Theory Activity No. 1

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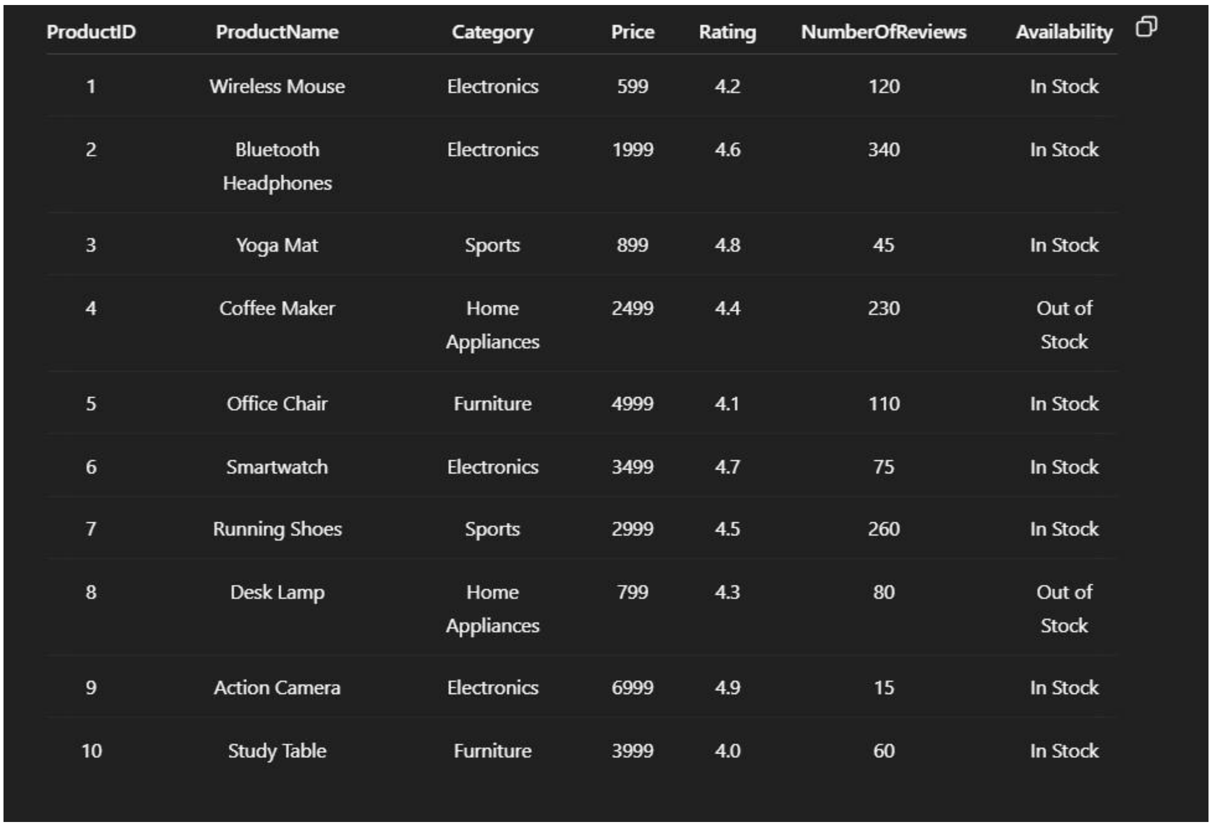
Roll No : CS5-18

Div : CS5

Dataset : Amazon Product Dataset

Dataset URL : Amazon-Product-Dataset



ProductID	ProductName	Category	Price	Rating	NumberOfReviews	Availability
1	Wireless Mouse	Electronics	599	4.2	120	In Stock
2	Bluetooth Headphones	Electronics	1999	4.6	340	In Stock
3	Yoga Mat	Sports	899	4.8	45	In Stock
4	Coffee Maker	Home Appliances	2499	4.4	230	Out of Stock
5	Office Chair	Furniture	4999	4.1	110	In Stock
6	Smartwatch	Electronics	3499	4.7	75	In Stock
7	Running Shoes	Sports	2999	4.5	260	In Stock
8	Desk Lamp	Home Appliances	799	4.3	80	Out of Stock
9	Action Camera	Electronics	6999	4.9	15	In Stock
10	Study Table	Furniture	3999	4.0	60	In Stock

