

# MINI PROJECT

## BIG BASKET ANALYSIS

- This dataset contains 10 attributes with simple meaning and which are described as follows:
  - **index** - Simply the Index!
  - **product** - Title of the product
  - **category** - Category into which product has been classified
  - **sub\_category** - Subcategory into which product has been kept
  - **brand** - Brand of the product
  - **sale\_price** - Price at which product is being sold on the site
  - **market\_price** - Market price of the product
  - **type** - Type into which product falls
  - **rating** - Rating the product has got from its consumers
  - **description** - Description of the dataset
  
- Libraries which we used with this Data Set:
  - Numpy
  - Pandas
  - Seaborn
  - Matplotlib

## Steps To Follow:

### 1. Load Dataset.

```
1 import numpy as np
2 import pandas as pd
3 import seaborn as sns
4 import matplotlib.pyplot as plt
5

[2]: 1 data=pd.read_csv("BigBasket Products.csv")
2 data
3
```

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
0	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	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	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	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	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	Wottagiril Perfume Spray - Heaven, Classic	Beauty & Hygiene	Fragrances & Deos	Layer	199.20	249.0	Perfume	3.9	Layer brings you Wottagiril Classic fragrant b...
27551	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	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	Green Tea - Pure Original	Beverages	Tea	Tetley	396.00	495.0	Tea Bags	4.2	Tetley Green Tea with its refreshing pure, ori...
27554	United Dreams Go Fair Deodorant	Beauty & Hygiene	Men's Grooming	United Colors Of Benetton	214.53	390.0	Men's Deodorants	4.5	The new mens fragrance from the United Dreams ...

27555 rows × 10 columns

### 2. Use head function to look for first 12 rows.

```
1 data.head(12)
```

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
0	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	220.0	220.0	Hair Oil & Serum	4.1	This Product contains Garlic Oil that is known...
1	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	MasterCook	180.0	180.0	Water & Fridge Bottles	2.3	Each product is microwave safe (without lid), ...
2	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	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	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	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 Multi...
6	Multani Matti	Beauty & Hygiene	Skin Care	Satinance	58.0	58.0	Face Care	3.6	Satinance multani matti is an excellent skin t...
7	Hand Sanitizer - 70% Alcohol Based	Beauty & Hygiene	Bath & Hand Wash	Bionova	250.0	250.0	Hand Wash & Sanitizers	4.0	70%Alcohol based is gentle of hand leave skin...
8	Biotin & Collagen Volumizing Hair Shampoo + Bl...	Beauty & Hygiene	Hair Care	StBotanica	1098.0	1098.0	Shampoo & Conditioner	3.5	An exclusive blend with Vitamin B7 Biotin, Hyd...
9	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 thorough...
10	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	Butter Cookies Gold Collection	Gourmet & World Food	Chocolates & Biscuits	Sapphire	600.0	600.0	Luxury Chocolates, Gifts	2.2	Enjoy a tin full of delicious butter cookies m...
12	...	...	...	...	...	...	...	...	...

### 3. Get Description of the data in the DataFrame.

```
1 data.describe()
```

	index	sale_price	market_price	rating
count	27555.00000	27549.000000	27555.000000	18919.000000
mean	13778.00000	334.648391	382.056654	3.943295
std	7564.58767	1202.10213	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

## 4. Find Information about the DataFrame.

```

[5] 1 data.shape
[5] (27555, 10)

[6] 1 data.size
[6] 275550

[7] 1 data.dtypes
[7] 0
    index      int64
    product     object
    category    object
    sub_category object
    brand       object
    sale_price   float64
    market_price float64
    type        object
    rating      float64
    description  object
dtype: object

[8] 1 data.isnull().sum()
[8] 0
    index      0
    product     1
    category    0
    sub_category 0
    brand       1
    sale_price   6
    market_price 0
    type        0
    rating      8636
    description  115
dtype: int64

[9] 1 data.head(20)
[9]
    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...
5      6  Germ - Removal Multipurpose Wipes  Cleaning & Household  All Purpose Cleaners  Nature Protect  169.00  199.0  Disinfectant Spray & Cleaners  3.3  Stay protected from contamination with Multi...
6      7  Multani Mitti  Beauty & Hygiene  Skin Care  Satinance  58.00  58.0  Face Care  3.6  Satinance multani mitti is an excellent skin t...
7      8  Hand Sanitizer - 70% Alcohol Base  Beauty & Hygiene  Bath & Hand Wash  Biomega  250.00  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  1098.00  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  20.00  20.0  Utensil Scrub-Pad, Glove  4.3  Scotch Brite Anti- Bacterial Scrub Pad thorough...
10    11  Wheat Grass Powder - Raw  Gourmet & World Food  Cooking & Baking Needs  NUTRASHIL  261.00  290.0  Flours & Pre-Mixes  4.0  Wheatgrass is a superfood potent health food w...
11    12  Butter Cookies Gold Collection  Gourmet & World Food  Chocolates & Biscuits  Sapphire  600.00  600.0  Luxury Chocolates, Gifts  2.2  Enjoy a tin full of delicious butter cookies m...
12    13  Face Wash - Oil Control, Active  Beauty & Hygiene  Skin Care  Oxy  110.00  110.0  Face Care  5.0  This face wash deeply cleanses dirt and impuri...
13    14  Mold & Mildew Remover with Bleach  Cleaning & Household  All Purpose Cleaners  Clorox  350.00  350.0  Floor & Other Cleaners  3.8  This formula has been scientifically proven to...
14    15  Just Spray - Mosquito Repellent Room Spray  Cleaning & Household  Fresheners & Repellents  Herbal Strategi  200.00  200.0  Mosquito Repellent  4.2  Strategi Just Spray is a very effective 100% H...
15    16  Dove Plastic Soap Case - Assorted Colour  Cleaning & Household  Bins & Bathroom Ware  Nakoda  49.00  59.0  Soap Cases & Dispensers  4.0  This soap case is made of virgin plastic which...
16    17  Smooth Skin Oil - For Dry Skin  Beauty & Hygiene  Skin Care  Aroma Treasures  324.00  360.0  Aromatherapy  5.0  Specially crafted for dry skin, this richly fo...
17    18  Salted Pumpkin  Gourmet & World Food  Snacks, Dry Fruits, Nuts  Graminway  180.00  180.0  Roasted Seeds & Nuts  4.9  Graminway Salted Pumpkin Seeds are the perfect...
18    19  Flax Seeds - Roasted  Gourmet & World Food  Snacks, Dry Fruits, Nuts  True Elements  120.00  120.0  Roasted Seeds & Nuts  4.3  True Elements brings to you Roasted Flax Seeds...
19    20  Organic Tofu - Soy Paneer  Gourmet & World Food  Dairy & Cheese  Murgimms  85.14  90.0  Tofu  3.9  We at Wellness Foods, manufacture dairy and no...

```

## 5. Find out Top & least sold products.

```

[18] 1 toppr=data.sort_values(by=['rating'],ascending=False)
[18] 2 toppr.head(18)
[18]
    index      product      category      sub_category      brand      sale_price      market_price      type      rating      description
8987  8988  Bernard Scot Ice Bucket With Tong & Glasses/Tu...  Kitchen, Garden & Pets  Crockery & Cutlery  Treo  639.0  790.0  Glassware  5.0  Now spend some relaxing time at home or with y...
8267  8268  Skin Fit Tablets - Improve Skin Health  Beauty & Hygiene  Health & Medicine  Jiva Ayurveda  63.0  63.0  Everyday Medicine  5.0  The Jiva Skin Fit tablet aims at keeping our s...
19459  19460  Disposable Face Mask - Melts, 3 Ply  Beauty & Hygiene  Health & Medicine  Mirabelle  49.0  119.0  Face Masks & Safety Gears  5.0  We can use the mask multiple times till it get...
19447  19448  Caviar Rejuvenate & Protecting Face Mask Sheet  Beauty & Hygiene  Skin Care  Glamveda  120.0  150.0  Face Care  5.0  Moist & elastic skin with nutritious caviar. G...
25246  25247  Adult Dry Dog Food - Chicken & Rice  Kitchen, Garden & Pets  Pet Food & Accessories  Chappi  1060.2  1140.0  Pet Meals & Treats  5.0  Chappi is complete and balanced nutrition for ...
8223  8224  Hyaluronic Acid Moisture Cream  Beauty & Hygiene  Skin Care  It's Skin  855.0  950.0  Face Care  5.0  Its Skins Hyaluronic acid is a moisture-bindin...
19414  19415  Baby Soft Relax Teether - 2 M+  Baby Care  Baby Accessories  Chicco  579.0  579.0  Soothers & Teethers  5.0  Right from his very first few months the mouth...
19412  19413  Arsohills - Tablets  Beauty & Hygiene  Health & Medicine  Herbal Hills  285.0  285.0  Supplements & Proteins  5.0  The selection of herbs in Arsohills is based u...
8236  8237  Milkshake - Vanilla Ice Cream Flavour  Bakery, Cakes & Dairy  Dairy  Hersheys  35.0  35.0  Flavoured, Soya Milk  5.0  Hershey's milkshakes contain 30% more calcium ...
8238  8239  Organic Mustard Oil/Rai Oil  Foodgrains, Oil & Masala  Edible Oils & Ghee  Earthon  370.0  370.0  Other Edible Oils  5.0  Earthon's Organic Mustard Oil is made from org...

