

# FLIPKART PRODUCT DATASET

## ANALYSIS

### ➤ Import Libraries and Load Data:

```
#Import libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

#Import csv file
Prod= pd.read_csv("/content/drive/MyDrive/Data analytics and reporting(DAR)/Flipkart Product Dataset.csv")
```

### ➤ Data Overview:

```
#View dimensions of data sets
print(Prod.shape)
```

➡ (12041, 11)

```
#Head of the data set
Prod.head()
```

|   | category_1             | category_2 | category_3 | title   | product_rating | selling_price | mrp    | seller_name    | seller_rating | description                                       | highlights  |
|---|------------------------|------------|------------|---|----------------|---------------|--------|----------------|---------------|---|---|
| 0 | Sports, Books and More | Sports     | Cricket    | ITWOSERVICES CRICKET NET 100X10 CRICKET NET NY... | 4.4            | ₹1,615        | ₹4,000 | I2SERVICES     | 4.4           | NaN   | Cricket Practice Net<br>NYLON HDPE Material<br>W x H... |
| 1 | Sports, Books and More | Sports     | Cricket    | ITWOSERVICES CRICKET NET GROUND BOUNDARY NET 1... | 4.4            | ₹152          | ₹600   | I2SERVICES     | 4.4           | 10 X 10 GREEN CRICKET NET HDPE NYLON.             | Cricket HDPE NYLON Material W x H x D: 3.048 x...       |
| 2 | Sports, Books and More | Sports     | Cricket    | VICTORY Medium Weight ( Pack of 1 ) Rubber Cri... | 3.7            | ₹59           | ₹199   | VictoryOutlets | 4.7           | NaN   | Cricket Rubber Ball<br>Weight: 110 g                    |
| 3 | Sports, Books and More | Sports     | Cricket    | VICTORY Cricket Wind Ball (Pack of 1) - Made L... | 3.8            | ₹75           | ₹299   | VictoryOutlets | 4.7           | NaN   | Cricket Synthetic Ball<br>Weight: 110 g                 |
| 4 | Sports, Books and More | Sports     | Cricket    | CEAT Hltman Full Size Double Blade Poplar Cric... | 3.4            | ₹329          | ₹1,399 | IndiaFit       | 4.7           | The Ceat Poplar Willow Cricket Bat has been de... | Age Group 15+ Yrs<br>Blade Made of Poplar Willow ...    |

```
▶ #View summary of data
print(Prod.info())
```

```
↗ <class 'pandas.core.frame.DataFrame'>
RangeIndex: 12041 entries, 0 to 12040
Data columns (total 11 columns):
#   Column                Non-Null Count  Dtype
---  -
0   category_1            12041 non-null  object
1   category_2            12041 non-null  object
2   category_3            12041 non-null  object
3   title                  12023 non-null  object
4   product_rating        11961 non-null  float64
5   selling_price         12013 non-null  object
6   mrp                   11666 non-null  object
7   seller_name           11825 non-null  object
8   seller_rating         11827 non-null  float64
9   description            5021 non-null   object
10  highlights            6560 non-null   object
dtypes: float64(2), object(9)
memory usage: 1.0+ MB
None
```

```
▶ #Data Description
print(Prod.describe())
```

```
↗
```

|       | product_rating | seller_rating |
|-------|----------------|---------------|
| count | 11961.000000   | 11827.000000  |
| mean  | 4.061617       | 4.394538      |
| std   | 0.345575       | 0.404288      |
| min   | 1.000000       | 3.000000      |
| 25%   | 3.900000       | 4.100000      |
| 50%   | 4.100000       | 4.400000      |
| 75%   | 4.300000       | 4.700000      |
| max   | 5.000000       | 5.000000      |

```
▶ #Display column names of the data set
Prod.columns
```

```
↗ Index(['category_1', 'category_2', 'category_3', 'title', 'product_rating',
        'selling_price', 'mrp', 'seller_name', 'seller_rating', 'description',
        'highlights'],
        dtype='object')
```

