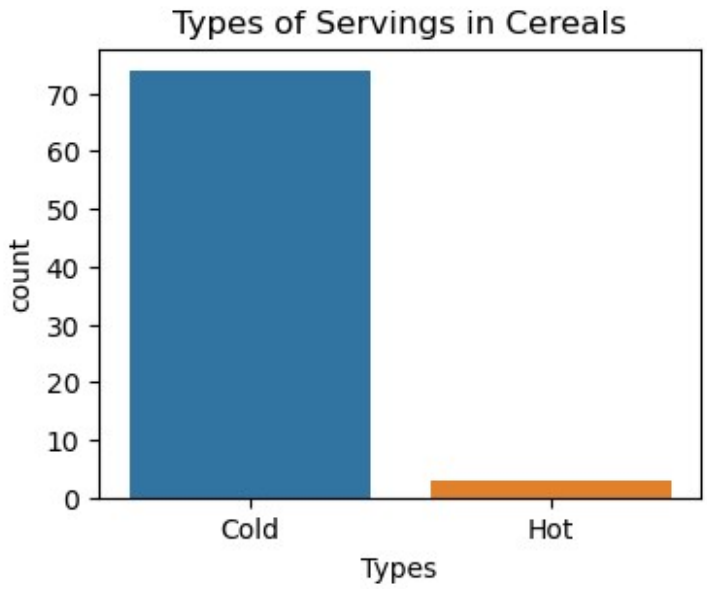
--> Out of the 7 brands, 'Kelloggs' produces the highest variety of cereals available in the market. 'General Mills' is the second in position with 22 varieties. The brand 'American Home Food Products' only presents with one cereal.

4. Number of serving types available

```
brk_cr["type"].value_counts()
```

```
Cold    74
Hot      3
Name: type, dtype: int64
```

```
# Countplot repressentation of serving types

plt.figure(figsize=(4,3))

x = sns.countplot (x = 'type', data = brk_cr )
x.set(xlabel = "Types", title = "Types of Servings in Cereals")

plt.show()

x.figure.savefig ("2.png", bbox_inches = 'tight')
```



--> 2 types of cereals are in the market.

1. Cold served
2. Hot served

The most variety is in the cold type of cereals.

```
plt.figure(figsize=(12,4))

x = sns.countplot (x = 'mfr', data = brk_cr, hue = 'type', palette =
```

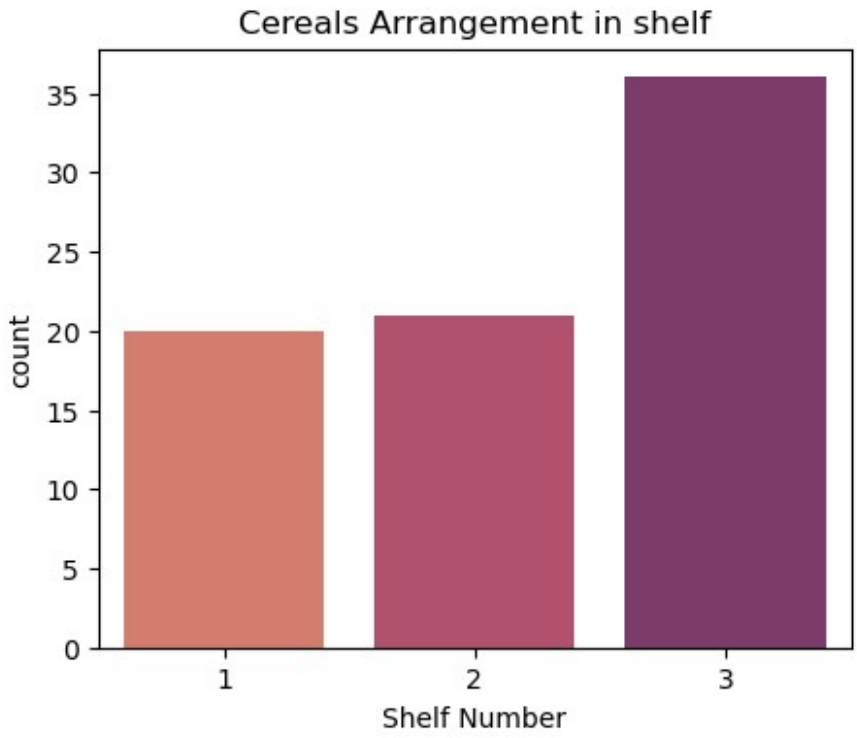
```
"BuGn_r" )
x.set(xlabel = "Manufactures", title = "Brand wise Production based on
Serving Types")

plt.show()

x.figure.savefig ("31.png", bbox_inches = 'tight')
```

5. Cereals arrangement in shelfs

```
sh = brk_cr['shelf'].value_counts()

sh
```

```
3    36
2    21
1    20
Name: shelf, dtype: int64
```

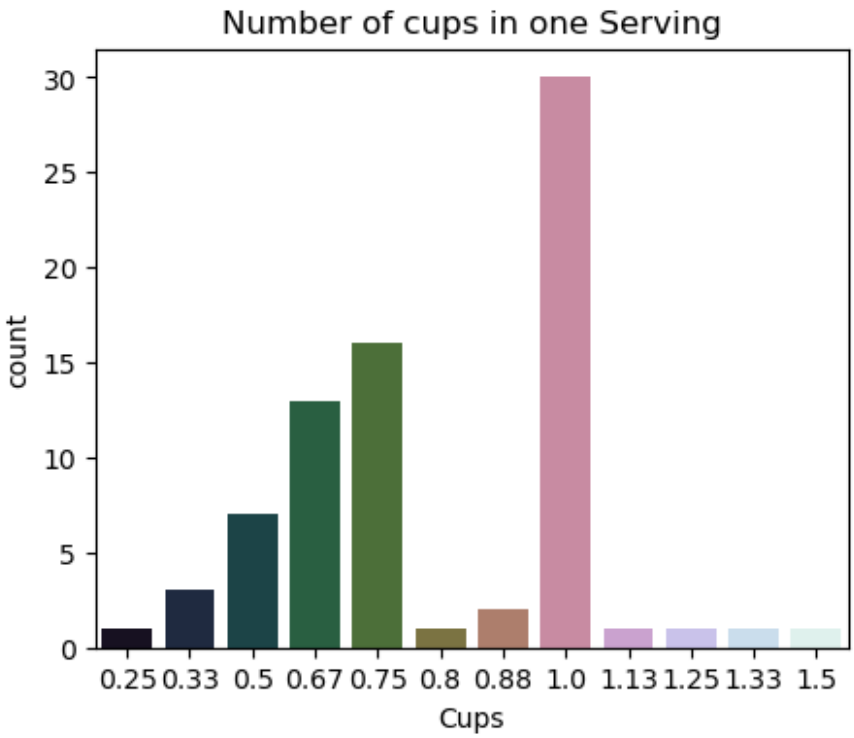
```
plt.figure(figsize =(5,4))

sns.countplot(brk_cr, x='shelf', palette = 'flare')
plt.title ("Cereals Arrangement in shelf")
plt.xlabel ("Shelf Number")


plt.savefig('3.png', bbox_inches = 'tight')
```



--> Most type of cereals are shown on the top shelf,ie, Shelf 3

6. Number of cups in one Serving

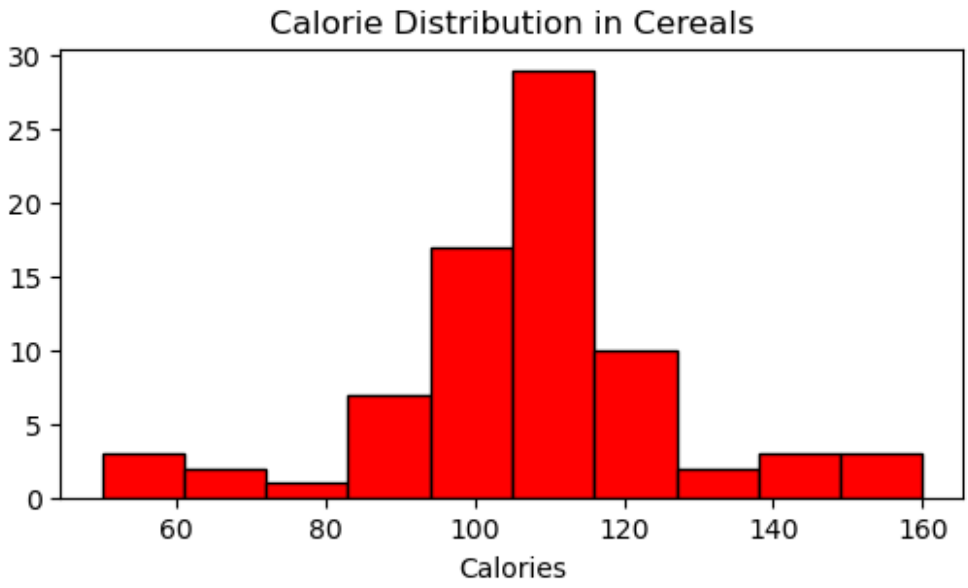
```
plt.figure(figsize =(5,4))

sns.countplot(brk_cr, x='cups', palette = 'cubehelix')
plt.title ("Number of cups in one Serving")
plt.xlabel ("Cups")


plt.savefig('4.png', bbox_inches = 'tight')
```



--> cereals are available in different packages. Packets and Containers are few of them. In this analysis, The quantity of 30 varieties of cereals are enough to be served in 1 cup each.

