```
import pandas as pd
```

```
df=pd.read_csv("BigBasket Products.csv")
df
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	220.00	220.0	Hair Oil & Serum	4.1	This Product contains Garlic Oil that is known...
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	180.00	180.0	Water & Fridge Bottles	2.3	Each product is microwave safe (without lid), ...
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	119.00	250.0	Lamp & Lamp Oil	3.4	A perfect gift for all occasions, be it your m...
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	149.00	176.0	Laundry, Storage Baskets	3.7	Multipurpose container with an attractive desi...
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	162.00	162.0	Bathing Bars & Soaps	4.4	Nivea Creme Soft Soap gives your skin the best...
...	...	...	...	...	...	...	...	...	...	...
27550	27551	Wottagirl! Perfume Spray - Heaven, Classic	Beauty & Hygiene	Fragrances & Deos	Layerr	199.20	249.0	Perfume	3.9	Layerr brings you Wottagirl Classic fragrant b...
27551	27552	Rosemary	Gourmet & World Food	Cooking & Baking Needs	Puramate	67.50	75.0	Herbs, Seasonings & Rubs	4.0	Puramate rosemary is enough to transform a dis...
27552	27553	Peri-Peri Sweet Potato Chips	Gourmet & World Food	Snacks, Dry Fruits, Nuts	FabBox	200.00	200.0	Nachos & Chips	3.8	We have taken the richness of Sweet Potatoes (...
27553	27554	Green Tea - Pure Original	Beverages	Tea	Tetley	396.00	495.0	Tea Bags	4.2	Tetley Green Tea with its refreshing pure, ori...
		United Dreams Go	Beauty &	Men's	United			Men's		The new mens fragrance from

```
df.head(12)
```

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2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	119.0	250.0	Lamp & Lamp Oil	3.4	A perfect gift for all occasions, be it your m...
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	149.0	176.0	Laundry, Storage Baskets	3.7	Multipurpose container with an attractive desi...
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	162.0	162.0	Bathing Bars & Soaps	4.4	Nivea Creme Soft Soap gives your skin the best...
5	6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	169.0	199.0	Disinfectant Spray & Cleaners	3.3	Stay protected from contamination with Multipu...
6	7	Multani Mati	Beauty & Hygiene	Skin Care	Satinance	58.0	58.0	Face Care	3.6	Satinance multani matti is an excellent skin t...
7	8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	250.0	250.0	Hand Wash & Sanitizers	4.0	70%Alcohol based is gentle of hand leaves skin...
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	1098.0	1098.0	Shampoo & Conditioner	3.5	An exclusive blend with Vitamin B7 Biotin, Hyd...
9	10	Scrub Pad - Anti-Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	20.0	20.0	Utensil Scrub-Pad, Glove	4.3	Scotch Brite Anti-Bacterial Scrub Pad thoroug...
10	11	Wheat Grass Powder - Raw	Gourmet & World Food	Cooking & Baking Needs	NUTRASHIL	261.0	290.0	Flours & Pre-Mixes	4.0	Wheatgrass is a superfood potent health food w...
11	12	Butter Cookies Gold	Gourmet &	Chocolates &	Sapphire	600.0	600.0	Luxury Chocolates,	2.2	Enjoy a tin full of delicious butter