## ➤ Missing Values Analysis:

```
▶ #Check missing values  
print(Prod.isnull().sum())
```

```
category_1      0  
category_2      0  
category_3      0  
title           18  
product_rating  80  
selling_price   28  
mrp            375  
seller_name     216  
seller_rating   214  
description     7020  
highlights      5481  
dtype: int64
```

```
▶ #Drop row with missing values and check the first few rows  
Prod_dropped=Prod.dropna()  
print(Prod_dropped.head())
```

```
category_1 category_2 category_3 \  
1 Sports, Books and More Sports Cricket  
4 Sports, Books and More Sports Cricket  
7 Sports, Books and More Sports Cricket  
8 Sports, Books and More Sports Cricket  
10 Sports, Books and More Sports Cricket  
  
title product_rating \  
1 ITWOSERVICES CRICKET NET GROUND BOUNDARY NET 1... 4.4  
4 CEAT Hitman Full Size Double Blade Poplar Cric... 3.4  
7 VECTOR X Cricket Bat Grip Handle Chevron Extra... 4.1  
8 LYCAN Full Size Pvc/ Hard Plastic Cricket Bat ... 4.0  
10 Star X Thrill Fox Heavy Duty First Grade HD Pl... 4.0  
  
selling_price mrp seller_name seller_rating \  
1 ₹152 ₹600 I2SERVICES 4.4  
4 ₹329 ₹1,399 IndiaFit 4.7  
7 ₹369 ₹396 SOCCERINTERNATIONAL 4.1  
8 ₹249 ₹1,099 sellguru 4.8  
10 ₹349 ₹749 STARX 4.5  
  
description \  
1 10 X 10 GREEN CRICKET NET HDPE NYLON.  
4 The Ceat Poplar Willow Cricket Bat has been de...  
7 Vector X Cricket Ring Chevron bat protection 6...  
8 Lycan hard plastic full size cricket bat , sui...  
10 StarX Brings you "Thrill Fox Heavy Duty First ...  
  
highlights  
1 Cricket HDPE NYLON Material W x H x D: 3.048 x...  
4 Age Group 15+ Yrs Blade Made of Poplar Willow ...  
7 Type: Replacement Grip Material: Premium Rubbe...  
8 Age Group 15+ Yrs Blade Made of PVC/Plastic Ad...  
10 Age Group 15+ Yrs Blade Made of PVC/Plastic Be...
```

```

▶ #Fill missing values in 'product_rating' with the mean of the column
Prod['product_rating'] = Prod['product_rating'].fillna(Mean)
## Check how many missing values remain in each column
Prod.isnull().sum()

```

↕

|                |      |
|----------------|------|
|                | 0    |
| category_1     | 0    |
| category_2     | 0    |
| category_3     | 0    |
| title          | 18   |
| product_rating | 0    |
| selling_price  | 28   |
| mrp            | 375  |
| seller_name    | 216  |
| seller_rating  | 214  |
| description    | 7020 |
| highlights     | 5481 |

dtype: int64

```

▶ #Forward fill missing values
New_prod=Prod.fillna(method='ffill')
#Print the first 5 rows
print(New_prod.head())

```

↕

|   | category_1             | category_2 | category_3 |  |
|---|------------------------|------------|------------|--|
| 0 | Sports, Books and More | Sports     | Cricket    |  |
| 1 | Sports, Books and More | Sports     | Cricket    |  |
| 2 | Sports, Books and More | Sports     | Cricket    |  |
| 3 | Sports, Books and More | Sports     | Cricket    |  |
| 4 | Sports, Books and More | Sports     | Cricket    |  |

|   | title   | product_rating |  |
|---|---|----------------|--|
| 0 | ITWOSERVICES CRICKET NET 100X10 CRICKET NET NY... | 4.4            |  |
| 1 | ITWOSERVICES CRICKET NET GROUND BOUNDARY NET 1... | 4.4            |  |
| 2 | VICTORY Medium Weight ( Pack of 1 ) Rubber Cri... | 3.7            |  |
| 3 | VICTORY Cricket Wind Ball (Pack of 1) - Made i... | 3.8            |  |
| 4 | CEAT Hitman Full Size Double Blade Poplar Cric... | 3.4            |  |

|   | selling_price | mrp    | seller_name    | seller_rating |  |
|---|---------------|--------|----------------|---------------|--|
| 0 | 1615.0        | 4000.0 | I2SERVICES     | 4.4           |  |
| 1 | 152.0         | 600.0  | I2SERVICES     | 4.4           |  |
| 2 | 59.0          | 199.0  | VictoryOutlets | 4.7           |  |
| 3 | 75.0          | 299.0  | VictoryOutlets | 4.7           |  |
| 4 | 329.0         | 1399.0 | IndiaFit       | 4.7           |  |

|   | description                                       |  |
|---|---|--|
| 0 | NaN   |  |
| 1 | 10 X 10 GREEN CRICKET NET HDPE NYLON.             |  |
| 2 | 10 X 10 GREEN CRICKET NET HDPE NYLON.             |  |
| 3 | 10 X 10 GREEN CRICKET NET HDPE NYLON.             |  |
| 4 | The Ceat Poplar Willow Cricket Bat has been de... |  |

|   | highlights  |  |
|---|---|--|
| 0 | Cricket Practice Net NYLON HDPE Material W x H... |  |
| 1 | Cricket HDPE NYLON Material W x H x D: 3.048 x... |  |
| 2 | Cricket Rubber Ball Weight: 110 g                 |  |
| 3 | Cricket Synthetic Ball Weight: 110 g              |  |
| 4 | Age Group 15+ Yrs Blade Made of Poplar Willow ... |  |