7. Calorie distribution in Cereals

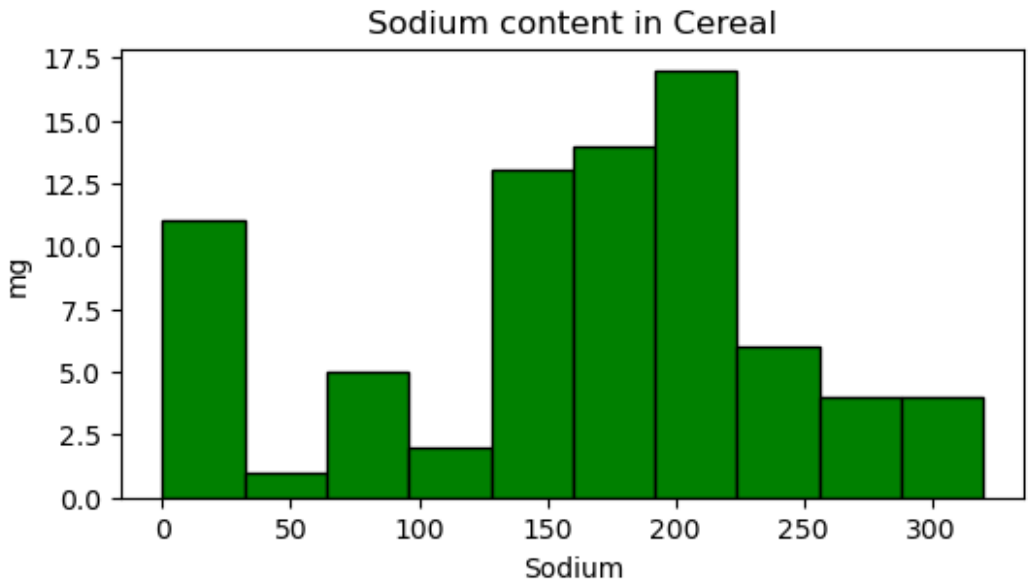
```
plt.figure(figsize=(6,3))

plt.hist(brk_cr['calories'], bins=10, color='red', edgecolor='black')

plt.xlabel('Calories')
plt.title('Calorie Distribution in Cereals')


plt.savefig("5.png", bbox_inches = 'tight')
plt.show()
```



--> There is no skweness or it's Zero Skweness in the distribution of Calories in cereals

8. Sodium content in Cereals

```
plt.figure(figsize=(6,3))

plt.hist (brk_cr['sodium'], bins= 10, color =
'green',edgecolor='black' )

plt.xlabel('Sodium')
plt.ylabel('mg')
plt.title('Sodium content in Cereal')

plt.savefig ("6.png", bbox_inches = 'tight')

plt.show()
```

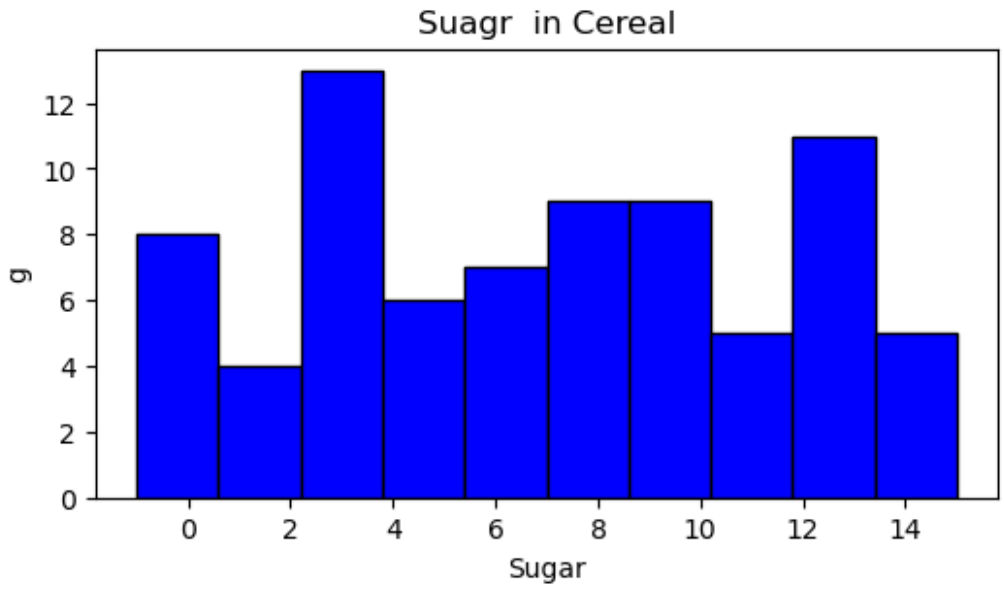


--> Right skweness

-->In the distribution of sodium in cereals, there is right skweness, which means the negative skweness.

9. Sugar in Cereals

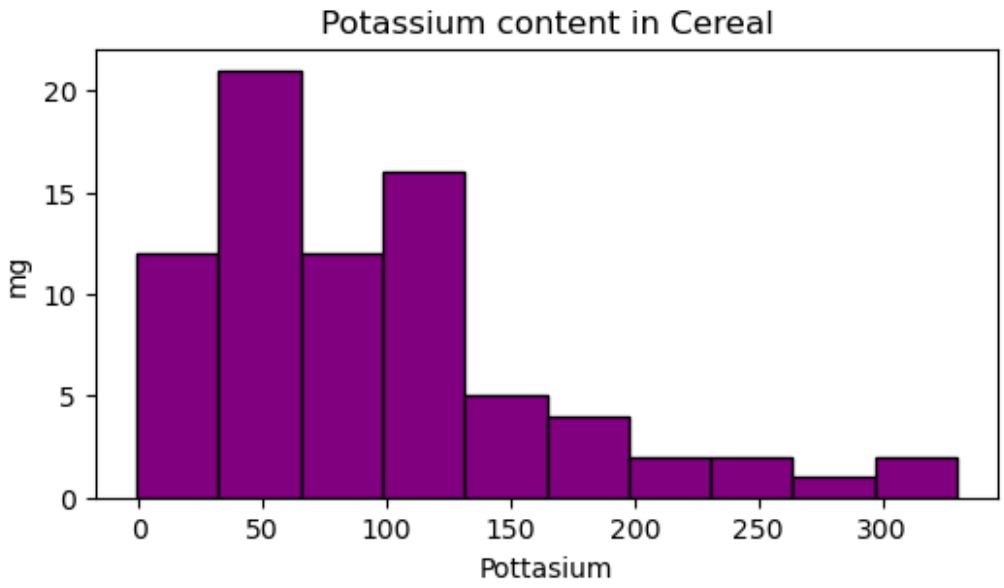
```
plt.figure(figsize=(6,3))

plt.hist (brk_cr['sugars'], bins= 10, color = 'blue',edgecolor='black'
)

plt.xlabel('Sugar')
plt.ylabel('g')
plt.title('Suagr  in Cereal')

plt.savefig ("7.png", bbox_inches = 'tight')

plt.show()
```



--> Zero skweness

10.Potassium content in cereals

```
plt.figure(figsize=(6,3))

plt.hist (brk_cr['potass'], bins= 10, color =
'purple',edgecolor='black' )

plt.xlabel('Pottasium')
plt.ylabel('mg')
plt.title('Potassium content in Cereal')

plt.savefig ("8.png", bbox_inches = 'tight')

plt.show()
```

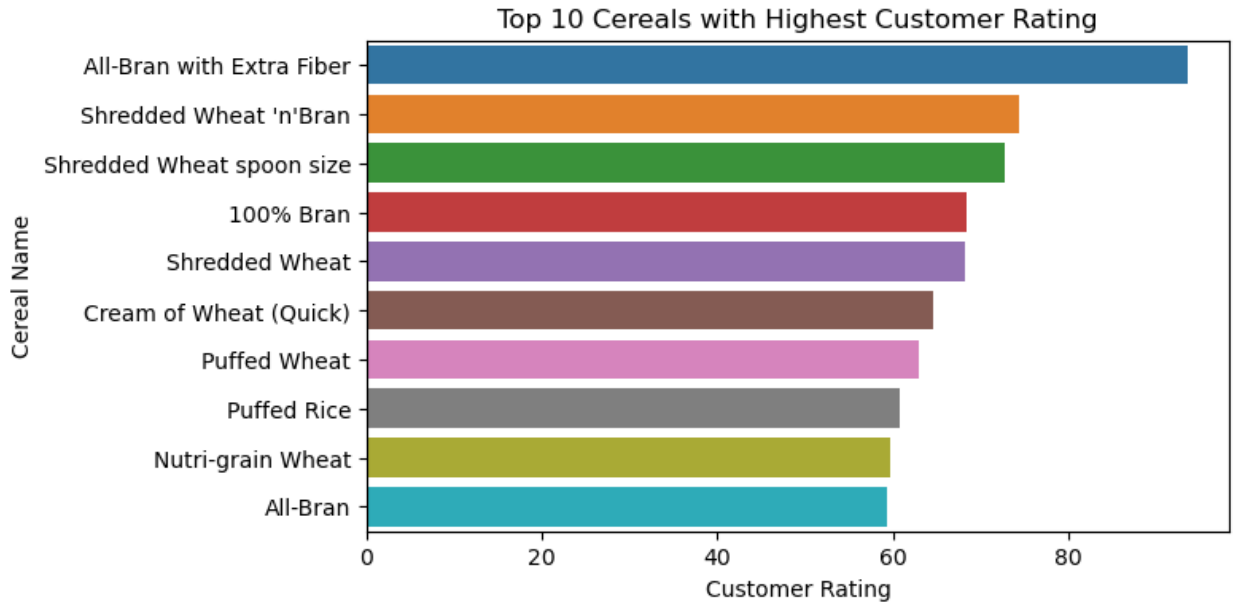


--> Left skweness

-->In the distribution of potassium in cereals, there is left skweness, which means the positive skweness.

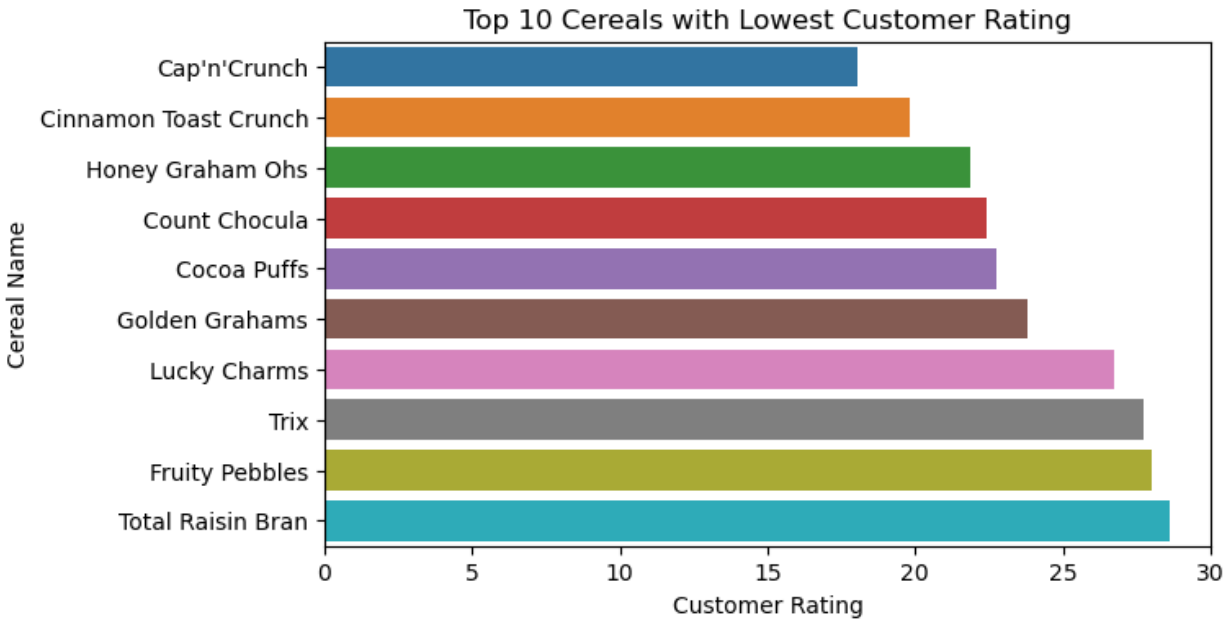
11. Top 10 Cereals with Highest Rating

```
# To find the Top 10 Cereals inrespect of their Ratings

tab = brk_cr.nlargest(10,'rating')

#Horizontal barplot of the finding

plt.figure (figsize=(7,4))
d= sns.barplot ( x='rating',
                 y="name",
                 data=tab,
                 orientation = 'horizontal')
d.set(xlabel = 'Customer Rating', ylabel = 'Cereal Name', title = 'Top
10 Cereals with Highest Customer Rating')

d.figure.savefig ('9.png', bbox_inches = 'tight')
```