First, your imports:

import pandas as pd

import

numpy as np

df = pd.read_csv('amazon_products.csv')

Problem Statements

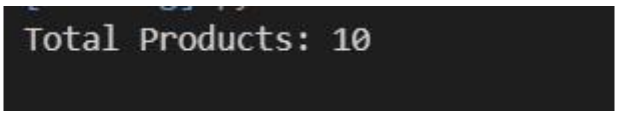
1. **Total number of products:**

Solution:

total_products = len(df) print("Total

number of products:",

total_products)   **Output:**



```
Total Products: 10
```

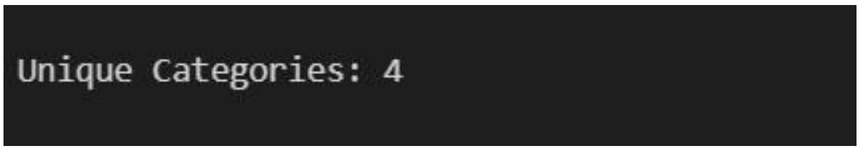
2. **Unique product categories:**

Solution:

unique_categories = df['Category'].nunique()

print("Number of unique categories:",

unique_categories)   **Output:**



```
Unique Categories: 4
```

3. **Top 5 most expensive products:**

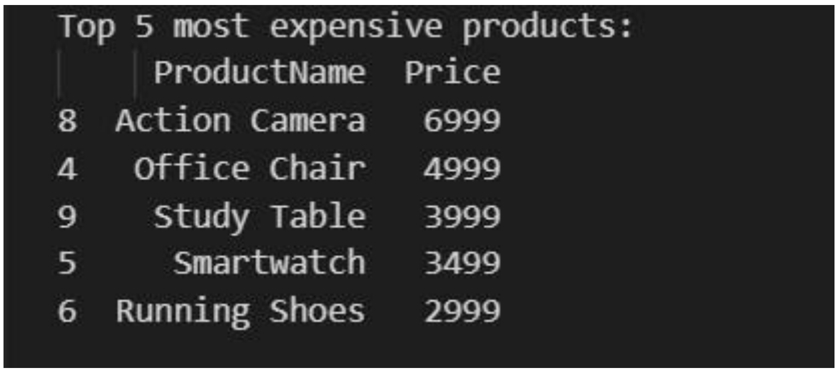
Solution:

top5_expensive =

df.sort_values(by='Price',

```
ascending=False).head(5)
print("Top 5 most expensive
products:")
print(top5_expensive[['ProductName', 'Price']])
```

Output:



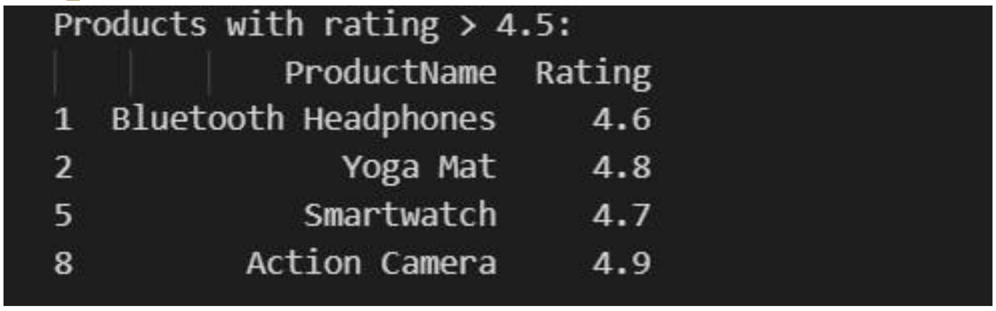
```
Top 5 most expensive products:
     ProductName  Price
8  Action Camera   6999
4   Office Chair   4999
9    Study Table   3999
5     Smartwatch   3499
6  Running Shoes   2999
```

4. Find products with rating > 4.5:

Solution:

```
high_rated_products = df[df['Rating'] > 4.5]
print("Products with rating > 4.5:")
print(high_rated_products[['ProductName',
'Rating']])
```

Output:

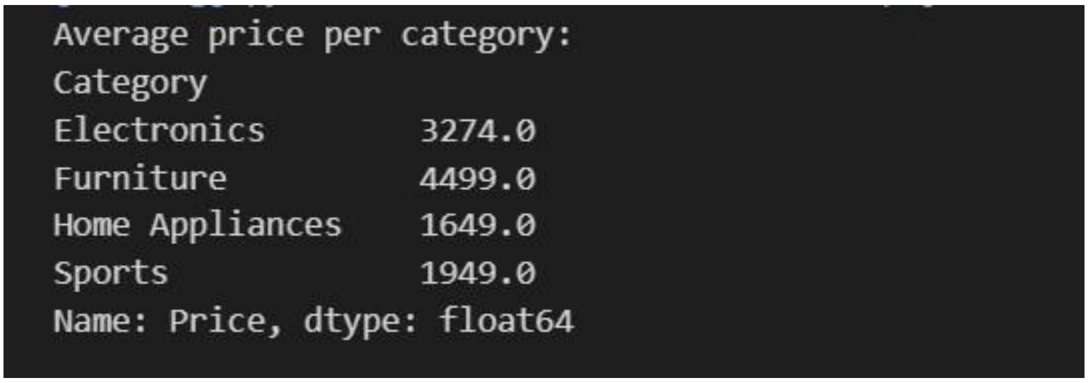


```
Products with rating > 4.5:
           ProductName  Rating
1  Bluetooth Headphones    4.6
2              Yoga Mat    4.8
5            Smartwatch    4.7
8         Action Camera    4.9
```

5. **Find the average price of products in each category:**

Solution:

avg_price_per_category = df.groupby('Category')['Price'].mean() print("Average price per category:") print(avg_price_per_category) **Output:**



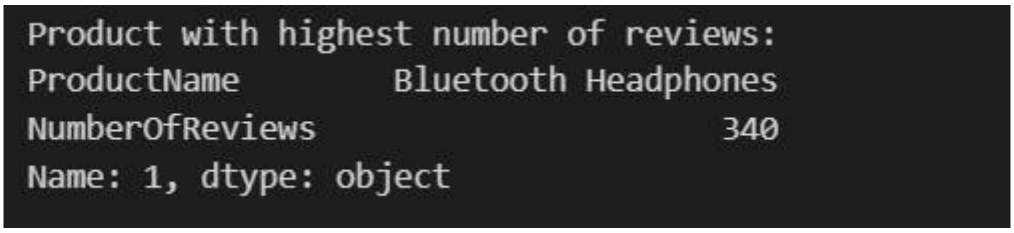
```
Average price per category:
Category
Electronics        3274.0
Furniture          4499.0
Home Appliances    1649.0
Sports             1949.0
Name: Price, dtype: float64
```

6. **Find the product with the highest number of reviews:**

Solution:

most_reviewed_product = df.loc[df['NumberOfReviews'].idxmax()] print("Product with highest number of reviews:") print(most_reviewed_product[['ProductName', 'NumberOfReviews']])

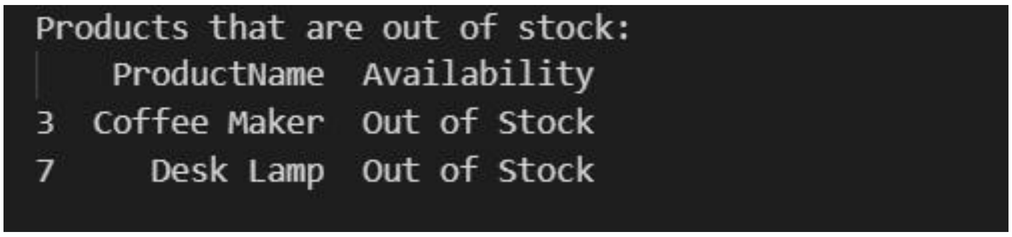
Output:



```
Product with highest number of reviews:
ProductName        Bluetooth Headphones
NumberOfReviews                     340
Name: 1, dtype: object
```