```

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
8987	Bernard Scot Ice Bucket With Tong & Glasses/Tu...	Kitchen, Garden & Pets	Crockery & Cutlery	Treo	639.0	790.0	Glassware	5.0	Now spend some relaxing time at home or with y...
8268	Skin-Fit Tablets - Improves Skin Health	Beauty & Hygiene	Health & Medicine	Jiva Ayurveda	63.0	63.0	Everyday Medicine	5.0	The Jiva Skin Fit tablet aims at keeping our s...
19459	Disposable Face Mask - Melt Blown, 3 Ply	Beauty & Hygiene	Health & Medicine	Mirabelle	49.0	119.0	Face Masks & Safety Gears	5.0	We can use the mask multiple times till it get...
19447	Caviar Rejuvenate & Protecting Face Mask Sheet	Beauty & Hygiene	Skin Care	Glamveda	120.0	150.0	Face Care	5.0	Moist & elastic skin with nutritious caviar. G...
25246	Adult Dry Dog Food - Chicken & Rice	Kitchen, Garden & Pets	Pet Food & Accessories	Chappi	1060.2	1140.0	Pet Meals & Treats	5.0	Chappi is complete and balanced nutrition for ...
8223	Hyaluronic Acid Moisture Cream	Beauty & Hygiene	Skin Care	It's Skin	855.0	950.0	Face Care	5.0	Its Skins Hyaluronic acid is a moisture-bindin...
19414	Baby Soft Relax Teethers - 2 M+	Baby Care	Baby Accessories	Chilco	579.0	579.0	Soothers & Teethers	5.0	Right from his very first few months the mouth...
19412	Arsollis - Tablets	Beauty & Hygiene	Health & Medicine	Herbal Hills	285.0	285.0	Supplements & Proteins	5.0	The selection of herbs in Arsollis is based u...
8236	Milkshake - Vanilla Ice Cream Flavour	Bakery, Cakes & Dairy	Dairy	Hersheys	35.0	35.0	Flavoured, Soya Milk	5.0	Hershey's milkshakes contain 30% more calcium ...
8238	Organic Mustard Oil/Rai Oil	Foodgrains, Oil & Masala	Edible Oils & Ghee	Earthon	370.0	370.0	Other Edible Oils	5.0	Earthon's Organic Mustard Oil is made from org...

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
24845	Divine-Issme Set - Eau De Parfum + Deodorant	Beauty & Hygiene	Fragrances & Deos	Ulric De Varens	918.75	1225.0	Gift Sets	1.0	Naturally masculine, lavender enhances this ca...
5731	Cooling Teether - Trumpet	Baby Care	Baby Accessories	Pigeon Baby	279.00	279.0	Soothers & Teethers	1.0	This cooling teether is designed to fit into y...
5677	Retinol Advanced Anti Aging Day Cream - SPF 30...	Beauty & Hygiene	Skin Care	StBotanica	899.00	899.0	Face Care	1.0	St.Botanica Retinol Advanced anti-ageing Day C...
17284	Soap Case - Avenue Nxt	Beauty & Hygiene	Bath & Hand Wash	Plasto World	95.00	95.0	Bathing Accessories	1.0	OurÅ Soap DishÅ is made of plastic infused wit...
10453	Milk Chocolate - Salted Peanut Praline	Snacks & Branded Foods	Chocolate & Candies	Uns	295.00	295.0	Chocolates	1.0	With a taste that lingers on, enjoy smooth 36%
...	...	...	...	...	...	...	...	...	...
27509	Deluxe Crackers - Veg	Gourmet & World Food	Chocolates & Biscuits	Kerk	150.00	150.0	Cookies, Biscotti, Wafer	NaN	Kerk Biscuits-has been a household name synony...
27511	Specialist Stain Remover Pen & Marker	Cleaning & Household	All Purpose Cleaners	365	449.00	449.0	Imported Cleaners	NaN	Mightier than the pen. The pen may be mightier...
27514	Verge & Sheer Perfume For Pair	Beauty & Hygiene	Fragrances & Deos	Skinn by Titan	1615.50	1795.0	Perfume	NaN	VERGE for men paints a picture of a classy ou...
27530	Ticket to Fleadom Dry Shampoo For Dogs	Kitchen, Garden & Pets	Pet Food & Accessories	Captain Zack	99.00	99.0	Pet Cleaning & Grooming	NaN	1) No Rinse Defence Against Ticks and Fleas. C...
27531	Vanilla Ice Cream	Gourmet & World Food	Dairy & Cheese	Haagen-Dazs	225.00	225.0	Gourmet Ice Cream	NaN	Some things are so good in their simplest form...
27555 rows x 10 columns									

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
24845	Divine-Issme Set - Eau De Parfum + Deodorant	Beauty & Hygiene	Fragrances & Deos	Ulric De Varens	918.75	1225.0	Gift Sets	1.0	Naturally masculine, lavender enhances this ca...
5731	Cooling Teether - Trumpet	Baby Care	Baby Accessories	Pigeon Baby	279.00	279.0	Soothers & Teethers	1.0	This cooling teether is designed to fit into y...
5677	Retinol Advanced Anti Aging Day Cream - SPF 30...	Beauty & Hygiene	Skin Care	StBotanica	899.00	899.0	Face Care	1.0	St.Botanica Retinol Advanced anti-ageing Day C...
17284	Soap Case - Avenue Nxt	Beauty & Hygiene	Bath & Hand Wash	Plasto World	95.00	95.0	Bathing Accessories	1.0	OurÅ Soap DishÅ is made of plastic infused wit...
10453	Milk Chocolate - Salted Peanut Praline	Snacks & Branded Foods	Chocolate & Candies	Uns	295.00	295.0	Chocolates	1.0	With a taste that lingers on, enjoy smooth 36%
19715	Voyage Sport Eau De Toilette	Beauty & Hygiene	Fragrances & Deos	Nautica	2287.50	3050.0	Eau De Toilette	1.0	Nautica Voyage Sport captures the mind, body a...
10473	Joy Square Glass	Kitchen, Garden & Pets	Storage & Accessories	Saura	109.00	126.0	Containers Sets	1.0	This glass, made of plastic material, is speci...
26202	Palette Deluxe Oil-Care Color Permanent - 4-0 ...	Beauty & Hygiene	Hair Care	Schwarzkopf	650.00	650.0	Hair Color	1.0	Achieve the intensive and radiant looking hair...
13088	Cold Pressed Jojoba Carrier Oil	Beauty & Hygiene	Skin Care	Soulflower	546.00	650.0	Aromatherapy	1.0	100% pure, natural, vegan and cold-pressed Sou...
22021	Spray Glass water Bottle With Cork - Orange	Kitchen, Garden & Pets	Storage & Accessories	Treo	439.00	540.0	Water & Fridge Bottles	1.0	Stylish in terms of its design and highly func...

index	product	category	sub_category	brand	sale_price	market_price	type	rating	description
0	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	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	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	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	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...
5	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	169.00	199.0	Disinfectant Spray & Cleaners	3.3	Stay protected from contamination with Multi...
6	Muttni Mati	Beauty & Hygiene	Skin Care	Satinance	58.00	58.0	Face Care	3.6	Satinance muttni matti is an excellent skin t...
7	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Blonova	250.00	250.0	Hand Wash & Sanitizers	4.0	70%Alcohol based is gentle of hand leaves skin...
8	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	1098.00	1098.0	Shampoo & Conditioner	3.5	An exclusive blend with Vitamin B7 Biotin, Hyd...
9	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	20.00	20.0	Utensil Scrub-Pad, Glove	4.3	Scotch Brite Anti- Bacterial Scrub Pad thorough...
10	Wheat Grass Powder - Raw	Gourmet & World Food	Cooking & Baking Needs	NUTRASHIL	261.00	290.0	Flours & Pre-Mixes	4.0	Wheatgrass is a superfood potent health food w...
11	Butter Cookies Gold Collection	Gourmet & World Food	Chocolate & Biscuits	Sapphire	600.00	600.0	Luxury Chocolates, Gifts	2.2	Enjoy a tin full of delicious butter cookies n...
12	Face Wash - Oil Control, Activ	Beauty & Hygiene	Skin Care	Oxy	110.00	110.0	Face Care	5.0	This face wash deeply cleanses dirt and impuri...
13	Mold & Mildew Remover with Bleach	Cleaning & Household	All Purpose Cleaners	Clorox	350.00	350.0	Floor & Other Cleaners	3.6	This formula has been scientifically proven to...
14	Just Spray - Mosquito Repellent Room Spray	Cleaning & Household	Fresheners & Repellents	Herbal Strategi	200.00	200.0	Mosquito Repellent	4.2	Strategic Just Spray is a very effective 100% H...
15	Dove Plastic Soap Case - Assorted Colour	Cleaning & Household	Bins & Bathroom Ware	Nakoda	49.00	59.0	Soap Cases & Dispensers	4.0	This soap case is made of virgin plastic which...
16	Smooth Skin Oil - For Dry Skin	Beauty & Hygiene	Skin Care	Aroma Treasures	324.00	360.0	Aromatherapy	5.0	Specially crafted for dry skin, this richly fo...
17	Salted Pumpkin	Gourmet & World Food	Snacks, Dry Fruits, Nuts	Graminway	180.00	180.0	Roasted Seeds & Nuts	4.9	Graminway Salted Pumpkin Seeds are the perfect...
18	Flax Seeds - Roasted	Gourmet & World Food	Snacks, Dry Fruits, Nuts	True Elements	120.00	120.0	Roasted Seeds & Nuts	4.3	True Elements brings to you Roasted Flax Seeds...
19	Organic Tofu - Soya Pioneer	Gourmet & World Food	Dairy & Cheese	Murginns	85.14	90.0	Tofu	3.9	We at Wellness Foods, manufacture dairy and no...