/tmp/ipython-input-1304556385.py:2: FutureWarning: DataFrame.fillna with 'method' is deprecated and will raise in a future version. Use obj.ffill() or obj.bfill() instead.  
New\_prod=Prod.fillna(method='ffill')

```

#Backward fill missing values
New_prod=Prod.fillna(method='bfill')
##Print the first 5 rows
print(New_prod.head())

```

|   | category_1             | category_2 | category_3 |  |
|---|------------------------|------------|------------|--|
| 0 | Sports, Books and More | Sports     | Cricket    |  |
| 1 | Sports, Books and More | Sports     | Cricket    |  |
| 2 | Sports, Books and More | Sports     | Cricket    |  |
| 3 | Sports, Books and More | Sports     | Cricket    |  |
| 4 | Sports, Books and More | Sports     | Cricket    |  |

|   | title   | product_rating |
|---|---|----------------|
| 0 | ITWOSERVICES CRICKET NET 100X10 CRICKET NET NY... | 4.4            |
| 1 | ITWOSERVICES CRICKET NET GROUND BOUNDARY NET 1... | 4.4            |
| 2 | VICTORY Medium Weight ( Pack of 1 ) Rubber Cri... | 3.7            |
| 3 | VICTORY Cricket Wind Ball (Pack of 1) - Made i... | 3.8            |
| 4 | CEAT Hitman Full Size Double Blade Poplar Cric... | 3.4            |

|   | selling_price | mrp    | seller_name    | seller_rating |
|---|---------------|--------|----------------|---------------|
| 0 | 1615.0        | 4000.0 | I2SERVICES     | 4.4           |
| 1 | 152.0         | 600.0  | I2SERVICES     | 4.4           |
| 2 | 59.0          | 199.0  | VictoryOutlets | 4.7           |
| 3 | 75.0          | 299.0  | VictoryOutlets | 4.7           |
| 4 | 329.0         | 1399.0 | IndiaFit       | 4.7           |

|   | description                                       |
|---|---|
| 0 | 10 X 10 GREEN CRICKET NET HDPE NYLON.             |
| 1 | 10 X 10 GREEN CRICKET NET HDPE NYLON.             |
| 2 | The Ceat Poplar Willow Cricket Bat has been de... |
| 3 | The Ceat Poplar Willow Cricket Bat has been de... |
| 4 | The Ceat Poplar Willow Cricket Bat has been de... |

|   | highlights  |
|---|---|
| 0 | Cricket Practice Net NYLON HDPE Material W x H... |
| 1 | Cricket HDPE NYLON Material W x H x D: 3.048 x... |
| 2 | Cricket Rubber Ball Weight: 110 g                 |
| 3 | Cricket Synthetic Ball Weight: 110 g              |
| 4 | Age Group 15+ Yrs Blade Made of Poplar Willow ... |

/tmp/ipython-input-3987773387.py:2: FutureWarning: DataFrame.fillna with 'method' is deprecated and will raise in a future version. Use obj.ffill() or obj.bfill() instead.  
New\_prod=Prod.fillna(method='bfill')

## ➤ Data Cleaning:

```

#Remove ₹ and commas, convert to numeric
Prod['selling_price'] = Prod['selling_price'].replace('₹,', '', regex=True).astype(float)
Prod['mrp'] = Prod['mrp'].replace('₹,', '', regex=True).astype(float)
# Display first few rows
print(Prod[['selling_price', 'mrp']].head())

```

|   | selling_price | mrp    |
|---|---------------|--------|
| 0 | 1615.0        | 4000.0 |
| 1 | 152.0         | 600.0  |
| 2 | 59.0          | 199.0  |
| 3 | 75.0          | 299.0  |
| 4 | 329.0         | 1399.0 |

## ➤ Basic Statistics:

```

#Mean
Mean=Prod['product_rating'].mean()
print(Mean)

```

4.061616921662068

```
#Median
Median=Prod['product_rating'].median()
print(Median)
```

4.1

```
#Mode
Mode=Prod['product_rating'].mode()
print(Mode)
```

0      4.0  
Name: product\_rating, dtype: float64

## ➤ Data Filtering and Sorting:

```
#Filtering data
filtered_product_rating= Prod['product_rating'] >= 4
filtered_product_rating
```

product\_rating

|       |       |
|-------|-------|
| 0     | True  |
| 1     | True  |
| 2     | False |
| 3     | False |
| 4     | False |
| ...   | ...   |
| 12036 | False |
| 12037 | True  |
| 12038 | True  |
| 12039 | True  |
| 12040 | False |