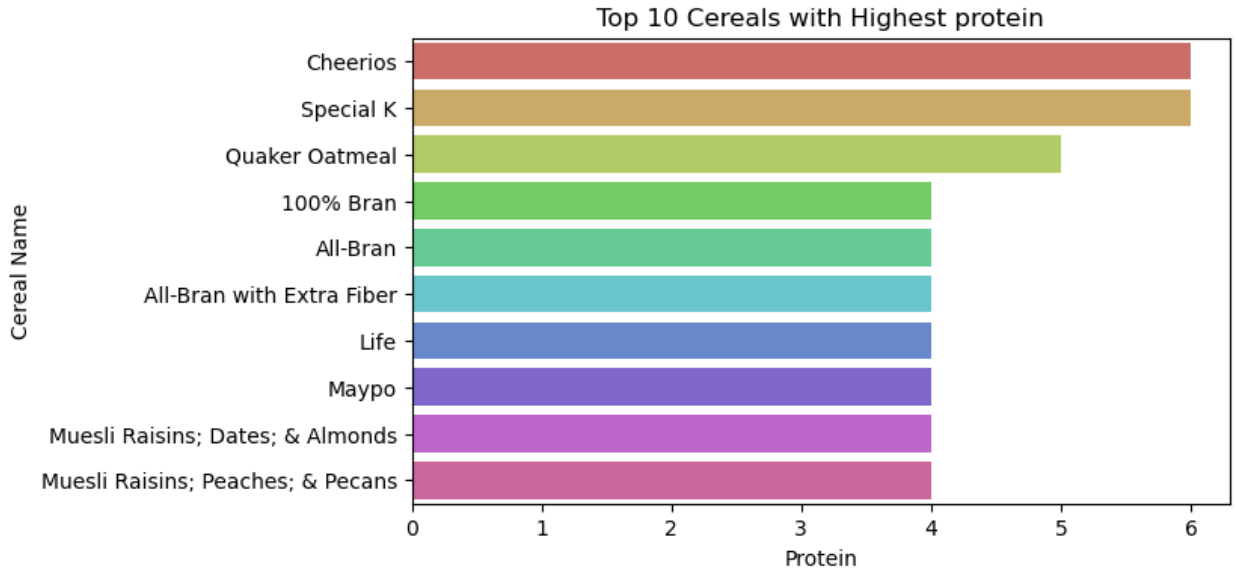
12. Top 10 Cereals with Lowest Rating

```
# To find the Top 10 Cereals inrespect of their Ratings

tab = brk_cr.nsmallest(10,'rating')

#Horizontal barplot of the finding

plt.figure (figsize=(7,4))

e = sns.barplot ( x='rating',
                  y="name",
                  data=tab,
                  orientation = 'horizontal')
e.set(xlabel = 'Customer Rating', ylabel = 'Cereal Name', title = 'Top
10 Cereals with Lowest Customer Rating')

e.figure.savefig ('10.png', bbox_inches = 'tight')
```



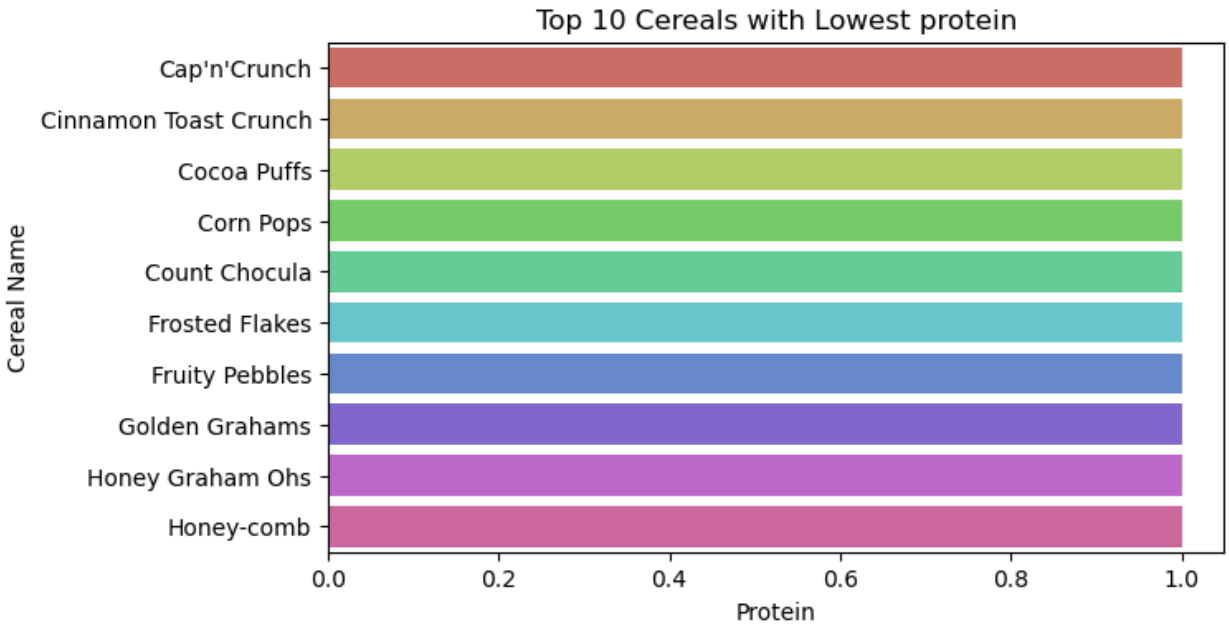
13. Top 10 Cereals with Highest protein

```
tab = brk_cr.nlargest (10, 'protein')

plt.figure (figsize=(7,4))
f = sns.barplot (
                    x = 'protein',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'hls')
f.set(xlabel = 'Protein', ylabel = 'Cereal Name', title = 'Top 10
Cereals with Highest protein')

f.figure.savefig('11.png', bbox_inches = 'tight')
```



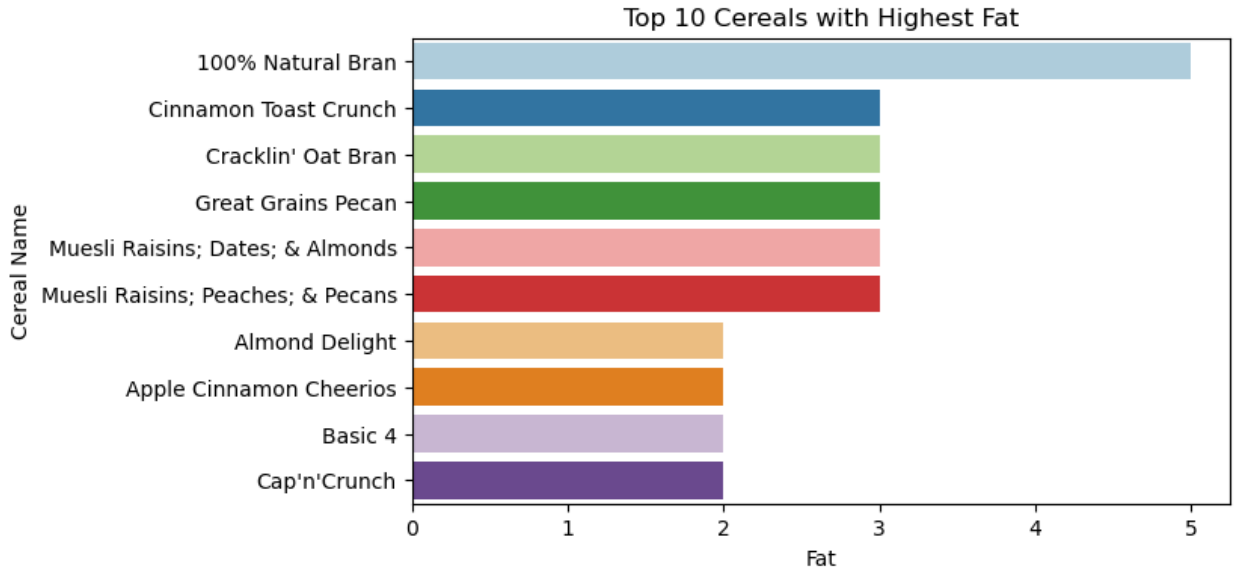
14. Top 10 Cereals with Lowest Protein

```
tab = brk_cr.nsmallest (10, 'protein')

plt.figure (figsize=(7,4))
f = sns.barplot (
                    x = 'protein',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'hls')
f.set(xlabel = 'Protein', ylabel = 'Cereal Name', title = 'Top 10
Cereals with Lowest protein')

f.figure.savefig('12.png', bbox_inches = 'tight')
```



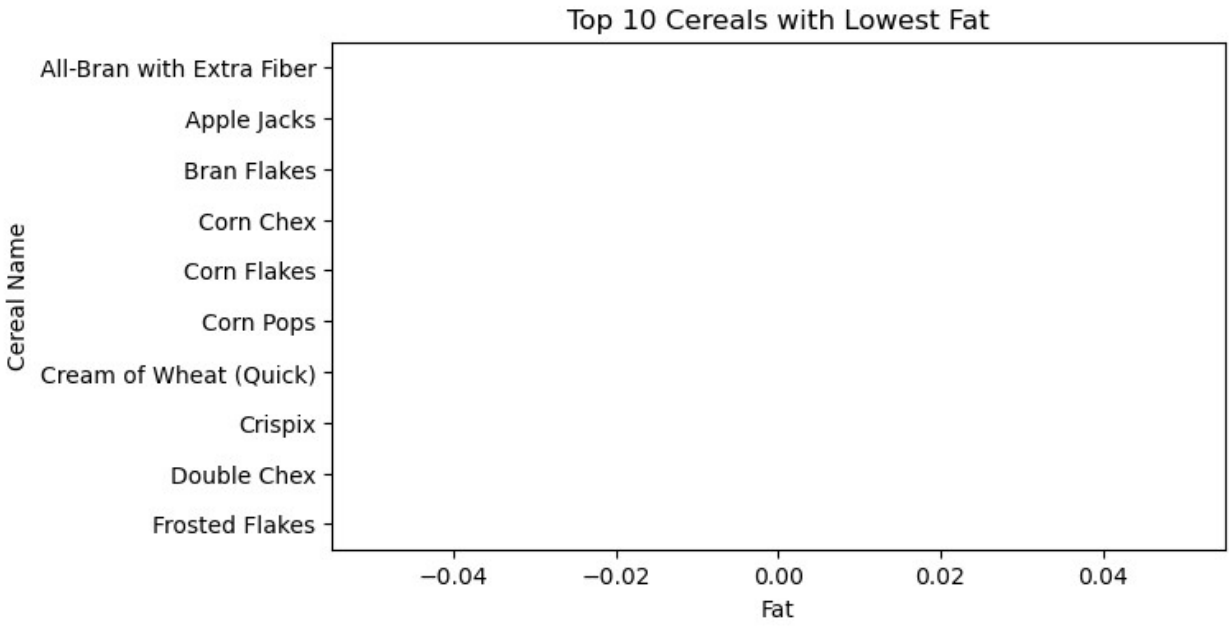
15. Top 10 Cereals with Highest Fat

```
tab = brk_cr.nlargest (10,'fat')

plt.figure (figsize=(7,4))
a = sns.barplot (
                    x = 'fat',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'Paired')

a.set(xlabel = 'Fat' , ylabel = 'Cereal Name', title = 'Top 10 Cereals
with Highest Fat')

a.figure.savefig ('13.png', bbox_inches = 'tight')
```