## 6. Measuring discount on a certain item.

```
[15] data['discount_price']=data['market_price']-data['sale_price']
    data['discount_percent']=(data['discount_price']/data['market_price'])*100
    data[['discount_price','discount_percent']].head(10)
```

	discount_price	discount_percent
0	0.0	0.000000
1	0.0	0.000000
2	131.0	52.400000
3	27.0	15.340909
4	0.0	0.000000
5	30.0	15.075377
6	0.0	0.000000
7	0.0	0.000000
8	0.0	0.000000
9	0.0	0.000000

```
[16] data.head()
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	220.0	220.0	Hair Oil & Serum	4.1	This Product contains Garlic Oil that is known...	0.0	0.000000
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	180.0	180.0	Water & Fridge Bottles	2.3	Each product is microwave safe (without lid), ...	0.0	0.000000
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...	131.0	52.400000
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...	27.0	15.340909
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...	0.0	0.000000

```
[17] data.sort_values(by=['discount_percent'],ascending=False).head(10)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
26976	26977	Curry Leaves	Fruits & Vegetables	Herbs & Seasonings	Fresho	2.45	15.0	Indian & Exotic Herbs	NaN	With dark green and glossy appearance, cury l...	12.55	83.666667
17713	17714	Fruit & Vegetables Hand Juicer	Kitchen, Garden & Pets	Kitchen Accessories	Triones	349.00	1995.0	Kitchen Tools & Other Accessories	1.9	Hand juicer for fruits and vegetables in steel...	1646.00	82.506266
13318	13319	Small Silicone Spatula With Plastic Handle - A...	Kitchen, Garden & Pets	Bakeware	HAZEL	75.00	399.0	Baking Tools & Brushes	3.9	This silicone spatula is safety-tested, heat r...	324.00	81.203008
13740	13741	Decorative Party Light Big Star String LED Lig...	Kitchen, Garden & Pets	Appliances & Electricals	Lexton	209.00	1099.0	CFL & Led Bulbs	3.2	Bring home these bright and festive lights no...	890.00	80.982712
10438	10439	NHS 860 Temperature Control Professional Hair ...	Beauty & Hygiene	Hair Care	Nova	467.03	2395.0	Tools & Accessories	3.2	This Settle Hair Straightener from Nova gives...	1927.97	80.499791
4562	4563	Concealer Brush 930	Beauty & Hygiene	Makeup	Mud	350.00	1750.0	Makeup Accessories	NaN	These are exceptional, high-quality premium ma...	1400.00	80.000000
11473	11474	Decorative Party Light Golden Bell String (LED ...	Kitchen, Garden & Pets	Appliances & Electricals	Lexton	415.00	1999.0	CFL & Led Bulbs	3.6	These string lights can be used anywhere for d...	1584.00	79.239620
13265	13266	Decorative Party Light Golden Bell String (LED ...	Kitchen, Garden & Pets	Appliances & Electricals	Lexton	415.00	1999.0	CFL & Led Bulbs	4.4	These string lights can be used anywhere for d...	1584.00	79.239620
10092	10093	USB String Fairy Lights 3M 30 LED For Decorati...	Kitchen, Garden & Pets	Appliances & Electricals	Mansaa	85.00	399.0	CFL & Led Bulbs	3.9	With the USB plug-in design, now you can use a...	314.00	78.696742
24292	24293	Steel Belly Shape Storage Dabba/Container Set...	Kitchen, Garden & Pets	Steel Utensils	Jensons	219.00	995.0	Steel Storage Containers	3.6	Jensons Stainless Steel Belly Puri Dabbastora...	776.00	77.980950

## 7. Find out the Missing Values from the Dataset.

```
[18] data.isnull().sum()
```

	0
index	0
product	1
category	0
sub_category	0
brand	1
sale_price	6
market_price	0
type	0
rating	8636
description	115
discount_price	6
discount_percent	6

dtype: int64

## 8. Find out the outliers from the dataset according to the columns and fill them with the mean.

```
✓ [19] Q1=data['rating'].quantile(0.25)
Q3=data['rating'].quantile(0.75)
IQR=Q3-Q1
up_bond=Q3+1.5*IQR
low_bond=Q1-1.5*IQR
mean_rating=data['rating'].mean()
data['rating']=np.where(
    (data['rating']<low_bond) | (data['rating']>up_bond) | pd.isnull(data['rating']),
    mean_rating,
    data['rating']
)
```

Index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0 1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	220.0	220.0	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0.0	0.000000
1 2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	180.0	180.0	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid)....	0.0	0.000000
2 3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	119.0	250.0	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	131.0	52.400000
3 4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	149.0	176.0	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27.0	15.340909
4 5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	162.0	162.0	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0.0	0.000000
5 6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	169.0	199.0	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multi...	30.0	15.075377
6 7	Multani Matti	Beauty & Hygiene	Skin Care	Satinance	58.0	58.0	Face Care	3.600000	Satinance multani matti is an excellent skin t...	0.0	0.000000
7 8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	250.0	250.0	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0.0	0.000000
8 9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	1098.0	1098.0	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0.0	0.000000
9 10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	20.0	20.0	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thoroug...	0.0	0.000000

```
✓ [20] data.head(10)
```

```
Index
product
category
sub_category
brand
sale_price
market_price
type
rating
description
discount_price
discount_percent
```

```
dtype: int64
```

```
✓ [21] data.isnull().sum()
```

	0
Index	0
product	1
category	0
sub_category	0
brand	1
sale_price	6
market_price	0
type	0
rating	0
description	115
discount_price	6
discount_percent	6

```
dtype: int64
```

```
✓ [22] Q1=data['sale_price'].quantile(0.25)
Q3=data['sale_price'].quantile(0.75)
IQR=Q3-Q1
up_bond=Q3+1.5*IQR
low_bond=Q1-1.5*IQR
mean_sp=data['sale_price'].mean()
data['sale_price']=np.where(
    (data['sale_price']<low_bond) | (data['sale_price']>up_bond) | pd.isnull(data['sale_price']),
    mean_sp,
    data['sale_price']
)
```

```
✓ [23] data.isnull().sum()
```

```
0s
```

	0
index	0
product	1
category	0
sub_category	0
brand	1
sale_price	0
market_price	0
type	0
rating	0
description	115
discount_price	6
discount_percent	6

dtype: int64

```
✓ [24] Q1=data['discount_price'].quantile(0.25)
Q3=data['discount_price'].quantile(0.75)
IQR=Q3-Q1
up_bound=Q3+1.5*IQR
low_bound=Q1-1.5*IQR
mean_dprice=data['discount_price'].mean()
data['discount_price']=np.where(
    (data['discount_price']<low_bound) | (data['discount_price']>up_bound) | pd.isnull(data['discount_price']),
    mean_dprice,
    data['discount_price']
)
data.isnull().sum()
```

```
0s
```

	0
index	0
product	1
category	0
sub_category	0
brand	1
sale_price	0
market_price	0
type	0
rating	0
description	115
discount_price	0
discount_percent	6

dtype: int64

```

✓ [25] Q1=data['discount_percent'].quantile(0.25)
Q3=data['discount_percent'].quantile(0.75)
IQR=Q3-Q1
up_bond=Q3+1.5*IQR
low_bond=Q1-1.5*IQR
mean_dpercent=data['discount_percent'].mean()
data['discount_percent']=np.where(
    (data['discount_percent']<low_bond) | (data['discount_percent']>up_bond) |pd.isnull(data['discount_percent']),
    mean_dpercent,
    data['discount_percent']
)

data.isnull().sum()


```

	0
index	0
product	1
category	0
sub_category	0
brand	1
sale_price	0
market_price	0
type	0
rating	0
description	115
discount_price	0
discount_percent	0