12041 rows × 1 columns

dtype: bool

```
#Filter by category
filtered_cricket_items = Prod['category_3'].str.contains("Cricket", na=False)
filtered_cricket_items
```

| category_3 |       |
|------------|-------|
| 0          | True  |
| 1          | True  |
| 2          | True  |
| 3          | True  |
| 4          | True  |
| ...        | ...   |
| 12036      | False |
| 12037      | False |
| 12038      | False |
| 12039      | False |
| 12040      | False |

12041 rows x 1 columns

dtype: bool

```
#Sort by price descending
sorted_Prod = Prod.sort_values(by='selling_price', ascending=False)
sorted_Prod
```

|       | category_1         | category_2                      | category_3        | title   | product_rating | selling_price | mrp       | seller_name      | seller_rating | description                                       | highlights  |
|-------|--------------------|---------------------------------|-------------------|---|----------------|---------------|-----------|------------------|---------------|---|---|
| 2328  | Electronics        | Laptops                         | Gaming Laptops    | DELL Alienware Core i7 12th Gen - (32 GB/1 TB...  | 4.800000       | 300490.0      | 1174131.0 | PETILANTE Online | 4.8           | NaN   | 17.3 Inch Full HD, Comfortview Plus NVIDIA G-S...     |
| 2683  | Electronics        | Camera Accessories              | Lens              | SONY SEL100400GMC Lens (White, 100 - 400 mm)      | 4.800000       | 199690.0      | 229490.0  | RetailNet        | 4.8           | NaN   | Lens Mount: E-mount Designed For: ILCE-7M2K, I...     |
| 2337  | Electronics        | Desktop PCs                     | Desktop PCs       | APPLE iMac Core i5 (7th Gen) (8 GB DDR4/1 TB)M... | 4.400000       | 189990.0      | 190400.0  | OmniTechRetail   | 4.4           | NaN   | Mac OS X Sierra Intel Core i5 (7th Gen) HDD Ca...     |
| 2334  | Electronics        | Desktop PCs                     | Desktop PCs       | APPLE All-in-One Core i5 (6th Gen) (8 GB DDR3/... | 4.400000       | 180990.0      | 188900.0  | OmniTechRetail   | 4.4           | NaN   | Mac OS X Lion Intel Core i5 (6th Gen) HDD HDD Capa... |
| 2703  | Electronics        | Camera Accessories              | Lens              | SONY SEL200600G Lens (White, 200 - 600 mm)        | 4.700000       | 154890.0      | 177990.0  | RetailNet        | 4.8           | NaN   | Lens Mount: E-mount Designed For: ILCE-7M2K, I...     |
| ...   | ...                | ...                             | ...               | ...   | ...            | ...           | ...       | ...              | ...           | ...   | ...   |
| 9967  | Home and Furniture | Kitchen, Cookware and Serveware | Tawas             | NIRLON Casting Coated Nonstick Aluminium Uttap... | 5.000000       | NaN           | NaN       | NaN              | NaN           | Nirlon Uttapam / Snack maker is a useful addit... | Made of: Aluminium Type: Tawa Non-stick, Dishw...     |
| 10379 | Home and Furniture | Kitchen Storage                 | Casserole         |   | NaN            | 4.061617      | NaN       | NaN              | NaN           | NaN   | NaN   |
| 11548 | Home and Furniture | Home Décor                      | Clocks            | BAREPEPE Digital Black Clock                      | 4.061617       | NaN           | NaN       | NaN              | NaN           | NaN   | Alarm Height x Width 100 mm x 160 mm Digital          |
| 11817 | Home and Furniture | Home Lighting                   | Ceiling Lamp      |   | NaN            | 4.061617      | NaN       | NaN              | NaN           | NaN   | NaN   |
| 12001 | Home and Furniture | Pet Supplies                    | Fish and Aquatics |   | NaN            | 4.061617      | NaN       | NaN              | NaN           | NaN   | NaN   |

12041 rows x 11 columns

```
#Sort by price ascending
sorted_Prod = Prod.sort_values(by='selling_price')
sorted_Prod
```