7. **Find products that are currently out of stock:**

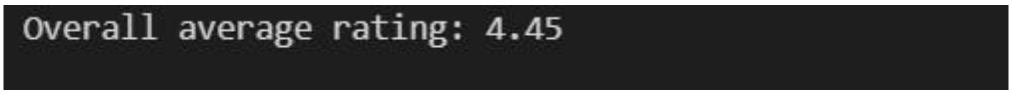
Solution: **out_of_stock_products = df[df['Availability'] == 'Out of Stock'] print("Products that are out of stock:") print(out_of_stock_products[['ProductName', 'Availability']])** **Output:**



```
Products that are out of stock:
    ProductName  Availability
3  Coffee Maker  Out of Stock
7     Desk Lamp  Out of Stock
```

8. **Calculate the overall average rating:**

Solution: **overall_average_rating = df['Rating'].mean() print("Overall average rating:", overall_average_rating)** **Output:**



```
Overall average rating: 4.45
```

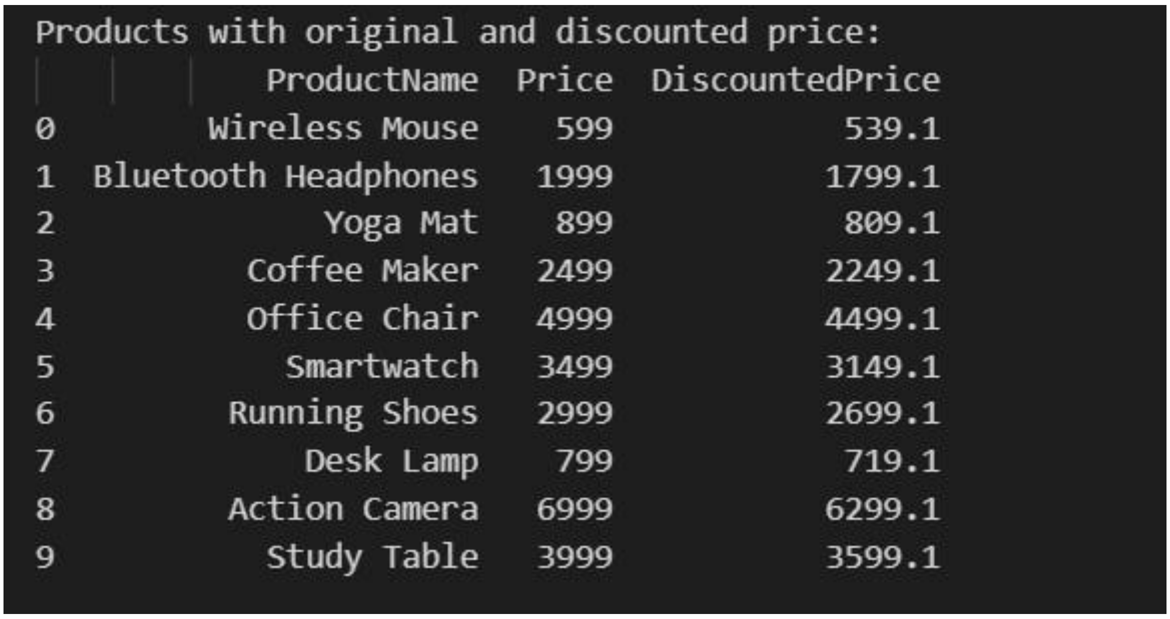
9. **Create a new column for 10% discounted price:**

Solution:

df['DiscountedPrice'] = df['Price'] * 0.9

print("Products with original and discounted price:")

print(df[['ProductName', 'Price', 'DiscountedPrice']]) **Output:**



```
Products with original and discounted price:
             ProductName  Price  DiscountedPrice
0         Wireless Mouse    599            539.1
1   Bluetooth Headphones   1999           1799.1
2               Yoga Mat    899            809.1
3           Coffee Maker   2499           2249.1
4           Office Chair   4999           4499.1
5             Smartwatch   3499           3149.1
6          Running Shoes   2999           2699.1
7              Desk Lamp    799            719.1
8          Action Camera   6999           6299.1
9            Study Table   3999           3599.1
```