**dtype:** int64

	description	count
A brand inspired by the Greek goddess of victory, it personifies strength, speed and energy and it launched its first perfume in 1929. Since then, a wide assortment of fragrance collections has hit the marketplace with refreshing, and eye-catching proposals that capture the essence and lifestyle of today's man and woman.	47	
Baldessarini Ambre Cologne is built around a whisky accord and complemented by top notes of mandarin and red apple, leading to a heart of violet, offset by a leather accord. With a base that blends notes of amber, oakwood, vanilla and labdanum. For Beauty tips, tricks & more visit <a href="https://bigbasket.blog/">https://bigbasket.blog/</a>	44	
Now free your environment, and yourself from the unhealthy plastic bottles and get a healthier one-time product for all your needs. These high-grade stainless steel bottles are here to enhance your dining and travelling experience, saving you from the negative effects of plastic. The single-walled steel bottles are perfect add-ons to your kitchen collection if you are looking for light-weighted, durable, classy looking product. The bottle comes with sipper & wide mouth steel cap, catering to double usage. Be it going to the gym, or sending it with the kids to school, the colourful sipper can always make it a very convenient, handy and attractive a stylish convenient product. You can take it to the office or just keep on the dinner table. Open the wide mouth lid and use at ease. The bottles come with the major USP of inter-changeable lid facility. Now you can make the same steel cap suitable as a sipper bottle by just interchanging the lids. Hence, get 2 of two-in-one featured bottles of same model and capacities and get the best of both, with a variety of colours!	37	
Energetic strong and stirred with action, X-MEN Charge Body Deodorant has the fragrance of pure desire in the most dashing way. Stay irresistible, 24x7.	35	
Joyo Klip It Stainless steel container comes with easy locking. These containers are made from high quality non-magnetic stainless steel body. Joyo Klip It container has odourless lid cover with food-grade silicone seal (gasket) in lid & has all 4 sides locks which ensure airtight containers for keeping food fresh, 100% leak-proof containers for keeping food from spilling, stackable design for easily storing the containers on top of each other and the pioneering clip mechanism. Take this container to the office, school, camping or hiking.	29	
Nutriorg certified organic sunflower oil is sourced through organically cultivated sunflower seeds from its crop. We use only organic products to ensure you get the best out of organic products. All our organic products are certified under USDA certifications. Before the packaged product reaches to you, each of our product lot undergoes laboratory tests to ensure it has the right ingredient mix which is organic, safe to use and hygienically prepared.	1	
It is a skin tonic that includes a combination of Giloya, Khadir, Chirayta, Kachaar with neem leaves, bark and fruits. It is effective for skin disorders like acne, pimples, itching, blisters and other skin disorders. Giloya relieves the disorders of the blood. Khadir is a blood purifier and is very good for skin allergies. Chirayta is a traditional Ayurvedic herb which is strongly bitter in taste but very good for reducing heat from the body.	1	
Savor the authentic and traditional taste from the heart of South India with our range of Just a Minute Ready Mixes. All made from choice herbs and spices. Enjoy this delicious Puliyogere Rice Mix in a jiffy by just adding 2 teaspoons of the masala mix and a dab of your favorite cooking oil or ghee and mix it with a cup of hot cooked rice. Easy as that.	1	
Good Morning Gift Collection is a combination of the best-in-class products from the house of Park Avenue. An ultimate gift for the men in your life.	1	
Tetley Green Tea with its refreshing pure, original flavour contains five times more antioxidants than fruits and vegetables. A cup of Tetley Natural Green Tea helps cleanse from within and eliminates all those pollutants and toxins that our bodies are exposed to on a daily basis!! Rejuvenate yourself every day with a cup of Tetley Natural Green Tea.	1	

21944 rows × 1 columns

**dtype:** int64

```

[27] description_mode=data['description'].mode()[0]
      data['description'].fillna(description_mode,inplace=True)

  <ipython-input-27-67cf9b54d6df>:2: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.
  This behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.

  For example, when doing `df[col].method(value, inplace=True)`, try using `df.method((col: value), inplace=True)` or `df[col] = df[col].method(value)` instead, to perform the operation inplace on the original object.

      data['description'].fillna(description_mode,inplace=True)

[28] data.isnull().sum()

  >>>   0
    index      0
  product      1
category      0
sub_category  0
    brand      1
sale_price     0
market_price   0
      type      0
    rating      0
  description    0
discount_price  0
discount_percent  0

dtype: int64

[29] data['description'].value_counts()

  >>>   count
    description
A brand inspired by the Greek goddess of victory, it personifies strength, speed and energy and it launched its first perfume in 1929. Since then, a wide assortment of fragrance collections has hit the marketplace with refreshing, and eye-catching proposals that capture the essence and lifestyle of today's man and woman. 162
Baldessarini Ambre Cologne is built around a whisky accord and complemented by top notes of mandarin and red apple, leading to a heart of violet, offset by a leather accord. With a base that blends notes of amber, oakwood, vanilla and labdanum. For Beauty tips, tricks & more visit https://bjgbasket.blog/ 44
Now free your environment, and yourself from the unhealthy plastic bottles and get a healthier one-time product for all your needs. These high-grade stainless steel bottles are here to enhance your dining and travelling experience, saving you from the negative effects of plastic. The single-walled steel bottles are perfect add-ons to your kitchen collection if you are looking for light-weighted, durable, classy looking product. The bottle comes with sippier & wide mouth steel cap, catering to double usage. Be it going to the gym, or sending it with the kids to school, the colourful sippier can always make it a very convenient, handy and more importantly a style-statement product. You can take it to the office or just keep on the dinner table. Open the wide mouth lid and use at school, camping or hiking! 37
Energetic strong and stirred with action, X-MEN Charge Body Deodorant has the fragrance of pure desire in the most dashing way. Stay irresistible, 24x7. 35
Joyko Klip It Stainless steel container comes with easy locking. These containers are made from high quality non-magnetic stainless steel body. Joyko Klip It container has odourless lid cover with food-grade silicone seal (gasket) in lid & has all 4 sides locks which ensure airtight containers for keeping food fresh, 100% leak-proof containers for keeping food from spilling, stackable design for easily storing the containers on top of each other and the pioneering clip mechanism. Take this container to the office, school, camping or hiking. 29
...
Nutriorg certified organic sunflower oil is sourced through organically cultivated sunflower seeds from its crop. We use only organic products to ensure you get the best out of organic products. All our organic products are certified under USDA certifications. Before the packaged product reaches to you, each of our product lot undergoes laboratory tests to ensure it has the right ingredient mix which is organic, safe to use and hygienically prepared. 1
It is a skin tonic that includes a combination of Giloya, Khadir, Chiriyata, Kachnaar with neem leaves, bark and fruits. It is effective for skin disorders like acne, pimples, itching, blisters and other skin disorders. Giloya relieves the disorders of the blood. Khadir is a blood purifier and is very good for skin allergies. Chiriyata is a traditional Ayurvedic herb which is strongly bitter in taste but very good for reducing heat from the body. 1
Savor the authentic and traditional taste from the heart of South India with our range of Just 5 Minute Ready Mixes. All made from choice herbs and spices. Enjoy this delicious Pulyogere Rice Mix in a jiffy by just adding 2 teaspoons of the masala mix and a dab of your favorite cooking oil or ghee and mix it with a cup of hot cooked rice. Easy as that. 1
Good Morning Gift Collection is a combination of the best-in-class products from the house of Park Avenue. An ultimate gift for the men in your life. 1
Tetley Green Tea with its refreshing pure, original flavour contains five times more antioxidants than fruits and vegetables. A cup of Tetley Natural Green Tea helps cleanse from within and eliminates all those pollutants and toxins that our bodies are exposed to on a daily basis!! Rejuvenate yourself every day with a cup of Tetley Natural Green Tea. 1

21944 rows x 1 columns

dtype: int64

```

```

[30] data.isnull().sum()

  >>>   0
    index      0
  product      1
category      0
sub_category  0
    brand      1
sale_price     0
market_price   0
      type      0
    rating      0
  description    0
discount_price  0
discount_percent  0

dtype: int64

[31] product_mode=data['product'].mode()[0]
      data['product'].fillna(product_mode,inplace=True)

  <ipython-input-31-5770b0ff987e3>:2: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.
  This behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.

  For example, when doing `df[col].method(value, inplace=True)`, try using `df.method((col: value), inplace=True)` or `df[col] = df[col].method(value)` instead, to perform the operation inplace on the original object.

      data['product'].fillna(product_mode,inplace=True)

```

```

✓ [32] data.isnull().sum()
0s

[1]:      0
index      0
product     0
category    0
sub_category 0
brand       1
sale_price   0
market_price 0
type        0
rating      0
description  0
discount_price 0
discount_percent 0

dtype: int64

```

```

✓ [33] data['product'].value_counts()
0s

[1]:      count
product
Turmeric Powder/Arisina Pudi      27
Extra Virgin Olive Oil           15
Cow Ghee/Tuppa                   14
Soft Drink                        12
Colorsilk Hair Colour With Keratin 12
...
Pepper & Herb Salami Chicken    1
Nutmeg Powder                     1
Disney Mickey Mouse Plastic Kids Sipper Bottle - Coolest Dude 1
Chocolates-Roasted Peanut Chocolate 1
Green Tea - Pure Original        1

23540 rows × 1 columns

dtype: int64

```

```

✓ [34] data.isnull().sum()
0s

[1]:      0
index      0
product     0
category    0
sub_category 0
brand       1
sale_price   0
market_price 0
type        0
rating      0
description  0
discount_price 0
discount_percent 0

dtype: int64