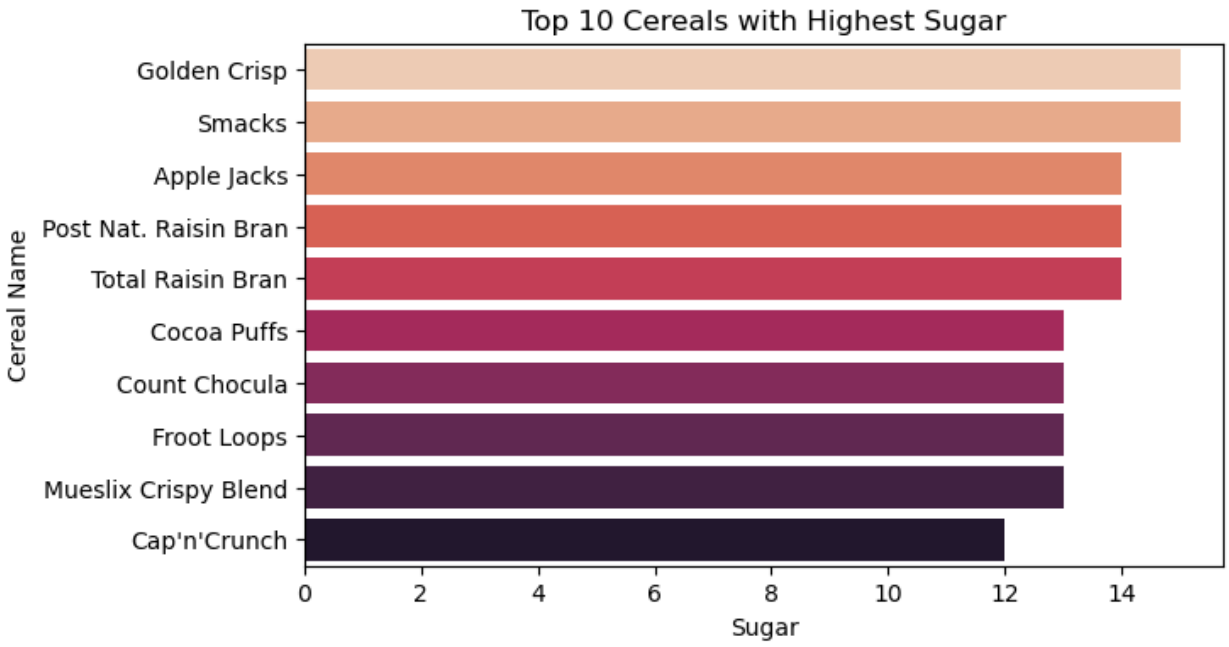
16. Top 10 Cereals with Lowest Fat

```
tab = brk_cr.nsmallest (10,'fat')

plt.figure (figsize=(7,4))
b = sns.barplot (
                    x = 'fat',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'Paired')

b.set(xlabel = 'Fat' , ylabel = 'Cereal Name', title = 'Top 10 Cereals
with Lowest Fat')

b.figure.savefig ('14.png', bbox_inches = 'tight')
```



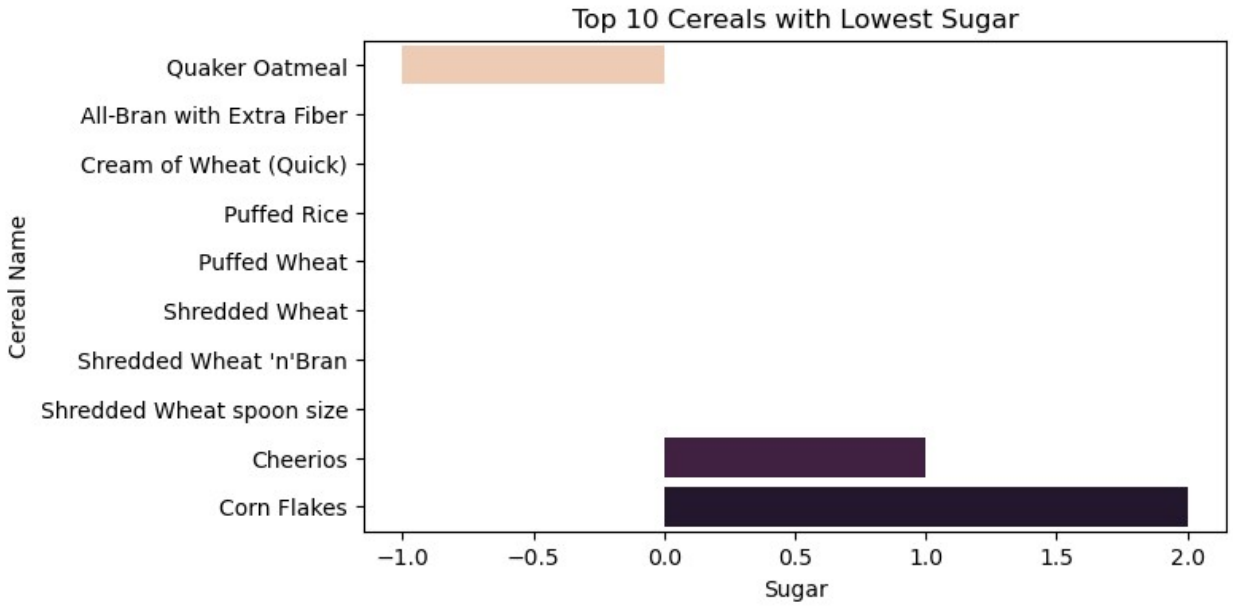
17. Top 10 Cereals with Highest Sugar

```
tab = brk_cr.nlargest (10,'sugars')

plt.figure (figsize=(7,4))
c = sns.barplot (
                    x = 'sugars',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'rocket_r')

c.set(xlabel = 'Sugar' , ylabel = 'Cereal Name', title = 'Top 10
Cereals with Highest Sugar')

c.figure.savefig ('15.png', bbox_inches = 'tight')
```



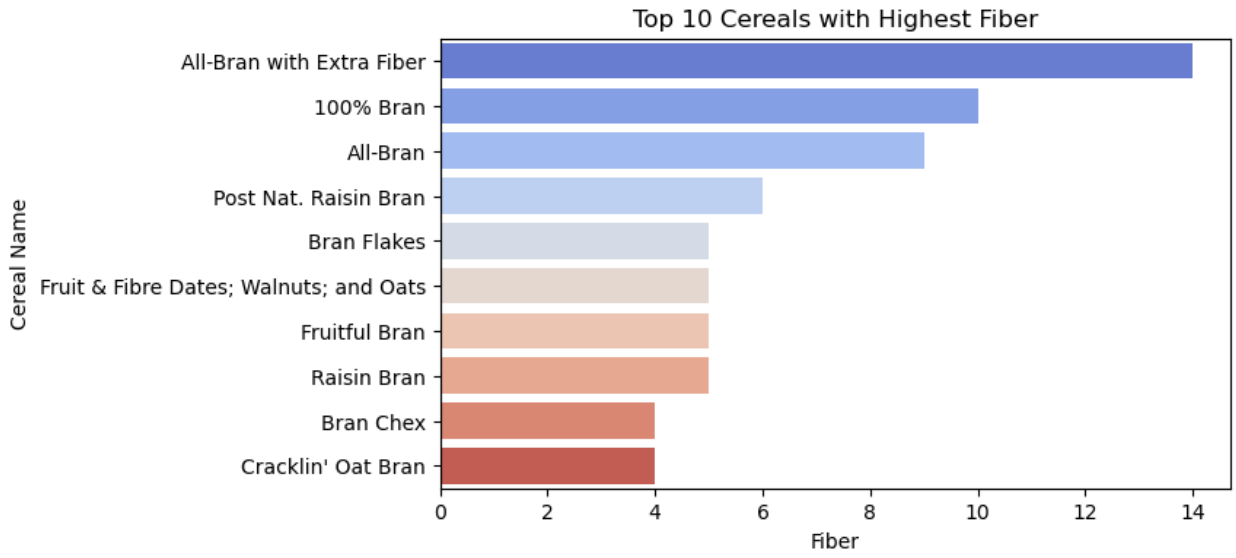
18. Top 10 Cereals with Lowest Sugar

```
tab = brk_cr.nsmallest (10,'sugars')

plt.figure (figsize=(7,4))
s = sns.barplot (
                    x = 'sugars',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'rocket_r')

s.set(xlabel = 'Sugar' , ylabel = 'Cereal Name', title = 'Top 10
Cereals with Lowest Sugar')

s.figure.savefig ('16.png', bbox_inches = 'tight')
```



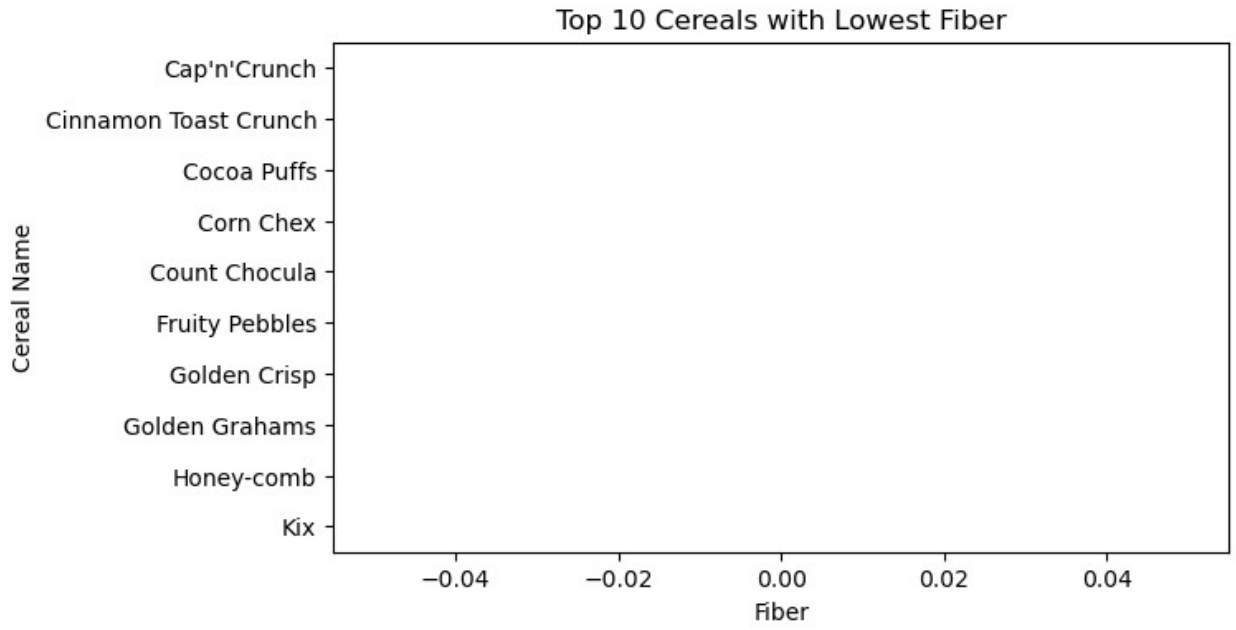
19. Top 10 Cereals with Highest Fiber

```
tab = brk_cr.nlargest (10,'fiber')

plt.figure (figsize=(7,4))
n = sns.barplot (
                    x = 'fiber',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'coolwarm')

n.set(xlabel = 'Fiber' , ylabel = 'Cereal Name', title = 'Top 10
Cereals with Highest Fiber')

n.figure.savefig ('17.png', bbox_inches = 'tight')
```