|       | category_1             | category_2                      | category_3               | title   | product_rating | selling_price | mrp   | seller_name        | seller_rating | description                                       | highlights  |
|-------|------------------------|---------------------------------|--------------------------|---|----------------|---------------|-------|--------------------|---------------|---|---|
| 656   | Sports, Books and More | Food Essentials                 | snacks and beverages     | BRITANNIA Gold Marie Biscuit (68 g)               | 4.400000       | 10.0          | NaN   | SuperComNet        | 4.6           | NaN   | Type: Marie Biscuit Quantity: 68 g Base Flavor... |
| 1264  | Sports, Books and More | Auto Accessories                | Helmets and Riding Gears | Pidlite Motomax Car & Bike 2K Rubbing Compoun...  | 3.600000       | 51.0          | 65.0  | BTPLD              | 4.4           | Removes minor bike and car scratches, paint de... | Pack Type: Bottle Pack of 1 Form: Wax Quantity... |
| 1304  | Sports, Books and More | Auto Accessories                | Car Audio /Video         | Pidlite Motomax Car & Bike 2K Rubbing Compoun...  | 3.600000       | 51.0          | 65.0  | BTPLD              | 4.4           | Removes minor bike and car scratches, paint de... | Pack Type: Bottle Pack of 1 Form: Wax Quantity... |
| 2     | Sports, Books and More | Sports                          | Cricket                  | VICTORY Medium Weight ( Pack of 1 ) Rubber Cri... | 3.700000       | 59.0          | 199.0 | VictoryOutlets     | 4.7           | NaN   | Cricket Rubber Ball Weight: 110 g                 |
| 10055 | Home and Furniture     | Kitchen, Cookware and Serveware | Kitchen tools            | KVG Whisk Beater Steel Coil Whisk                 | 3.600000       | 59.0          | 75.0  | MYTHANGLOORYRetail | 4.9           | KVG Stainless Steel Egg Beater Lassi / Butler ... | NaN   |
| ...   | ...                    | ...                             | ...                      | ...   | ...            | ...           | ...   | ...                | ...           | ...   | ...   |
| 9967  | Home and Furniture     | Kitchen, Cookware and Serveware | Tawas                    | NIRLON Casting Coated Nonstick Aluminium Uttap... | 5.000000       | NaN           | NaN   | NaN                | NaN           | Nirlon Uttapam / Snack maker is a useful addit... | Made of: Aluminium Type: Tawa Non-stick, Dishw... |
| 10379 | Home and Furniture     | Kitchen Storage                 | Casserole                |   | NaN            | 4.061617      | NaN   | NaN                | NaN           | NaN   | NaN   |
| 11548 | Home and Furniture     | Home Décor                      | Clocks                   | BAREPEPE Digital Black Clock                      | 4.061617       | NaN           | NaN   | NaN                | NaN           | NaN   | Alarm Height x Width 100 mm x 160 mm Digital      |
| 11817 | Home and Furniture     | Home Lighting                   | Ceiling Lamp             |   | NaN            | 4.061617      | NaN   | NaN                | NaN           | NaN   | NaN   |
| 12001 | Home and Furniture     | Pet Supplies                    | Fish and Aquatics        |   | NaN            | 4.061617      | NaN   | NaN                | NaN           | NaN   | NaN   |

12041 rows x 11 columns

## ➤ Group By Statistical Analysis:

```
#Group by
#Mean
mean_stats = Prod.groupby('category_1')[['selling_price', 'mrp', 'product_rating']].mean()
print(mean_stats)
```

|                        | selling_price | mrp          | product_rating |
|------------------------|---------------|--------------|----------------|
| category_1             |               |              |                |
| Bady and Kids          | 507.073599    | 1232.446476  | 4.082332       |
| Electronics            | 7246.622313   | 10499.896767 | 4.125469       |
| Home and Furniture     | 2278.016076   | 4436.169516  | 4.042148       |
| Men's wear             | 899.822354    | 2122.377778  | 4.017302       |
| Sports, Books and More | 1536.490369   | 3159.177281  | 4.077219       |
| Women's wear           | 1199.926263   | 1914.987075  | 4.064255       |

```
#Group by
#Median
median_stats = Prod.groupby('category_1')[['selling_price', 'mrp', 'product_rating']].median()
print(median_stats)
```

|                        | selling_price | mrp    | product_rating |
|------------------------|---------------|--------|----------------|
| category_1             |               |        |                |
| Bady and Kids          | 359.0         | 999.0  | 4.1            |
| Electronics            | 799.0         | 1950.0 | 4.2            |
| Home and Furniture     | 529.0         | 1299.0 | 4.1            |
| Men's wear             | 498.0         | 1499.0 | 4.0            |
| Sports, Books and More | 399.0         | 899.0  | 4.1            |
| Women's wear           | 399.0         | 1299.0 | 4.1            |

```
#Group by
#Standard deviation
std_stats = Prod.groupby('category_1')[['selling_price', 'mrp', 'product_rating']].std()
print(std_stats)
```

|                        | selling_price | mrp          | product_rating |
|------------------------|---------------|--------------|----------------|
| category_1             |               |              |                |
| Bady and Kids          | 1154.353676   | 1479.543958  | 0.329574       |
| Electronics            | 22811.164889  | 45089.746323 | 0.382444       |
| Home and Furniture     | 5153.493842   | 8871.914503  | 0.350573       |
| Men's wear             | 1331.089363   | 2510.037129  | 0.302392       |
| Sports, Books and More | 5501.466016   | 10773.566055 | 0.416056       |
| Women's wear           | 5226.618267   | 3275.015396  | 0.307685       |