```
df.describe()
```

	index	sale_price	market_price	rating
count	27555.00000	27549.000000	27555.000000	18919.000000
mean	13778.00000	334.648391	382.056664	3.943295
std	7954.58767	1202.102113	581.730717	0.739217
min	1.00000	2.450000	3.000000	1.000000
25%	6889.50000	95.000000	100.000000	3.700000
50%	13778.00000	190.320000	220.000000	4.100000
75%	20666.50000	359.000000	425.000000	4.300000
max	27555.00000	112475.000000	12500.000000	5.000000

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27555 entries, 0 to 27554
Data columns (total 10 columns):
 #   Column        Non-Null Count  Dtype  
---  ------        --------------  -----  
 0   index         27555 non-null  int64  
 1   product       27554 non-null  object 
 2   category      27555 non-null  object 
 3   sub_category  27555 non-null  object 
 4   brand         27554 non-null  object 
 5   sale_price    27549 non-null  float64
 6   market_price  27555 non-null  float64
 7   type          27555 non-null  object
 8   rating        18919 non-null  float64
 9   description   27440 non-null  object
dtypes: float64(3), int64(1), object(6)
memory usage: 2.1+ MB
```

```
# Group the data by the 'Product' column and count the occurrences
product_counts = df.groupby('product').size()

# Get the product with the maximum occurrences (top sold product)
top_sold_product = product_counts.idxmax()

# Get the product with the minimum occurrences (least sold product)
least_sold_product = product_counts.idxmin()

print("Top Sold Product:", top_sold_product)
print("Least Sold Product:", least_sold_product)
```

```
Top Sold Product: Turmeric Powder/Arisina Pudi
Least Sold Product: & Moms - Citrus Soap
```

```
# Check if 'Sale_Price' exists in the dataset, otherwise use another price column as needed
df['Discount'] = ((df['market_price'] - df['sale_price']) / df['market_price']) * 100

# Show the product name and the corresponding discount
print(df[['product', 'Discount']].head())
```

```
                                            product   Discount
0             Garlic Oil - Vegetarian Capsule 500 mg   0.000000
1                              Water Bottle - Orange   0.000000
2                     Brass Angle Deep - Plain, No.2  52.400000
3  Cereal Flip Lid Container/Storage Jar - Assort...  15.340909
4                 Creme Soft Soap - For Hands & Body   0.000000
```

```
missing_values = df.isnull().sum()

print("Missing Values:")
print(missing_values)
```

```
Missing Values:
index              0
product            1
category           0
sub_category       0
brand              1
sale_price         6
market_price       0
type               0
rating          8636
description      115
Discount           6
dtype: int64
```

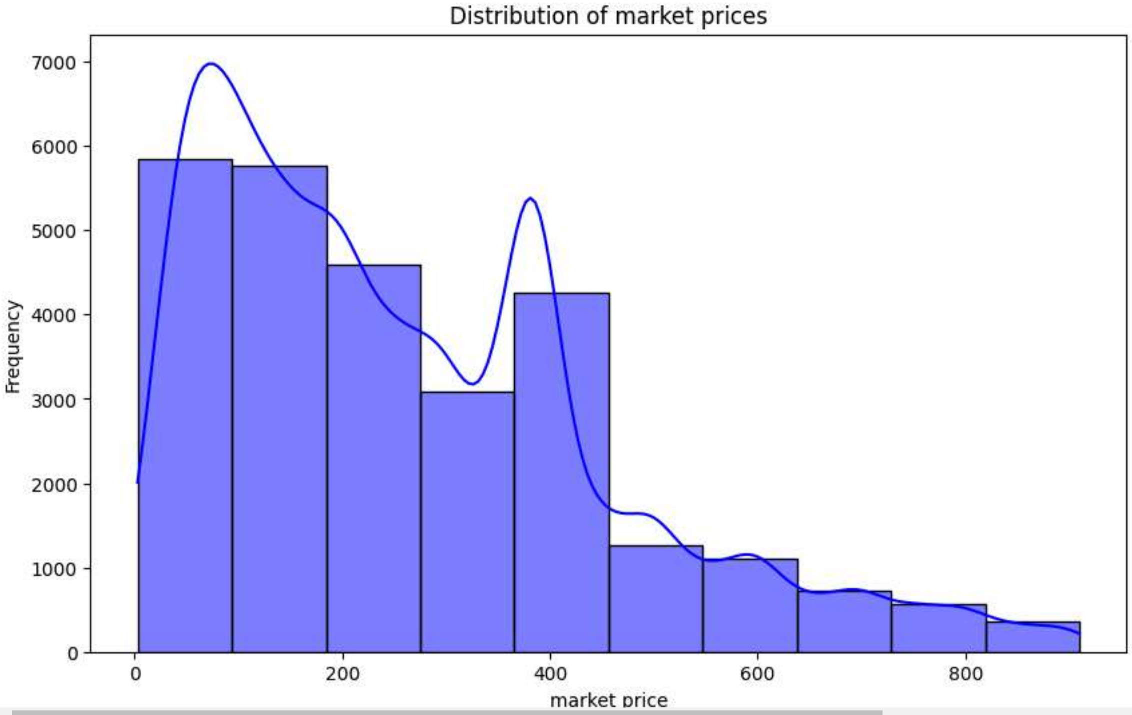
```
import numpy as np

# Function to identify and fill outliers
def fill_outliers_with_mean(df):
    for column in df.select_dtypes(include=[np.number]).columns:  # iterate through numerical columns
        Q1 = df[column].quantile(0.25)
        Q3 = df[column].quantile(0.75)
        IQR = Q3 - Q1
        lower_bound = Q1 - 1.5 * IQR
        upper_bound = Q3 + 1.5 * IQR

        # Replace outliers with the mean of the column
        df[column] = np.where(df[column] < lower_bound, df[column].mean(), df[column])
        df[column] = np.where(df[column] > upper_bound, df[column].mean(), df[column])
    return df
df = fill_outliers_with_mean(df)
```

```
!pip install matplotlib seaborn
```