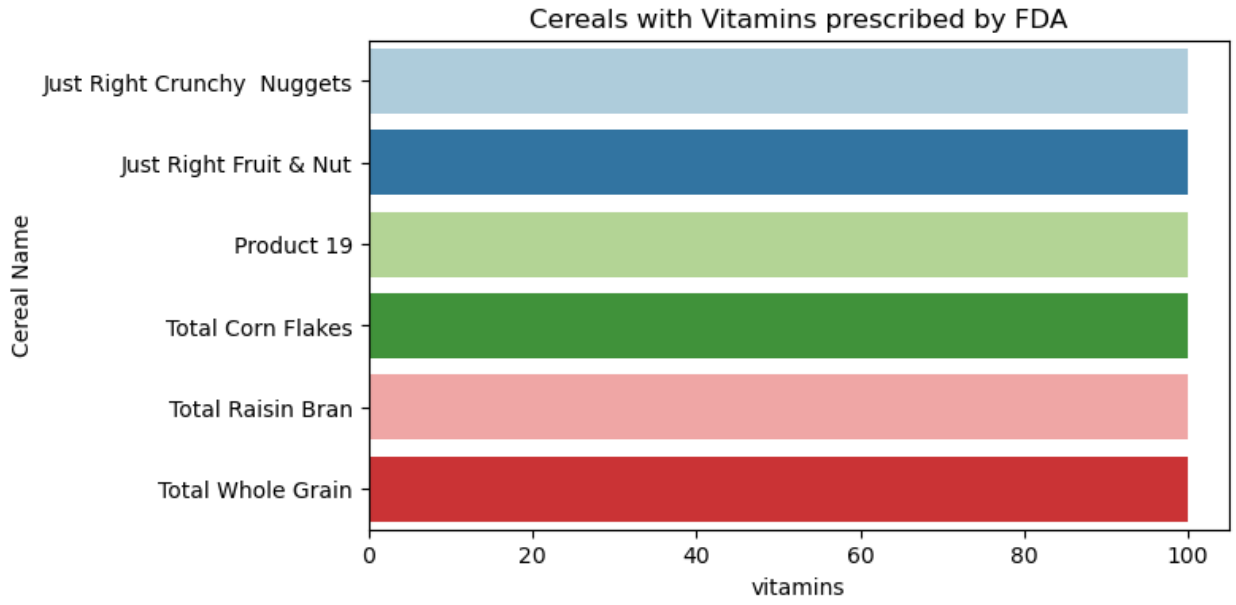
20. Top 10 Cereals with Lowest Rating

```
tab = brk_cr.nsmallest (10,'fiber')

plt.figure (figsize=(7,4))
m = sns.barplot (
                    x = 'fiber',
                    y = 'name',
                    data = tab,
                    orientation = 'horizontal',
                    palette = 'coolwarm')

m.set(xlabel = 'Fiber' , ylabel = 'Cereal Name', title = 'Top 10
Cereals with Lowest Fiber')

m.figure.savefig ('18.png', bbox_inches = 'tight')
```



21.Which cereal has the highest Vitamins&Minerals prescribed by FDA

```
tab = brk_cr[brk_cr['vitamins'] == 100]



plt.figure (figsize=(7,4))
m = sns.barplot (
                    x = 'vitamins',
                    y = 'name',
                    data = tab.head(10),
                    orientation = 'horizontal',
                    palette = 'Paired')

m.set(xlabel = 'vitamins' , ylabel = 'Cereal Name', title = 'Cereals
with Vitamins prescribed by FDA')

m.figure.savefig ('19.png', bbox_inches = 'tight')
```

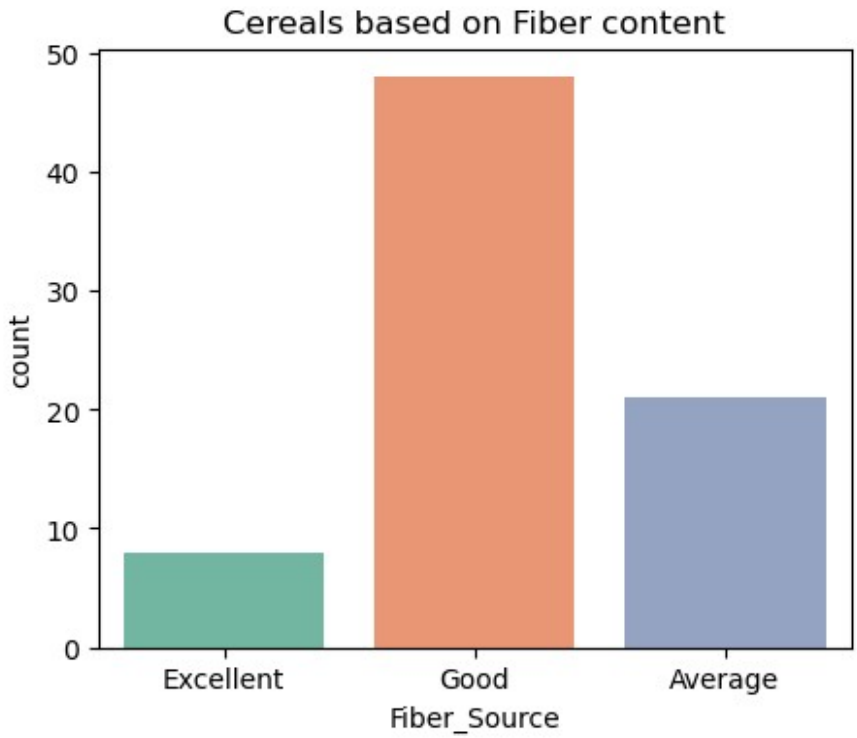


22. Number of cereals in each fiber Category

```
b = brk_cr.groupby (by = 'fiber_source')['fiber'].count()
b
```

```
fiber_source
Average      21
Excellent     8
Good         48
Name: fiber, dtype: int64
```

```
# Countplot representation of fiber content in cereals

plt.figure(figsize=(5,4))

q = sns.countplot (x = 'fiber_source', data = brk_cr, palette =
"Set2")
q.set(xlabel = "Fiber_Source",title = "Cereals based on Fiber
content")

q.figure.savefig("20.png", bbox_inches='tight')

plt.show()
```

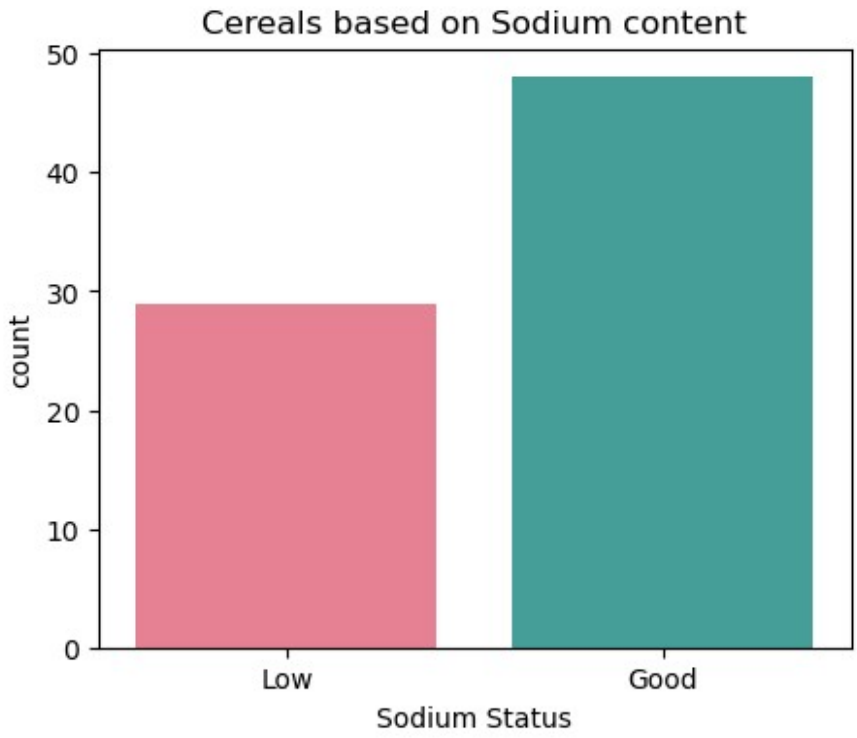


23. Number of cereals falling under different Sodium Category

```
sod = brk_cr['sodium_status'].value_counts()
sod
```

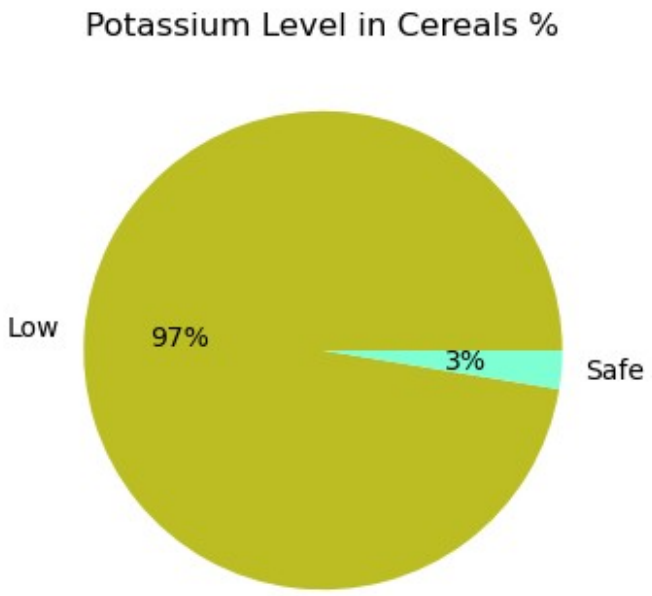
```
Good    48
Low     29
Name: sodium_status, dtype: int64
```

```
plt.figure(figsize =(5,4))
sns.countplot(brk_cr, x='sodium_status', palette = 'husl')
plt.title ("Cereals based on Sodium content")
plt.xlabel ("Sodium Status")

plt.savefig('21.png', bbox_inches = 'tight')
```