## ➤ Pivot Table Analysis:

🔍 #Pivot table – Average Selling Price by Category

```
pivot_price = pd.pivot_table(Prod, values='selling_price', index='category_1', columns='category_2', aggfunc='mean')
print(pivot_price)
```

|                        |                            |                            |                                |     |
|------------------------|----------------------------|----------------------------|--------------------------------|-----|
| category_2             | Accessories                | Auto Accessories           | Baby Boy Clothing              | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | NaN                        | NaN                        | 372.975                        |     |
| Electronics            | NaN                        | NaN                        | NaN                            |     |
| Home and Furniture     | NaN                        | NaN                        | NaN                            |     |
| Men's wear             | 929.323741                 | NaN                        | NaN                            |     |
| Sports, Books and More | NaN                        | 879.075                    | NaN                            |     |
| Women's wear           | 847.489028                 | NaN                        | NaN                            |     |
| category_2             | Baby Care                  | Baby Girl Clothing         | Beauty and Grooming            | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | 533.453125                 | 330.825                    | NaN                            |     |
| Electronics            | NaN                        | NaN                        | NaN                            |     |
| Home and Furniture     | NaN                        | NaN                        | NaN                            |     |
| Men's wear             | NaN                        | NaN                        | NaN                            |     |
| Sports, Books and More | NaN                        | NaN                        | NaN                            |     |
| Women's wear           | NaN                        | NaN                        | 288.879397                     |     |
| category_2             | Bed Room Furniture         | Books                      | Bottom Wear                    | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | NaN                        | NaN                        | NaN                            |     |
| Electronics            | NaN                        | NaN                        | NaN                            |     |
| Home and Furniture     | 7949.525                   | NaN                        | NaN                            |     |
| Men's wear             | NaN                        | NaN                        | 537.086022                     |     |
| Sports, Books and More | NaN                        | 338.170732                 | NaN                            |     |
| Women's wear           | NaN                        | NaN                        | NaN                            |     |
| category_2             | Boys Clothing              | ...                        | Suits, Blazzers and waistcoats | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | 392.65                     | ...                        | NaN                            |     |
| Electronics            | NaN                        | ...                        | NaN                            |     |
| Home and Furniture     | NaN                        | ...                        | NaN                            |     |
| Men's wear             | NaN                        | ...                        | 2411.2                         |     |
| Sports, Books and More | NaN                        | ...                        | NaN                            |     |
| Women's wear           | NaN                        | ...                        | NaN                            |     |
| category_2             | Swim and Beachwear         | Tablets                    |                                | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | NaN                        | NaN                        |                                |     |
| Electronics            | NaN                        | 38313.4                    |                                |     |
| Home and Furniture     | NaN                        | NaN                        |                                |     |
| Men's wear             | NaN                        | NaN                        |                                |     |
| Sports, Books and More | NaN                        | NaN                        |                                |     |
| Women's wear           | 419.4                      | NaN                        |                                |     |
| category_2             | Tableware and Dinnerware   | Ties, socks, caps and more |                                | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          |                            | NaN                        |                                | NaN |
| Electronics            |                            | NaN                        |                                | NaN |
| Electronics            |                            | NaN                        |                                | NaN |
| Home and Furniture     | 844.058333                 |                            |                                | NaN |
| Men's wear             |                            | NaN                        | 319.5                          |     |
| Sports, Books and More |                            | NaN                        |                                | NaN |
| Women's wear           |                            | NaN                        |                                | NaN |
| category_2             | Top Wear                   | Toys                       | Watches                        | \   |
| category_1             |                            |                            |                                |     |
| Bady and Kids          | NaN                        | 724.89083                  | NaN                            |     |
| Electronics            | NaN                        | NaN                        | NaN                            |     |
| Home and Furniture     | NaN                        | NaN                        | NaN                            |     |
| Men's wear             | 410.758333                 | NaN                        | 2941.386935                    |     |
| Sports, Books and More | NaN                        | NaN                        | NaN                            |     |
| Women's wear           | NaN                        | NaN                        | 1345.500000                    |     |
| category_2             | Western and maternity Wear | Winter Wear                |                                |     |
| category_1             |                            |                            |                                |     |
| Bady and Kids          |                            | NaN                        | NaN                            |     |
| Electronics            |                            | NaN                        | NaN                            |     |
| Home and Furniture     |                            | NaN                        | NaN                            |     |
| Men's wear             |                            | NaN                        | 950.83125                      |     |
| Sports, Books and More |                            | NaN                        | NaN                            |     |
| Women's wear           | 473.566308                 | 872.75000                  |                                |     |