```

```

✓ [35] data['brand'].value_counts()
0s
   count
  brand
  Fresho      638
  bb Royal    539
  BB Home     428
  DP          250
  Fresho Signature 171
  ...
  ...
  Wellastrate     1
  Clean & Fresh    1
  Lal           1
  Glint          1
  Baron De Bercy    1
2313 rows x 1 columns
dtype: int64

✓ [36] mode_brand=data['brand'].mode()[0]
       data['brand'].fillna(mode_brand,inplace=True)

  ↗<ipython-input-36-62ab65c02223>:2: FutureWarning: A value is trying to be set on a copy of a DataFrame or Series through chained assignment using an inplace method.
  The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are setting values always behaves as a copy.
  For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method((col: value), inplace=True)' or df[col] = df[col].method(value) instead, to perform the operation inplace on the original object.

       data['brand'].fillna(mode_brand,inplace=True)

✓ [37] data['brand'].value_counts()
0s
   count
  brand
  Fresho      639
  bb Royal    539
  BB Home     428
  DP          250
  Fresho Signature 171
  ...
  ...
  Wellastrate     1
  Clean & Fresh    1
  Lal           1
  Glint          1
  Baron De Bercy    1
2313 rows x 1 columns
dtype: int64

✓ [38] data.isnull().sum()
0s
   0
  index      0
  product     0
  category    0
  sub_category 0
  brand        0
  sale_price   0
  market_price 0
  type         0
  rating        0
  description   0
  discount_price 0
  discount_percent 0
dtype: int64

```

		product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334.648391	220.0	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0.000000	0.000000
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	MasterCook	334.648391	180.0	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid).	0.000000	0.000000
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334.648391	250.0	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	47.469268	8.621433
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334.648391	176.0	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27.000000	15.340909
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334.648391	162.0	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0.000000	0.000000
5	6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334.648391	199.0	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multipl...	30.000000	15.075377
6	7	Mutani Matti	Beauty & Hygiene	Skin Care	Satinance	334.648391	58.0	Face Care	3.600000	Satinance mutani matti is an excellent skin t...	0.000000	0.000000
7	8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334.648391	250.0	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0.000000	0.000000
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334.648391	1098.0	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0.000000	0.000000
9	10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334.648391	20.0	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thorough...	0.000000	0.000000

```
[40] data['sale_price'].value_counts()
```

count

sale\_price

334.648391 27529

5.000000 25

3.000000 1

**dtype:** int64

```
[41] data['sale_price']=data['sale_price'].astype('int64')
```

		product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220.0	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0.000000	0.000000
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	MasterCook	334	180.0	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid).	0.000000	0.000000
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334	250.0	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	47.469268	8.621433
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176.0	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27.000000	15.340909
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162.0	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0.000000	0.000000
5	6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334	199.0	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multipl...	30.000000	15.075377
6	7	Mutani Matti	Beauty & Hygiene	Skin Care	Satinance	334	58.0	Face Care	3.600000	Satinance mutani matti is an excellent skin t...	0.000000	0.000000
7	8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334	250.0	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0.000000	0.000000
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334	1098.0	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0.000000	0.000000
9	10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334	20.0	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thorough...	0.000000	0.000000
10	11	Wheat Grass Powder - Raw	Gourmet & World Food	Cooking & Baking Needs	NUTRASHIL	334	290.0	Flours & Pre-Mixes	4.000000	Wheatgrass is a superfood potent health food w...	29.000000	10.000000
11	12	Butter Cookies Gold Collection	Gourmet & World Food	Chocolates & Biscuits	Sapphire	334	600.0	Luxury Chocolates, Gift	3.943295	Enjoy a tin full of delicious butter cookies m...	0.000000	0.000000
12	13	Face Wash - Oil Control, Active	Beauty & Hygiene	Skin Care	Oxy	334	110.0	Face Care	5.000000	This face wash deeply cleanses dirt and impuri...	0.000000	0.000000
13	14	Mold & Mildew Remover with Bleach	Cleaning & Household	All Purpose Cleaners	Clorox	334	350.0	Floor & Other Cleaners	3.800000	This formula has been scientifically proven to...	0.000000	0.000000

```
[ ] data['sale_price'].value_counts()
```

```
count
```

sale_price	count
334	27529
5	25
3	1

```
dtype: int64
```

```
[ ] data['discount_price'].value_counts()
```

```
count
```

discount_price	count
0.000000	12321
47.469268	3366
10.000000	248
30.000000	237
50.000000	185
...	...
2.600000	1
28.240000	1
18.550000	1
32.970000	1
71.220000	1

```
1555 rows x 1 columns
```

```
dtype: int64
```

```
[ ] data['discount_price']=data['discount_price'].round().astype(int)
```

```
[ ] data['discount_price'].value_counts()
```

```
count
```

discount_price	count
0	12332
47	3405
10	449
4	373
30	368
...	...
107	9
113	8
103	8
115	7
117	6

```
129 rows x 1 columns
```

```
dtype: int64
```

[ ] data.head(10)													
Index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent		
0 1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220.0	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0	0.000000		
1 2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	334	180.0	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid), ...	0	0.000000		
2 3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334	250.0	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	47	8.621433		
3 4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176.0	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27	15.340909		
4 5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162.0	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0	0.000000		
5 6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334	199.0	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multi...	30	15.075377		
6 7	Mutani Mati	Beauty & Hygiene	Satinance	Satinance	334	58.0	Face Care	3.600000	Satinance mutani mati is an excellent skin t...	0	0.000000		
7 8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334	250.0	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0	0.000000		
8 9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334	1098.0	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0	0.000000		
9 10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334	20.0	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thoroug...	0	0.000000		

[ ] data['market_price'].value_counts()	
	count
199.00	584
150.00	469
99.00	465
50.00	446
250.00	429
...	...
13.75	1
4475.00	1
4099.00	1
153.75	1
1071.00	1

1348 rows x 1 columns

**dtype:** int64

[ ] data['market_price']=data['market_price'].round().astype(int) data.head(10)													
Index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent		
0 1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0	0.000000		
1 2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	334	180	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid), ...	0	0.000000		
2 3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334	250	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	47	8.621433		
3 4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27	15.340909		
4 5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0	0.000000		
5 6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334	199	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multi...	30	15.075377		
6 7	Mutani Mati	Beauty & Hygiene	Satinance	Satinance	334	58	Face Care	3.600000	Satinance mutani mati is an excellent skin t...	0	0.000000		
7 8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334	250	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0	0.000000		
8 9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334	1098	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0	0.000000		
9 10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334	20	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thoroug...	0	0.000000		

```
[ ] data['discount_percent'].value_counts()
```

discount_percent	count
0.000000	12321
10.000000	1271
20.000000	1254
15.000000	831
25.000000	799
...	...
33.671523	1
32.467532	1
14.009804	1
44.047619	1
32.352941	1

3531 rows × 1 columns

dtype: int64

```
[ ] data['discount_percent']=data['discount_percent'].round().astype(int)
```

```
[ ] data.head(10)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220	Hair Oil & Serum	4.100000	This Product contains Garlic Oil that is known...	0	0
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	334	180	Water & Fridge Bottles	3.943295	Each product is microwave safe (without lid), ...	0	0
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334	250	Lamp & Lamp Oil	3.400000	A perfect gift for all occasions, be it your m...	47	9
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176	Laundry, Storage Baskets	3.700000	Multipurpose container with an attractive desi...	27	15
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162	Bathing Bars & Soaps	4.400000	Nivea Creme Soft Soap gives your skin the best...	0	0
5	6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334	199	Disinfectant Spray & Cleaners	3.300000	Stay protected from contamination with Multi...	30	15
6	7	Multani Matti	Beauty & Hygiene	Skin Care	Satinance	334	58	Face Care	3.600000	Satinance multani matti is an excellent skin t...	0	0
7	8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334	250	Hand Wash & Sanitizers	4.000000	70%Alcohol based is gentle of hand leaves skin...	0	0
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334	1098	Shampoo & Conditioner	3.500000	An exclusive blend with Vitamin B7 Biotin, Hyd...	0	0
9	10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334	20	Utensil Scrub-Pad, Glove	4.300000	Scotch Brite Anti- Bacterial Scrub Pad thoroug...	0	0

```
[ ] data['rating']=data['rating'].round(1)
```

```
[ ] data.head(10)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220	Hair Oil & Serum	4.1	This Product contains Garlic Oil that is known...	0	0
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	334	180	Water & Fridge Bottles	3.9	Each product is microwave safe (without lid), ...	0	0
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Trm	334	250	Lamp & Lamp Oil	3.4	A perfect gift for all occasions, be it your m...	47	9
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176	Laundry, Storage Baskets	3.7	Multipurpose container with an attractive desi...	27	15
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162	Bathing Bars & Soaps	4.4	Nivea Creme Soft Soap gives your skin the best...	0	0
5	6	Germ - Removal Multipurpose Wipes	Cleaning & Household	All Purpose Cleaners	Nature Protect	334	199	Disinfectant Spray & Cleaners	3.3	Stay protected from contamination with Multi...	30	15
6	7	Multani Matti	Beauty & Hygiene	Skin Care	Satinance	334	58	Face Care	3.6	Satinance multani matti is an excellent skin t...	0	0
7	8	Hand Sanitizer - 70% Alcohol Base	Beauty & Hygiene	Bath & Hand Wash	Bionova	334	250	Hand Wash & Sanitizers	4.0	70%Alcohol based is gentle of hand leaves skin...	0	0
8	9	Biotin & Collagen Volumizing Hair Shampoo + Bi...	Beauty & Hygiene	Hair Care	StBotanica	334	1098	Shampoo & Conditioner	3.5	An exclusive blend with Vitamin B7 Biotin, Hyd...	0	0
9	10	Scrub Pad - Anti- Bacterial, Regular	Cleaning & Household	Mops, Brushes & Scrubs	Scotch brite	334	20	Utensil Scrub-Pad, Glove	4.3	Scotch Brite Anti- Bacterial Scrub Pad thoroug...	0	0

```
[ ] data['rating'].value_counts()
```