24. How many products have a safe level of Potassium content

```
a = brk_cr['Potass_status'].value_counts()


plt.figure(figsize=(5,4))

plt.pie(a, labels=['Low','Safe'], autopct = '%0.0f%%',
colors=['tab:olive','aquamarine'])
plt.title ("Potassium Level in Cereals %")

plt.savefig("22.png", bbox_inches='tight')
```




```
#How many products have a safe level of Potassium content

print(brk_cr[brk_cr['Potass_status']=='Safe']['name'].count())

#What are they?

brk_cr[brk_cr['Potass_status']=='Safe']
```

```
2
```

```
                        name       mfr  type  calories  protein  fat
sodium  \
2                  All-Bran  Kelloggs  Cold        70        4    1
260
3  All-Bran with Extra Fiber  Kelloggs  Cold        50        4    0
140

   fiber  carbo  sugars  potass  vitamins  shelf  weight  cups
rating  \
2    9.0    7.0       5     320        25      3     1.0  0.33
59.425505
3   14.0    8.0       0     330        25      3     1.0  0.50
93.704912

   perc_fat_in_calorie sodium_status fiber_source Potass_status
2                 1.43          Good    Excellent          Safe
3                 0.00           Low    Excellent          Safe
```

25.How many products are following the health guidelines interms of sodium, potassium and fiber content?

```
brk_cr[(brk_cr['Potass_status'] == 'Safe') & (brk_cr['sodium_status']
== 'Good') & (brk_cr['fiber_source'] == 'Excellent')]
```

```
       name       mfr  type  calories  protein  fat  sodium  fiber
carbo  \
2  All-Bran  Kelloggs  Cold        70        4    1     260    9.0
7.0

   sugars  potass  vitamins  shelf  weight  cups     rating  \
2       5     320        25      3     1.0  0.33  59.425505

   perc_fat_in_calorie sodium_status fiber_source Potass_status
2                 1.43          Good    Excellent          Safe
```

26.How many products are lacking in terms of sodium, potassium and fiber content?

```
count = brk_cr[(brk_cr['Potass_status'] == 'Less') &
(brk_cr['sodium_status'] == 'Low') & (brk_cr['fiber_source'] ==
'Average')]['name'].count()

print('A total of',count,"Cereals doesn't meet the standareds")

brk_cr[(brk_cr['Potass_status'] == 'Low') & (brk_cr['sodium_status']
== 'Low') & (brk_cr['fiber_source'] == 'Average')]['name']
```

```
A total of 0 Cereals doesn't meet the standareds

19                  Cracklin' Oat Bran
26                 Frosted Mini-Wheats
32                   Grape Nuts Flakes
34                  Great Grains Pecan
44    Muesli Raisins; Dates; & Almonds
57                      Quaker Oatmeal
59                     Raisin Nut Bran
63                      Shredded Wheat
64                Shredded Wheat 'n'Bran
65             Shredded Wheat spoon size
68               Strawberry Fruit Wheats
Name: name, dtype: object
```

27. Is there any cereals with no sugar

```
brk_cr[brk_cr['sugars'] <= 0]
```

```
                         name          mfr  type  calories  protein
fat  \
3   All-Bran with Extra Fiber     Kelloggs  Cold        50        4
0
20     Cream of Wheat (Quick)      Nabisco   Hot       100        3
```

```
0
54                 Puffed Rice  Quaker Oats  Cold        50         1
0
55               Puffed Wheat  Quaker Oats  Cold        50         2
0
57             Quaker Oatmeal  Quaker Oats   Hot       100         5
2
63             Shredded Wheat      Nabisco  Cold        80         2
0
64     Shredded Wheat 'n'Bran      Nabisco  Cold        90         3
0
65  Shredded Wheat spoon size      Nabisco  Cold        90         3
0

    sodium  fiber  carbo  sugars  potass  vitamins  shelf  weight
cups  \
3      140   14.0    8.0       0     330        25      3    1.00
0.50
20      80    1.0   21.0       0      -1         0      2    1.00
1.00
54       0    0.0   13.0       0      15         0      3    0.50
1.00
55       0    1.0   10.0       0      50         0      3    0.50
1.00
57       0    2.7   -1.0      -1     110         0      1    1.00
0.67
63       0    3.0   16.0       0      95         0      1    0.83
1.00
64       0    4.0   19.0       0     140         0      1    1.00
0.67
65       0    3.0   20.0       0     120         0      1    1.00
0.67

       rating  perc_fat_in_calorie sodium_status fiber_source
Potass_status
3   93.704912                  0.0           Low    Excellent
Safe
20  64.533816                  0.0           Low         Good
Low
54  60.756112                  0.0           Low         Good
Low
55  63.005645                  0.0           Low         Good
Low
57  50.828392                  2.0           Low      Average
Low
63  68.235885                  0.0           Low      Average
Low
64  74.472949                  0.0           Low      Average
Low
```

```
65  72.801787                  0.0           Low      Average
Low
```

28. Is there any cereals with no Sodium

```
brk_cr[brk_cr['sodium'] <= 0]
```

```
                          name                           mfr  type
calories  \
26        Frosted Mini-Wheats                       Kelloggs  Cold
100
43                      Maypo  American Home Food Products   Hot
100
54                 Puffed Rice                    Quaker Oats  Cold
50
55                Puffed Wheat                    Quaker Oats  Cold
50
57              Quaker Oatmeal                    Quaker Oats   Hot
100
60              Raisin Squares                       Kelloggs  Cold
90
63              Shredded Wheat                        Nabisco  Cold
80
64     Shredded Wheat 'n'Bran                        Nabisco  Cold
90
65  Shredded Wheat spoon size                        Nabisco  Cold
90

    protein  fat  sodium  fiber  carbo  sugars  potass  vitamins
shelf  \
26        3    0       0    3.0   14.0       7     100         25
2
43        4    1       0    0.0   16.0       3      95         25
2
54        1    0       0    0.0   13.0       0      15          0
3
55        2    0       0    1.0   10.0       0      50          0
3
57        5    2       0    2.7   -1.0      -1     110          0
1
60        2    0       0    2.0   15.0       6     110         25
3
63        2    0       0    3.0   16.0       0      95          0
1
64        3    0       0    4.0   19.0       0     140          0
1
65        3    0       0    3.0   20.0       0     120          0
1

    weight  cups     rating  perc_fat_in_calorie sodium_status
```

```
fiber_source  \
26    1.00  0.80  58.345141                    0.0           Low
Average
43    1.00  1.00  54.850917                    1.0           Low
Good
54    0.50  1.00  60.756112                    0.0           Low
Good
55    0.50  1.00  63.005645                    0.0           Low
Good
57    1.00  0.67  50.828392                    2.0           Low
Average
60    1.00  0.50  55.333142                    0.0           Low
Good
63    0.83  1.00  68.235885                    0.0           Low
Average
64    1.00  0.67  74.472949                    0.0           Low
Average
65    1.00  0.67  72.801787                    0.0           Low
Average

   Potass_status
26           Low
43           Low
54           Low
55           Low
57           Low
60           Low
63           Low
64           Low
65           Low
```

>Statistical Analysis and Visualisation of Data

29. Average amount of sugar in one serving

```
brk_cr['sugars'].mean()
```

```
6.922077922077922
```

30. Average amount of sodium in one serving

```
brk_cr['sodium'].mean()
```

```
159.67532467532467
```

31. Average amount of calorie in one serving

```
brk_cr['calories'].mean()
```

```
106.88311688311688
```

32. Average amount of fiber in one serving

```
brk_cr['fiber'].mean()
```

```
2.1519480519480516
```

33. Average amount of fat in one serving

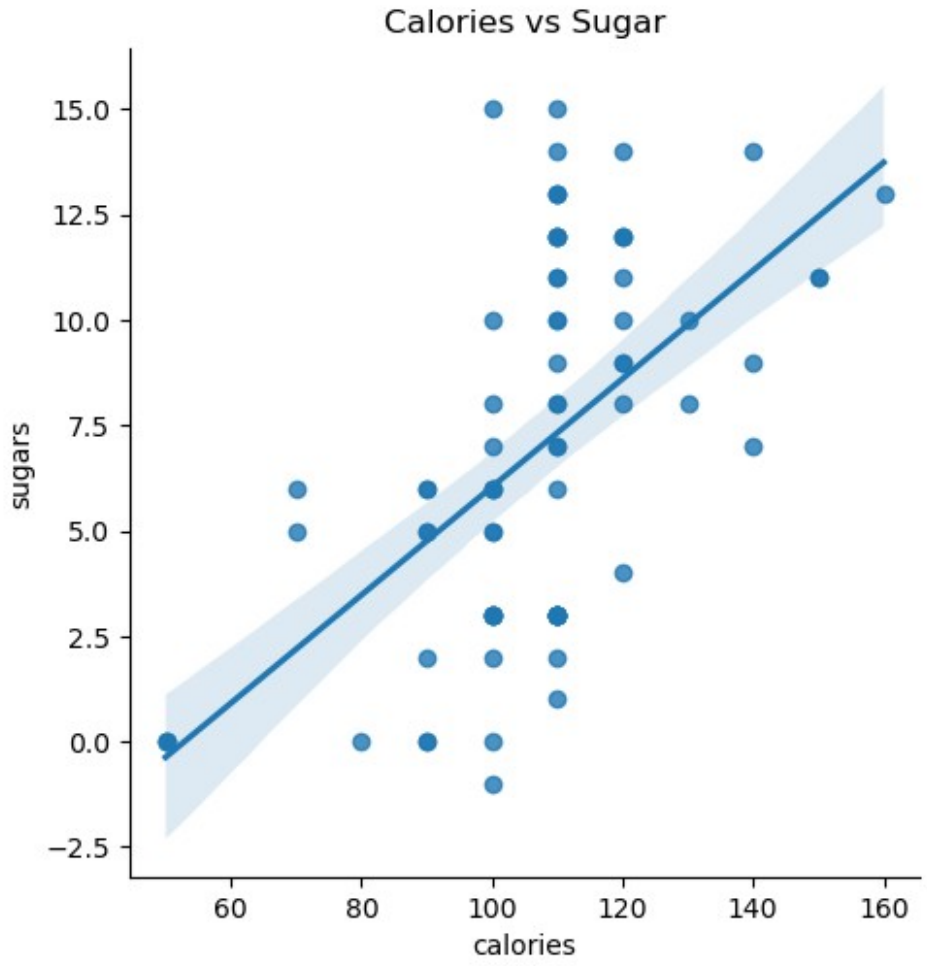
```
brk_cr['fat'].mean()
```

```
1.0129870129870129
```

34. Correlation between Calories and Sugar

```
print('The corr : ',brk_cr['calories'].corr(brk_cr['sugars']))

sns.lmplot(x="calories", y="sugars", data=brk_cr)
plt.title("Calories vs Sugar")

plt.savefig("23.png", bbox_inches='tight')
```