[6 rows x 77 columns]

```
#Pivot table – Average Product Rating by Category
pivot_rating = pd.pivot_table(Prod,values='product_rating',index='category_1',columns='category_2',aggfunc='mean')
print(pivot_rating)
```

```
category_2
category_1
Bady and Kids      NaN      NaN      4.038333
Electronics        NaN      NaN      NaN
Home and Furniture  NaN      NaN      NaN
Men's wear         4.084946    NaN      NaN
Sports, Books and More  NaN      4.07      NaN
Women's wear       4.111780    NaN      NaN
```

```
category_2
category_1
Bady and Kids      4.173906    3.985707    NaN
Electronics        NaN      NaN      NaN
Home and Furniture  NaN      NaN      NaN
Men's wear         NaN      NaN      NaN
Sports, Books and More  NaN      NaN      NaN
Women's wear       NaN      NaN      4.318
```

```
category_2
category_1
Bady and Kids      NaN      NaN      NaN
Electronics        NaN      NaN      NaN
Home and Furniture  3.888333    NaN      NaN
Men's wear         NaN      NaN      3.86382
Sports, Books and More  NaN      4.4      NaN
Women's wear       NaN      NaN      NaN
```

```
category_2
category_1
Bady and Kids      4.061808    ...      NaN
Electronics        NaN      ...      NaN
Home and Furniture  NaN      ...      NaN
Men's wear         NaN      ...      3.925
Sports, Books and More  NaN      ...      NaN
Women's wear       NaN      ...      NaN
```

```
category_2
category_1
Bady and Kids      NaN      NaN
Electronics        NaN      4.48
Home and Furniture  NaN      NaN
Men's wear         NaN      NaN
Sports, Books and More  NaN      NaN
Women's wear       3.915    NaN
```

```
category_2
category_1
Bady and Kids      NaN      NaN
Electronics        NaN      NaN
Home and Furniture  4.215833    NaN
Men's wear         NaN      4.1475
Sports, Books and More  NaN      NaN
Women's wear       NaN      NaN
```

```
category_2
category_1
Bady and Kids      NaN      4.05215    NaN
Electronics        NaN      NaN      NaN
```

```
Electronics      NaN      NaN
Home and Furniture  4.215833    NaN
Men's wear       NaN      4.1475
Sports, Books and More  NaN      NaN
Women's wear     NaN      NaN
```

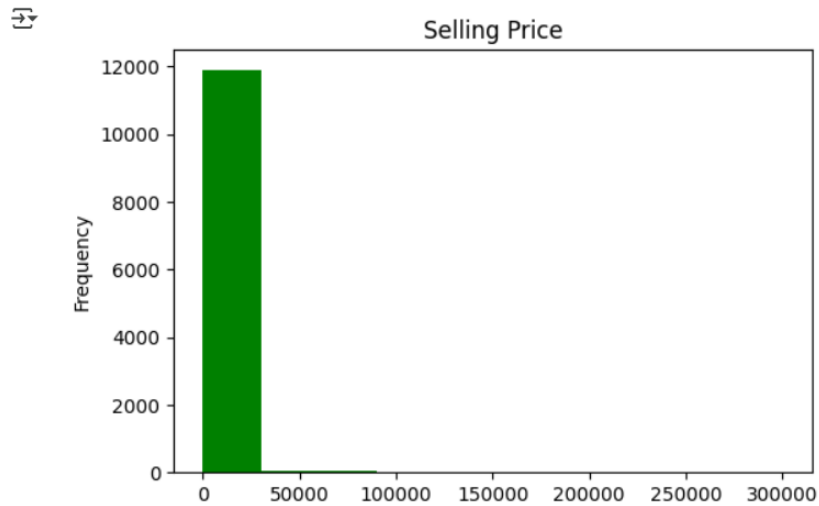
```
category_2
category_1
Bady and Kids      NaN      4.05215    NaN
Electronics        NaN      NaN      NaN
Home and Furniture  NaN      NaN      NaN
Men's wear         3.92    NaN      4.303808
Sports, Books and More  NaN      NaN      NaN
Women's wear       NaN      NaN      4.131818
```

```
category_2
category_1
Bady and Kids      NaN      NaN
Electronics        NaN      NaN
Home and Furniture  NaN      NaN
Men's wear         NaN      3.986875
Sports, Books and More  NaN      NaN
Women's wear       4.051429    4.127500
```