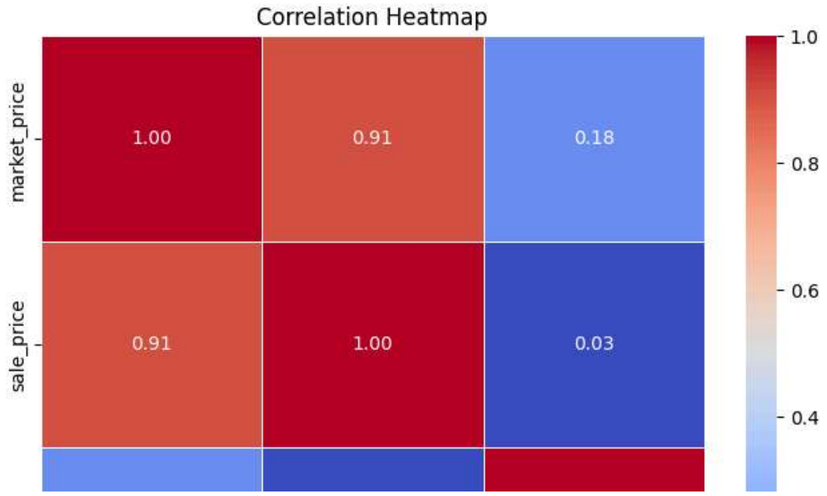
```
Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (3.8.0)
Requirement already satisfied: seaborn in /usr/local/lib/python3.10/dist-packages (0.13.2)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (1.3.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (4.55.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (1.4.7)
Requirement already satisfied: numpy<2,>=1.21 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (1.26.4)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (24.2)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (11.0.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (3.2.0)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib) (2.8.2)
Requirement already satisfied: pandas>=1.2 in /usr/local/lib/python3.10/dist-packages (from seaborn) (2.2.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.2->seaborn) (2024.2)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.2->seaborn) (2024.2)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib) (1.16.0)
```

```
import matplotlib.pyplot as plt
import seaborn as sns
```

```
plt.figure(figsize=(10, 6))
sns.histplot(df['market_price'], bins=10, kde=True, color='blue')
plt.title("Distribution of market prices")
plt.xlabel("market price")
plt.ylabel("Frequency")
plt.show()
```



```
corr = df[['market_price', 'sale_price', 'Discount']].corr()

# Plot heatmap
plt.figure(figsize=(8, 6))
sns.heatmap(corr, annot=True, cmap='coolwarm', fmt='.2f', linewidths=0.5)
plt.title("Correlation Heatmap")
plt.show()
```


Correlation Heatmap
market_price
sale_price
1.00
0.91
0.18
0.91
1.00
0.03
1.0
0.8
0.6
0.4