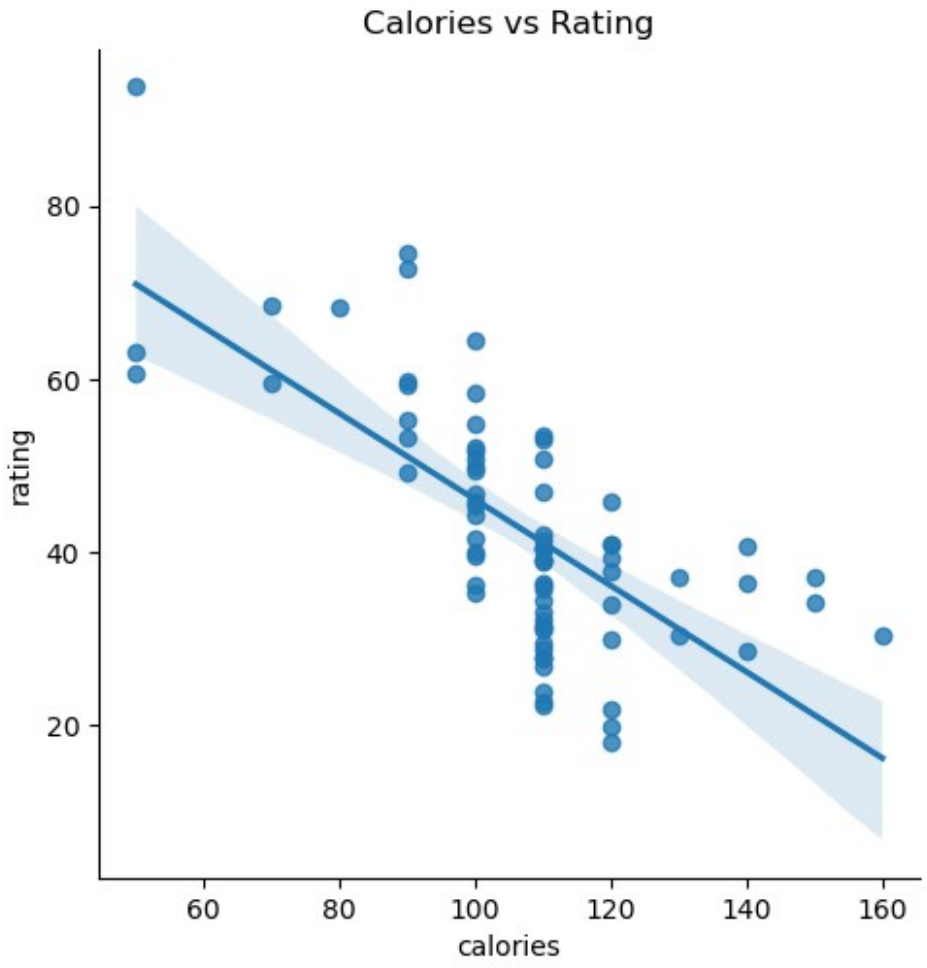
```
The corr :  0.5623402898034883
```



35. Correlation between Calories and Rating

```
print('The corr : ',brk_cr['calories'].corr(brk_cr['rating']))

sns.lmplot(x="calories", y="rating", data=brk_cr)
plt.title("Calories vs Rating")

plt.savefig("24.png", bbox_inches='tight')
```

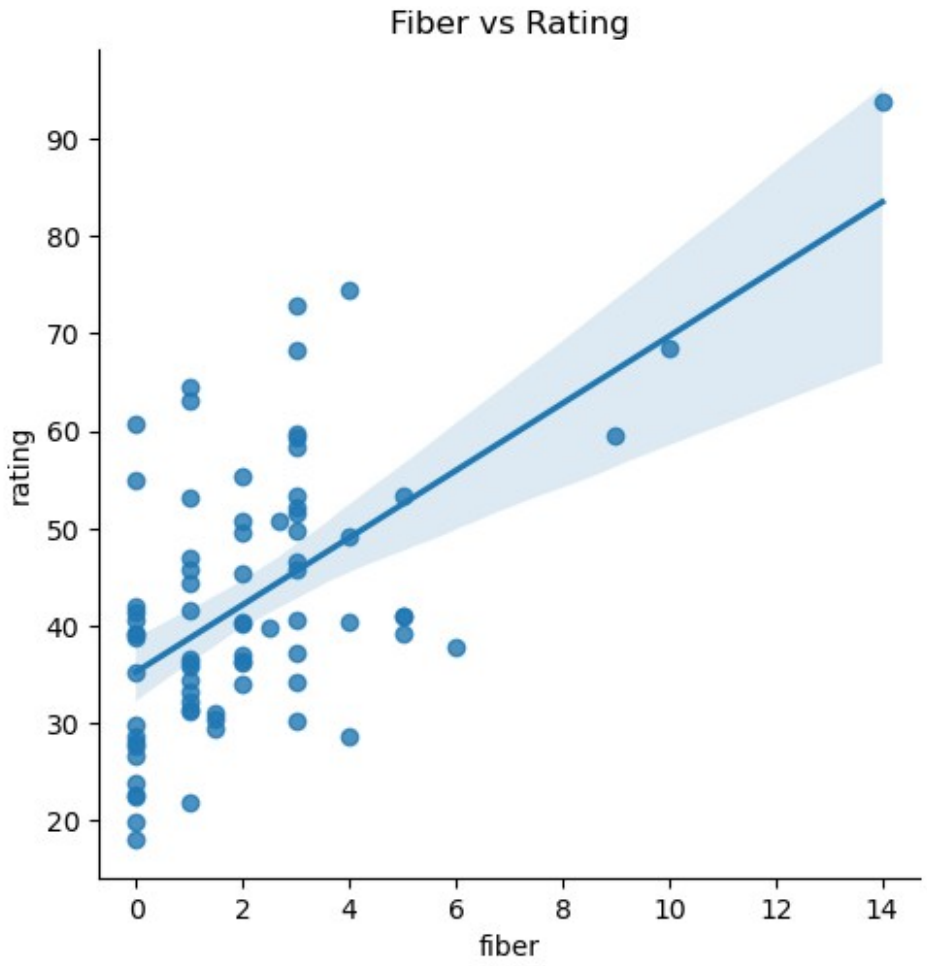
```
The corr :  -0.6893760311652586
```



36. Correlation between Brand Fiber and Rating

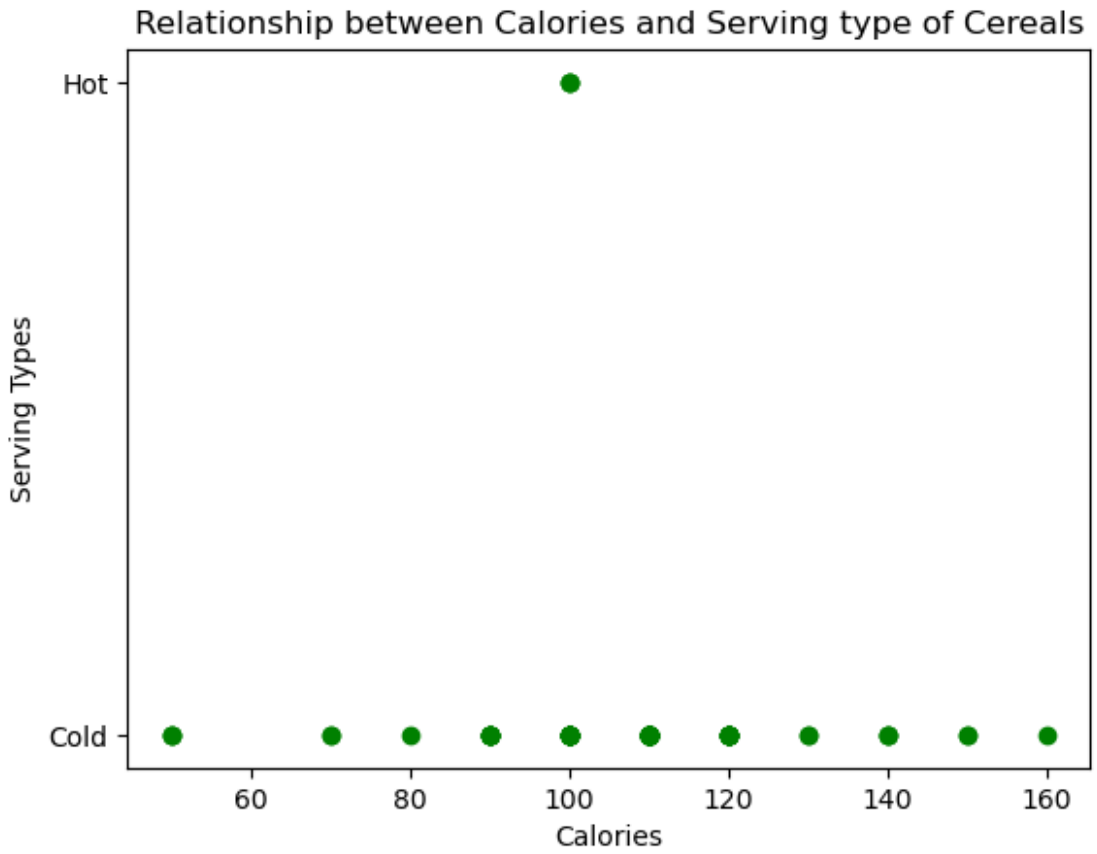
```
print('The corr : ',brk_cr['fiber'].corr(brk_cr['rating']))

sns.lmplot(x="fiber", y="rating", data=brk_cr)
plt.title("Fiber vs Rating")

plt.savefig("25.png", bbox_inches='tight')
```

```
The corr :  0.5841604199515837
```