count

rating

3.9	10880
4.2	2249
4.3	2138
4.0	2089
4.1	1767
5.0	1407
4.4	1037
3.8	866
4.5	797
3.0	684
3.7	672
3.5	535
3.6	447
3.3	400
4.6	322
3.4	303
4.7	287
4.8	199
3.2	181
3.1	163
2.9	79

```
[ ] data.head(5)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	Garlic Oil - Vegetarian Capsule 500 mg	Beauty & Hygiene	Hair Care	Sri Sri Ayurveda	334	220	Hair Oil & Serum	4.1	This Product contains Garlic Oil that is known...	0	0
1	2	Water Bottle - Orange	Kitchen, Garden & Pets	Storage & Accessories	Mastercook	334	180	Water & Fridge Bottles	3.9	Each product is microwave safe (without lid), ...	0	0
2	3	Brass Angle Deep - Plain, No.2	Cleaning & Household	Pooja Needs	Tmn	334	250	Lamp & Lamp Oil	3.4	A perfect gift for all occasions, be it your m...	47	9
3	4	Cereal Flip Lid Container/Storage Jar - Assort...	Cleaning & Household	Bins & Bathroom Ware	Nakoda	334	176	Laundry, Storage Baskets	3.7	Multipurpose container with an attractive desi...	27	15
4	5	Creme Soft Soap - For Hands & Body	Beauty & Hygiene	Bath & Hand Wash	Nivea	334	162	Bathing Bars & Soaps	4.4	Nivea Creme Soft Soap gives your skin the best...	0	0

## 9. Create Plots or visualizations.

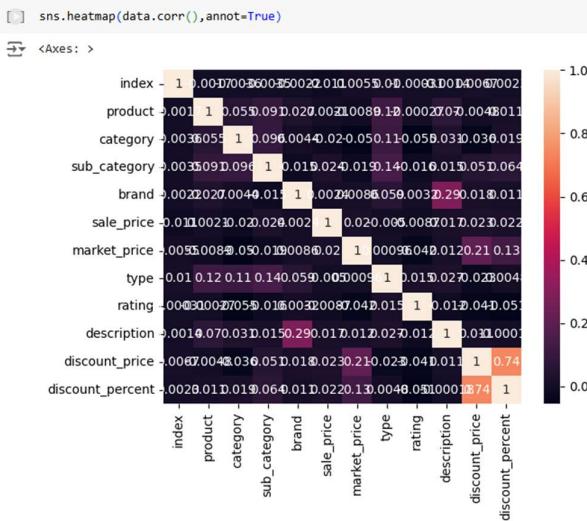
```
[ ] from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
newfeature=['product','category','sub_category','brand','type','description']
for i in newfeature:
    data[i]=le.fit_transform(data[i])
data
```

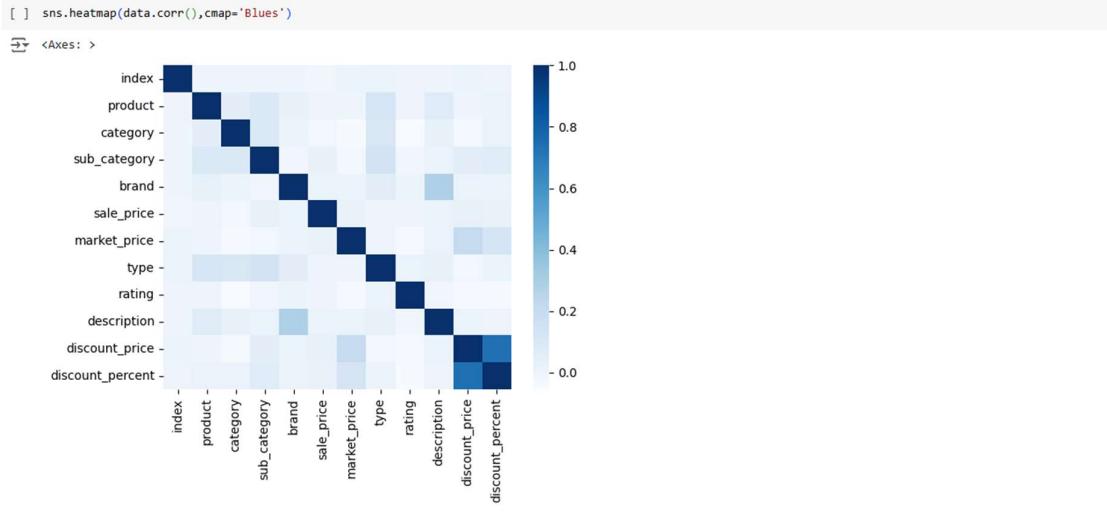
	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	8277	2	49	1959	334	220	204	4.1	18758	0	0
1	2	22935	9	86	1258	334	180	420	3.9	5402	0	0
2	3	2957	4	73	2125	334	250	249	3.4	865	47	9
3	4	3573	4	9	1386	334	176	250	3.7	11693	27	15
4	5	5476	2	8	1455	334	162	39	4.4	12257	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
27550	27551	23383	2	41	1145	334	249	329	3.9	10123	50	20
27551	27552	18608	8	20	1672	334	75	215	4.0	14401	8	10
27552	27553	16244	8	82	675	334	200	286	3.8	20983	0	0
27553	27554	9120	3	87	2062	334	495	395	4.2	16926	99	20
27554	27555	22427	2	59	2158	334	390	271	4.5	17814	47	45

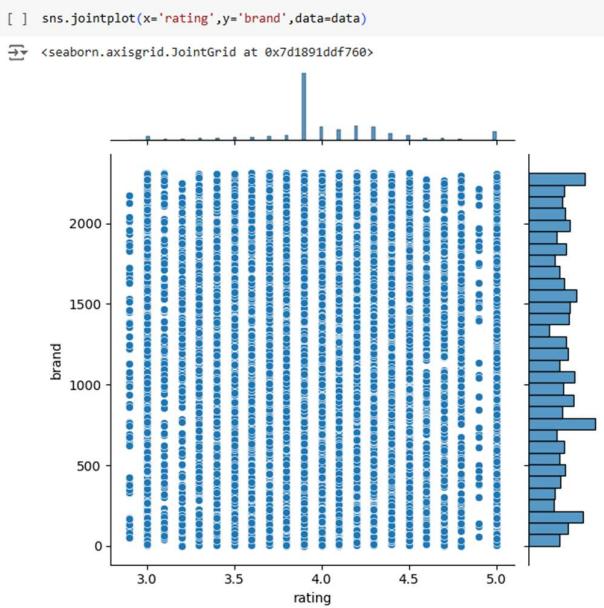
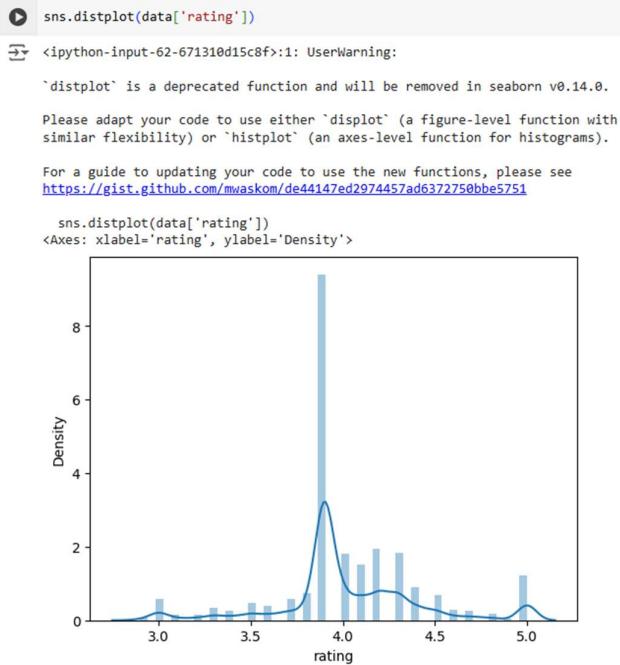
27555 rows × 12 columns

```
[ ] data.corr()
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
index	1.000000	-0.001729	-0.003579	-0.003489	-0.002248	-0.010960	0.005493	0.010138	-0.000306	-0.001432	0.006689	0.002328
product	-0.001729	1.000000	0.054980	0.090798	0.027203	0.002094	-0.008872	0.118097	-0.000272	0.069961	-0.004776	0.011256
category	-0.003579	0.054980	1.000000	0.095718	0.004448	-0.020137	-0.049709	0.109048	-0.055287	0.031262	-0.035919	0.018878
sub_category	-0.003489	0.090798	0.095718	1.000000	-0.014615	0.024162	0.018660	0.141230	-0.015648	0.014831	0.051079	0.064466
brand	-0.002248	0.027203	0.004448	-0.014615	1.000000	0.002444	0.008609	0.058534	0.003238	0.285328	0.017604	0.010663
sale_price	-0.010960	0.002094	-0.020137	0.024162	0.002444	1.000000	0.019920	-0.004953	-0.008692	0.017171	0.023300	0.021853
market_price	0.005493	-0.008872	-0.049709	-0.018660	0.008609	0.019920	1.000000	0.009965	-0.041908	0.011728	0.208676	0.129170
type	0.010138	0.118097	0.109048	0.141230	0.058534	-0.004953	0.009965	1.000000	0.015022	0.027045	-0.022563	0.004770
rating	-0.000306	-0.00272	-0.055287	-0.015648	0.003238	-0.008692	-0.041908	0.015022	1.000000	-0.012175	-0.041126	-0.050876
description	-0.001432	0.069961	0.031262	0.014831	0.285328	0.017171	0.011728	0.027045	-0.012175	1.000000	0.011116	-0.000178
discount_price	0.006689	-0.004776	-0.035919	0.051079	0.017604	0.023300	0.208676	-0.022583	-0.041126	0.011116	1.000000	0.736809
discount_percent	0.002328	0.011256	0.018878	0.064466	0.010663	0.021853	0.129170	0.004770	-0.050876	-0.000178	0.736809	1.000000