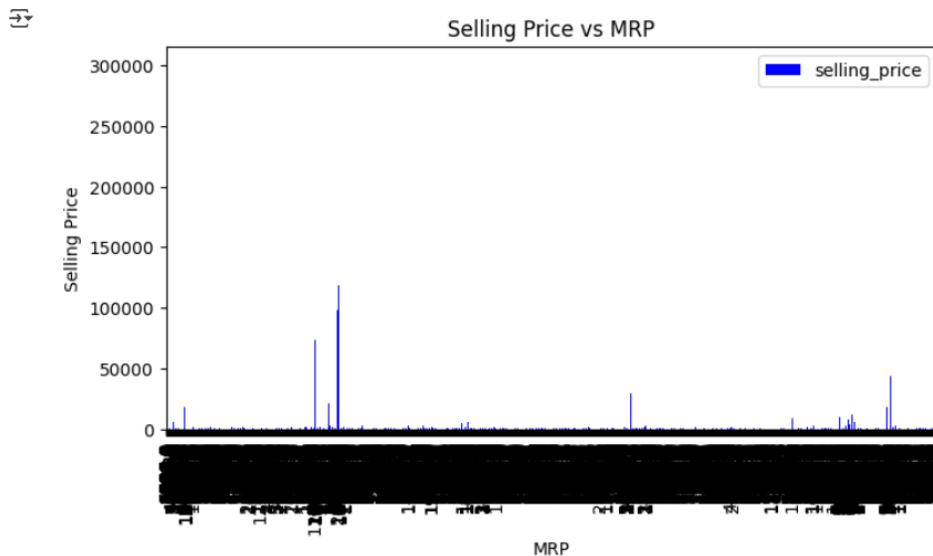
[6 rows x 77 columns]

## ➤ Data Visualization:

```
#Creates a histogram for the column selling_price
Prod['selling_price'].plot(kind="hist", figsize=(6,4), color="green")
# Adds a title
plt.title("Selling Price")
# Displays the plot
plt.show()
```



```
#Create a bar plot of selling_price vs mrp
Prod.plot(kind='bar', x='mrp', y='selling_price', figsize=(8,4), color='blue')
#Add labels and title
plt.xlabel("MRP")
plt.ylabel("Selling Price")
plt.title("Selling Price vs MRP")
#Display the plot
plt.show()
```



```

#Create a line plot of selling_price vs product_rating
Prod.plot(kind='line', x='mrp', y='selling_price', figsize=(8,4),marker="*", color='red', markersize=6)
# Add labels and title
plt.xlabel("MRP")
plt.ylabel("Selling Price")
plt.title("Selling Price vs MRP")
# Display the plot
plt.show()

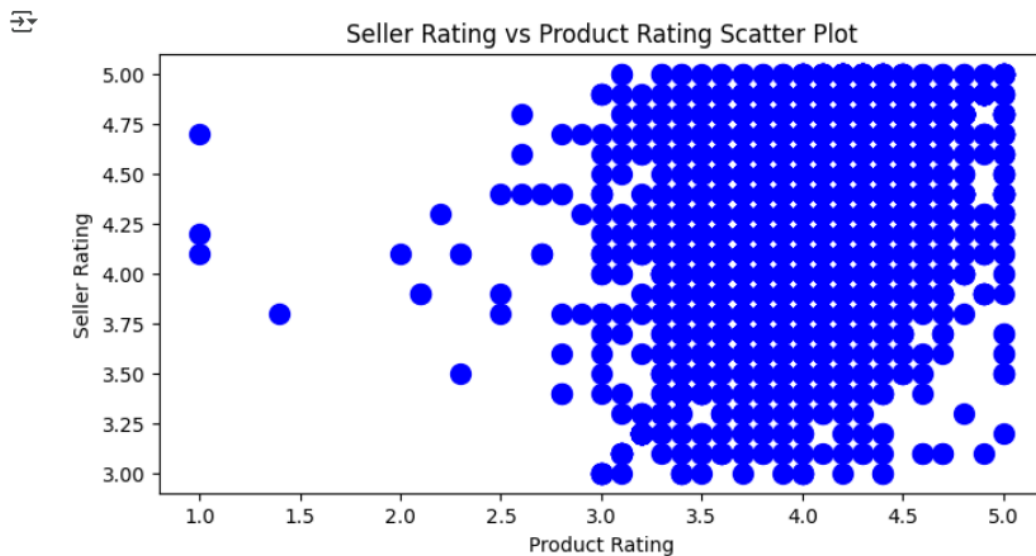
```



```

#Create a scatter plot of seller_rating vs product_rating
Prod.plot(kind='scatter', x='product_rating', y='seller_rating', figsize=(8,4), color='blue', s=100)
#Add labels and title
plt.xlabel("Product Rating")
plt.ylabel("Seller Rating")
plt.title("Seller Rating vs Product Rating Scatter Plot")
# Display the plot
plt.show()

```



## **PRESENTED BY:**

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