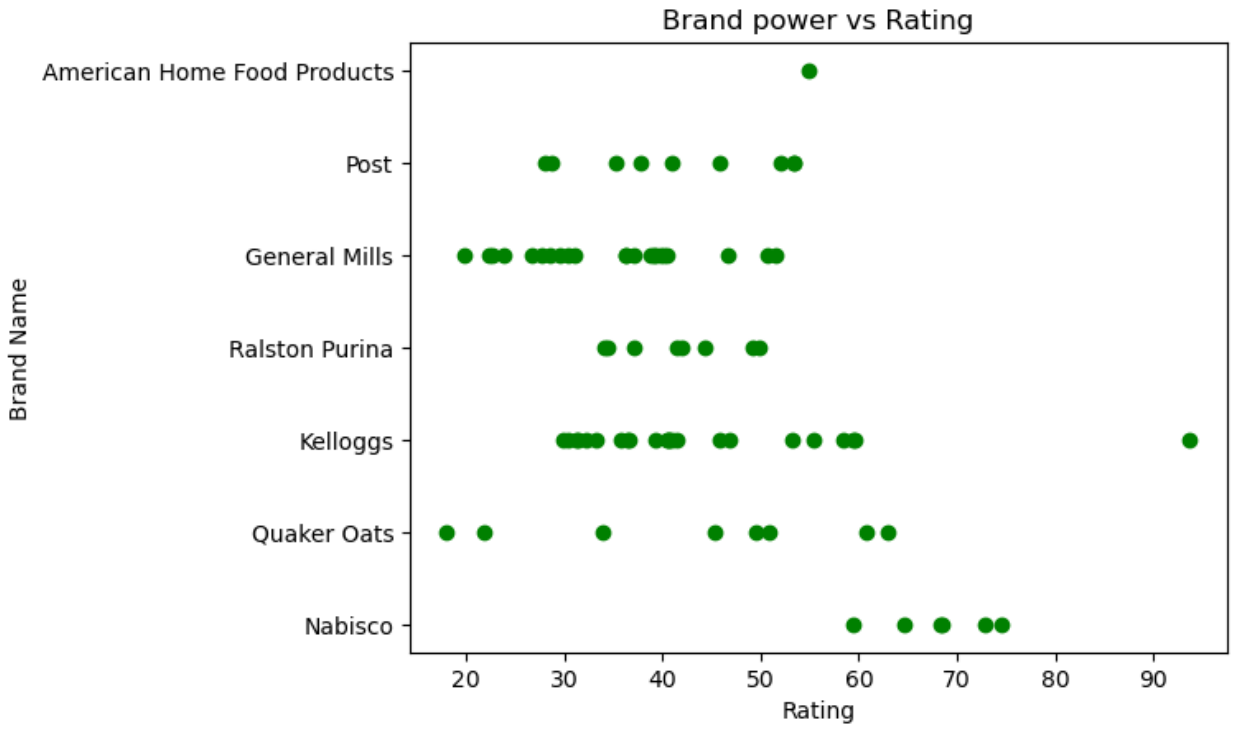
37.Relationship between Calories and Serving type of Cereals

```
plt.scatter(x = 'calories', y = 'type', data = brk_cr, c='green')

plt.xlabel('Calories')
plt.ylabel('Serving Types')
plt.title('Relationship between Calories and Serving type of Cereals')

plt.savefig("26.png", bbox_inches='tight')
```



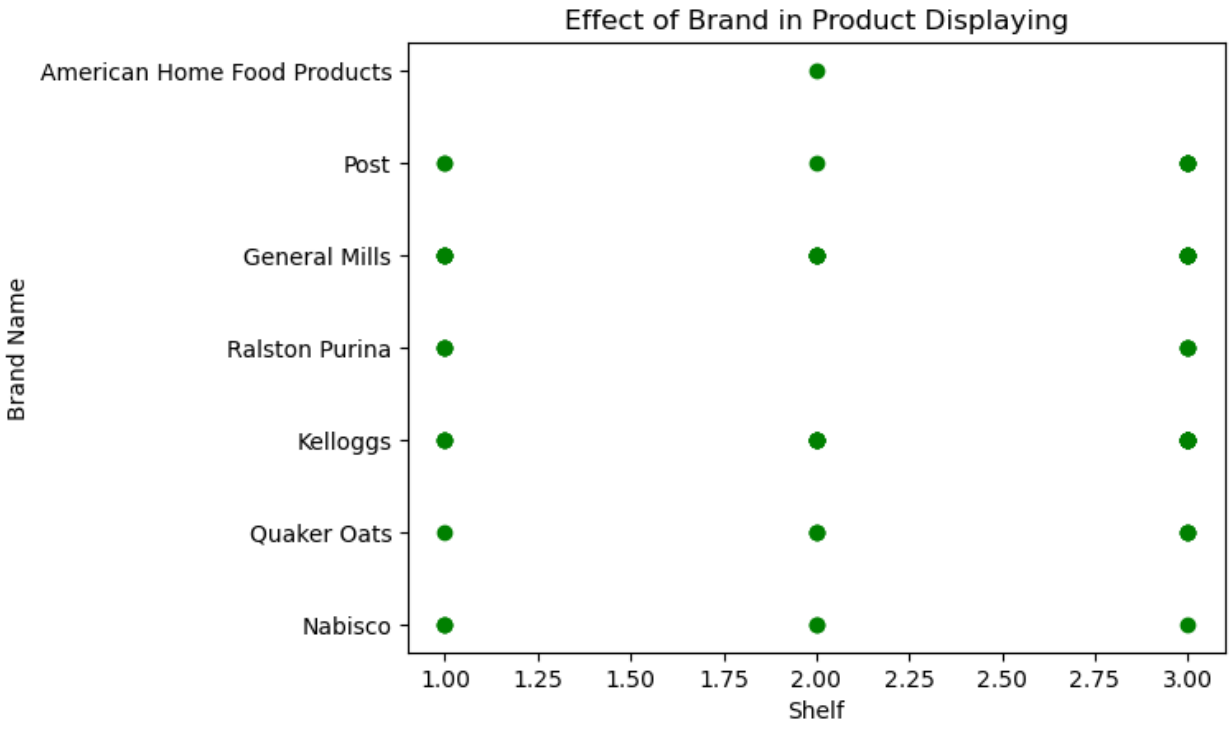
38. Correlation between Brand Name and Rating

```
plt.scatter(x = 'rating', y = 'mfr', data = brk_cr, c='green')

plt.xlabel('Rating')
plt.ylabel('Brand Name')
plt.title('Brand power vs Rating')

plt.savefig("27.png", bbox_inches='tight')
```



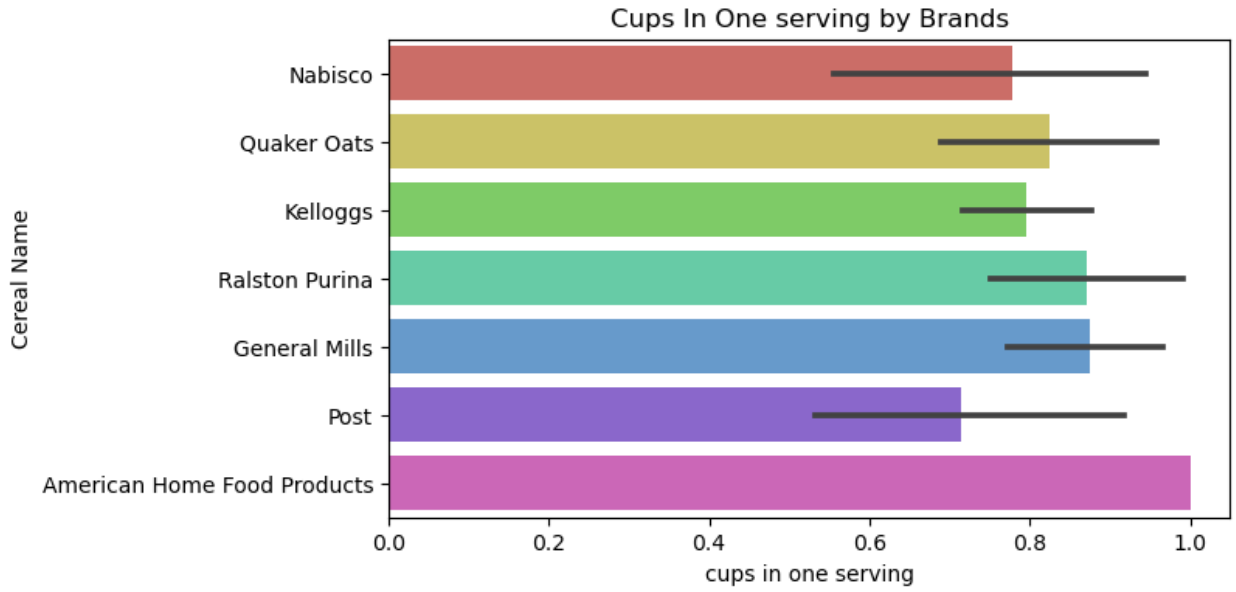
39. Correlation between Brand Name and Display

```
plt.scatter(x = 'shelf', y = 'mfr', data = brk_cr, c='green')

plt.xlabel('Shelf')
plt.ylabel('Brand Name')
plt.title('Effect of Brand in Product Displaying')

plt.savefig("28.png", bbox_inches='tight')
```



40. Cups In One serving by Brands

```
plt.figure (figsize=(7,4))
f = sns.barplot (
                    x = 'cups',
                    y = 'mfr',
                    data = brk_cr,
                    palette = 'hls')
f.set(xlabel = 'cups in one serving', ylabel = 'Cereal Name', title =
'Cups In One serving by Brands')

f.figure.savefig('29.png', bbox_inches = 'tight')
```



41. Correlation matrix of Numerical features

```
# subset containing the the numerical columns

brk_cr1 = brk_cr.select_dtypes(include = np.number)

# correlation metrix of Numerical features

brk_cr.corr
```

```
<bound method DataFrame.corr of                          name
mfr  type  calories  protein  fat  \
0                   100% Bran         Nabisco  Cold        70        4
1
1           100% Natural Bran     Quaker Oats  Cold       120        3
5
2                    All-Bran        Kelloggs  Cold        70        4
1
3   All-Bran with Extra Fiber        Kelloggs  Cold        50        4
0
4              Almond Delight  Ralston Purina  Cold       110        2
2
..                        ...             ...   ...       ...      ...
...
72                   Triples   General Mills  Cold       110        2
1
73                      Trix   General Mills  Cold       110        1
1
74                Wheat Chex  Ralston Purina  Cold       100        3
1
75                   Wheaties   General Mills  Cold       100        3
1
```

```
76        Wheaties Honey Gold   General Mills  Cold       110        2
1

    sodium  fiber  carbo  sugars  potass  vitamins  shelf  weight
cups  \
0      130   10.0    5.0       6     280        25      3     1.0
0.33
1       15    2.0    8.0       8     135         0      3     1.0
1.00
2      260    9.0    7.0       5     320        25      3     1.0
0.33
3      140   14.0    8.0       0     330        25      3     1.0
0.50
4      200    1.0   14.0       8      -1        25      3     1.0
0.75
..     ...    ...    ...     ...     ...       ...    ...     ...   ..
.
72     250    0.0   21.0       3      60        25      3     1.0
0.75
73     140    0.0   13.0      12      25        25      2     1.0
1.00
74     230    3.0   17.0       3     115        25      1     1.0
0.67
75     200    3.0   17.0       3     110        25      1     1.0
1.00
76     200    1.0   16.0       8      60        25      1     1.0
0.75

       rating  perc_fat_in_calorie sodium_status fiber_source
Potass_status
0   68.402973                 1.43           Low    Excellent
Low
1   33.983679                 4.17           Low         Good
Low
2   59.425505                 1.43          Good    Excellent
Safe
3   93.704912                 0.00           Low    Excellent
Safe
4   34.384843                 1.82          Good         Good
Low
..        ...                  ...           ...          ...
...
72  39.106174                 0.91          Good         Good
Low
73  27.753301                 0.91           Low         Good
Low
74  49.787445                 1.00          Good      Average
Low
75  51.592193                 1.00          Good      Average
```

```
Low
76  36.187559                    0.91          Good          Good
Low

[77 rows x 20 columns]>
```

```
# Visualisation of correlation matrix using Heatmap


plt.figure(figsize=(10,6))
a= sns.heatmap(brk_cr1.corr(), annot = True, fmt = '.1f', linewidth =
1).set_title("Correlation Matrix")

a.figure.savefig ("30.png", bbox_inches = "tight")
```