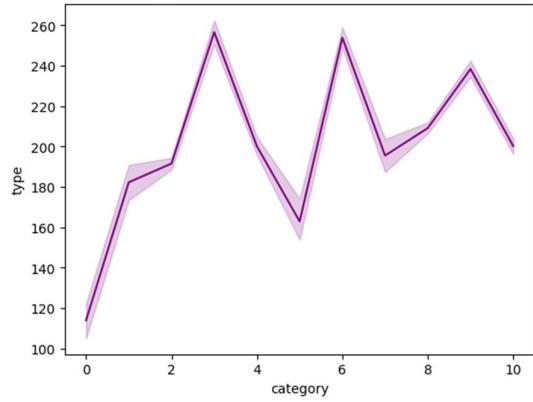


```
[ ] data.head(5)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	8277	2	49	1959	334	220	204	4.1	18758	0	0
1	2	22935	9	86	1258	334	180	420	3.9	5402	0	0
2	3	2957	4	73	2125	334	250	249	3.4	865	47	9
3	4	3573	4	9	1386	334	176	250	3.7	11693	27	15
4	5	5476	2	8	1455	334	162	39	4.4	12257	0	0

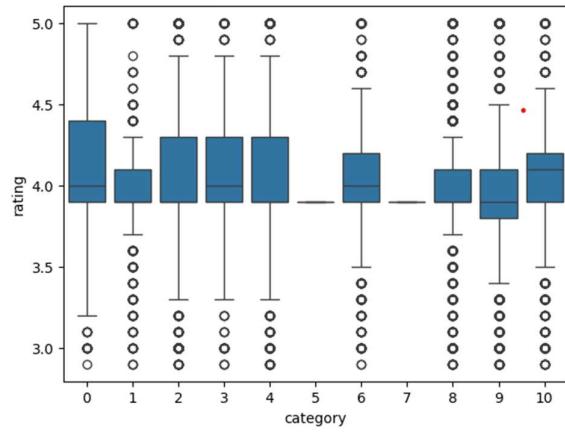
```
[ ] sns.lineplot(x='category',y='type',data=data,color='purple')
```

```
↳ <Axes: xlabel='category', ylabel='type'>
```



```
[ ] sns.boxplot(x='category',y='rating',data=data)
```

```
↳ <Axes: xlabel='category', ylabel='rating'>
```



```
[ ]
```

```
data.head(5)
```

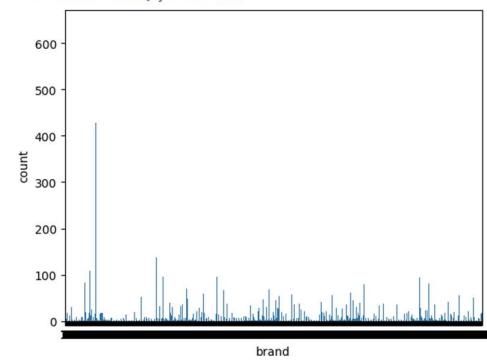
```
⤵
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	8277	2	49	1959	334	220	204	4.1	18758	0	0
1	2	22935	9	86	1258	334	180	420	3.9	5402	0	0
2	3	2957	4	73	2125	334	250	249	3.4	865	47	9
3	4	3573	4	9	1386	334	176	250	3.7	11693	27	15
4	5	5476	2	8	1455	334	162	39	4.4	12257	0	0

```
[ ]
```

```
sns.countplot(x='brand',data=data)
```

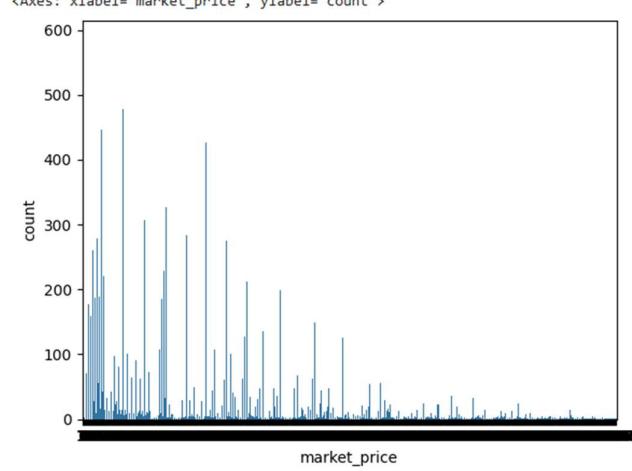
```
⤵
```



```
[ ]
```

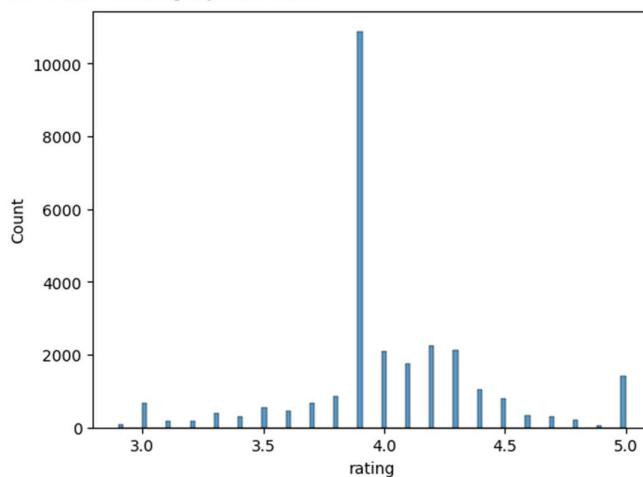
```
sns.countplot(x='market_price',data=data)
```

```
⤵
```



```
▶ sns.histplot(x='rating',data=data)
```

```
⇨ <Axes: xlabel='rating', ylabel='Count'>
```



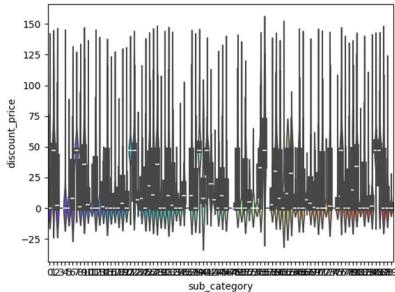
```
▶ sns.violinplot(x='sub_category',y='discount_price',data=data,palette='rainbow')
```

```
⇨ <ipython-input-74-02f6a1c4d7ec>:1: FutureWarning:
```

```
Passing 'palette' without assigning 'hue' is deprecated and will be removed in v0.14.0. Assign the 'x' variable to 'hue' and set 'legend=False' for the same effect.
```

```
    sns.violinplot(x='sub_category',y='discount_price',data=data,palette='rainbow')
```

```
<Axes: xlabel='sub_category', ylabel='discount_price'>
```



```
▶ plt.xlabel('rating')
```

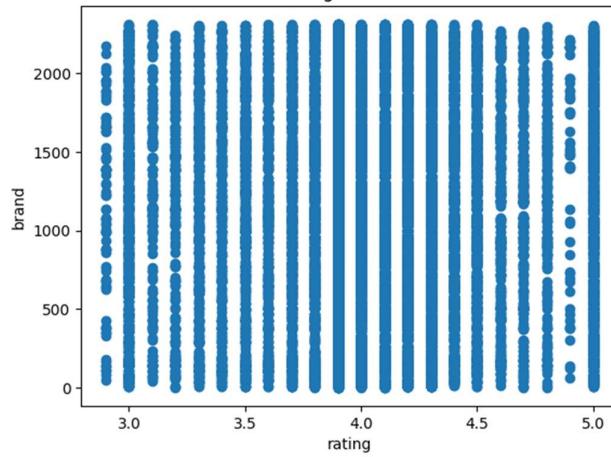
```
▶ plt.ylabel('brand')
```

```
▶ plt.title('rating vs brand')
```

```
▶ plt.scatter(data['rating'],data['brand'])
```

```
⇨ <matplotlib.collections.PathCollection at 0x7d188742a650>
```

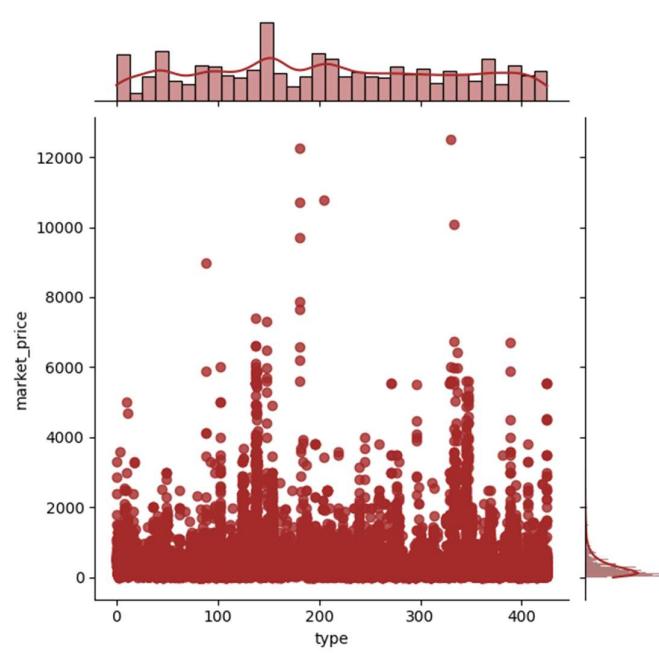
rating vs brand

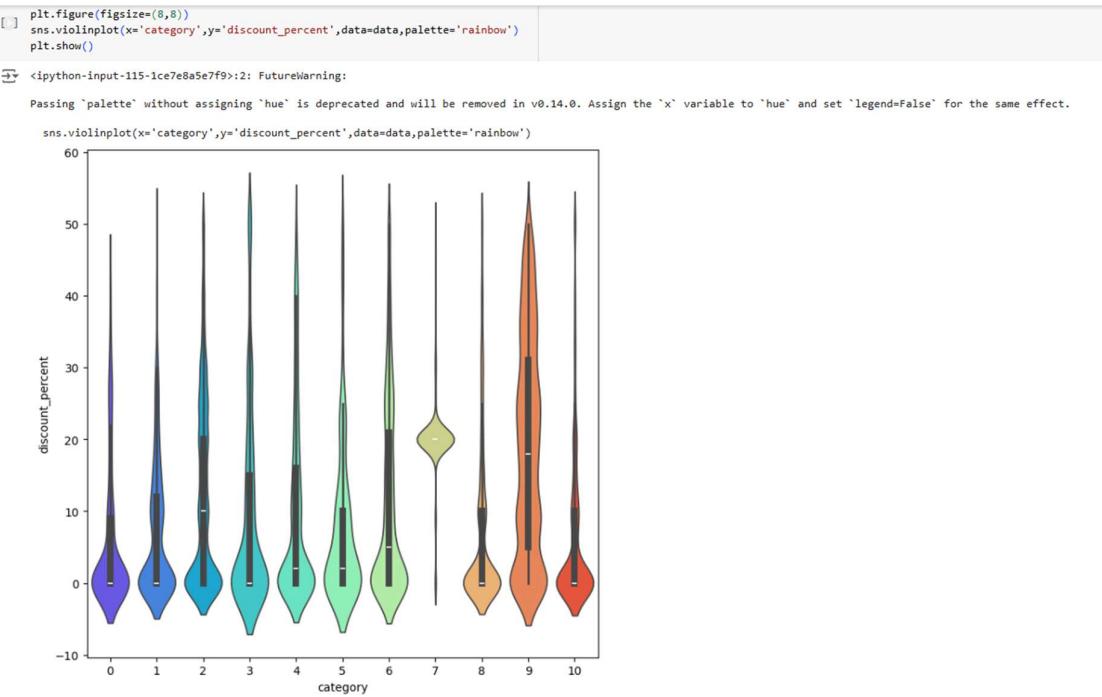
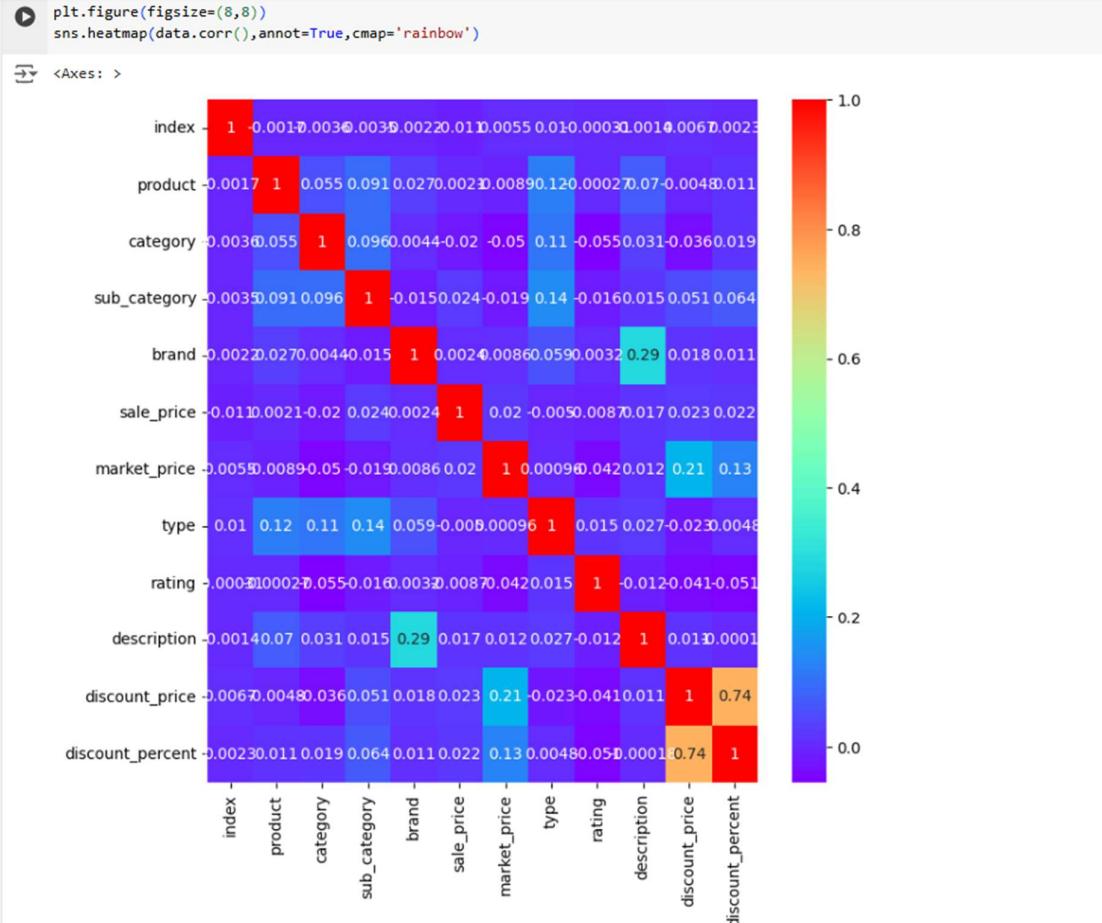


```
data.head(5)
```

	index	product	category	sub_category	brand	sale_price	market_price	type	rating	description	discount_price	discount_percent
0	1	8277	2	49	1959	334	220	204	4.1	18758	0	0
1	2	22935	9	86	1258	334	180	420	3.9	5402	0	0
2	3	2957	4	73	2125	334	250	249	3.4	865	47	9
3	4	3573	4	9	1386	334	176	250	3.7	11693	27	15
4	5	5476	2	8	1455	334	162	39	4.4	12257	0	0

```
sns.jointplot(x='type',y='market_price',data=data,kind='reg',color='brown')  
plt.show()
```





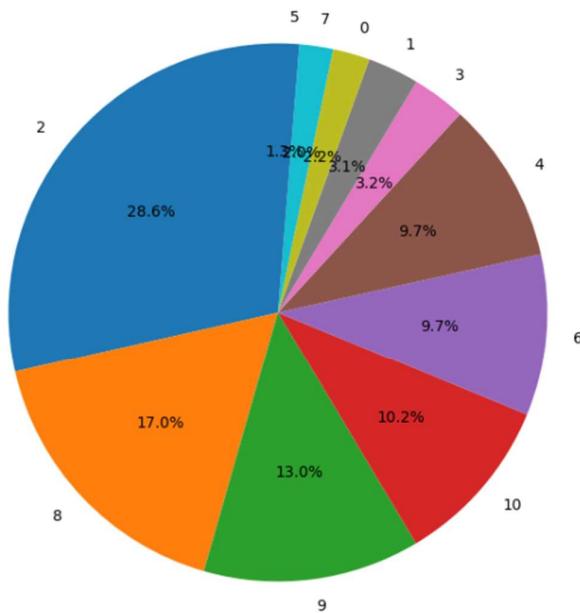
```
[ ] data.head(5)
```

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```
[ ] category_count = data['category'].value_counts()

plt.figure(figsize=(8, 8))
plt.pie(category_count, labels=category_count.index, autopct='%.1f%%', startangle=90)
plt.title('Distribution of Products by Categories')
plt.show()
```

→ Distribution of Products by Categories



```
[ ] plt.plot(data['discount_percent'], data['sale_price'],color='yellow')
plt.xlabel('Discount Percentage',color='blue')
plt.ylabel('Sale Price',color='green')
plt.title('Sale Price vs. Discount Percentage',color='red')
plt.grid(True)
plt.show()
```



```
[ ] sns.histplot(data['description'],color='purple')
plt.xlabel('Description')
plt.ylabel('Frequency')
plt.title('Distribution of Product')
plt.show()
```