10. Find underrated products (high rating >4.5 but reviews <20):

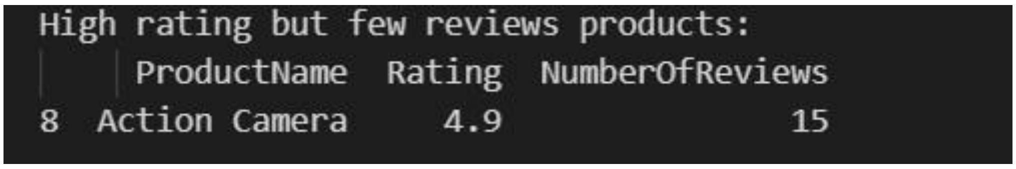
Solution:

underrated_products = df[(df['Rating'] > 4.5) & (df['NumberOfReviews'] < 20)]

print("High rating but few reviews products:")

print(underrated_products[['ProductName', 'Rating', 'NumberOfReviews']])

Output:



```
High rating but few reviews products:
     ProductName  Rating  NumberOfReviews
8  Action Camera     4.9               15
```

11. Find the cheapest product in each category:

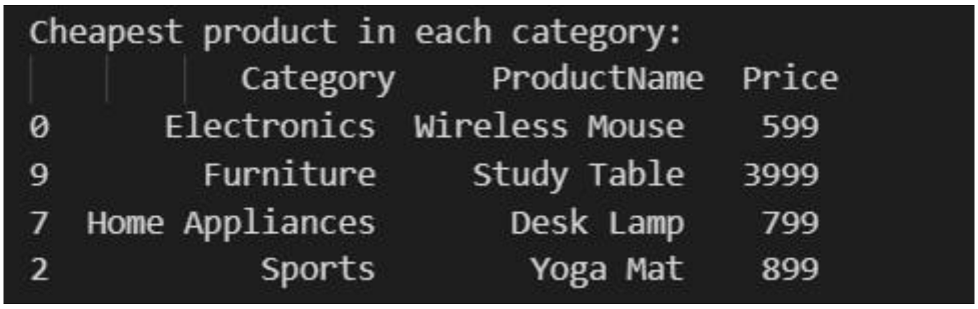
Solution:

cheapest_in_category = df.loc[df.groupby('Category')['Price'].idxmin()]

print("\nCheapest product in each category:\n",

cheapest_in_category[['Category',

'ProductName', 'Price']]) **Output:**



```
Cheapest product in each category:
          Category      ProductName  Price
0      Electronics  Wireless Mouse    599
9        Furniture     Study Table   3999
7  Home Appliances       Desk Lamp    799
2           Sports        Yoga Mat    899
```

12. List all products priced above the average price:

Solution:

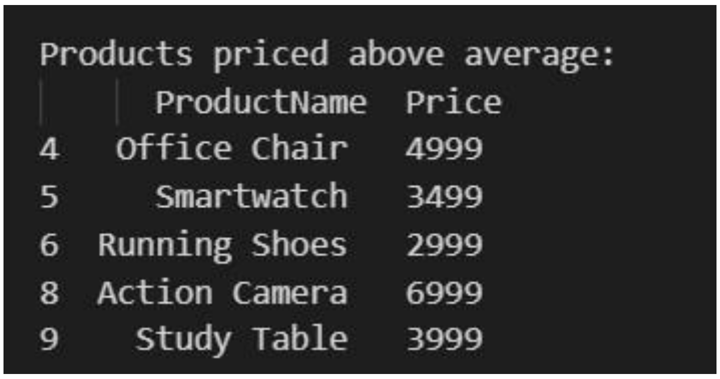
average_price = df['Price'].mean()

above_avg_products = df[df['Price'] >

average_price] print("\nProducts priced

above average:\n",

above_avg_products[['ProductName', 'Price']]) **Output:**

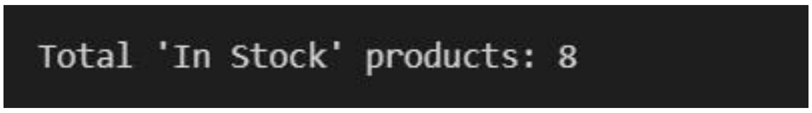


```
Products priced above average:
       ProductName  Price
4     Office Chair   4999
5       Smartwatch   3499
6   Running Shoes    2999
8   Action Camera    6999
9      Study Table   3999
```

13. Total number of products "In Stock":

Solution:

in_stock_count = df[df['Availability'] == 'In Stock'].shape[0] print("\nTotal 'In Stock' products:", in_stock_count) **Output:**



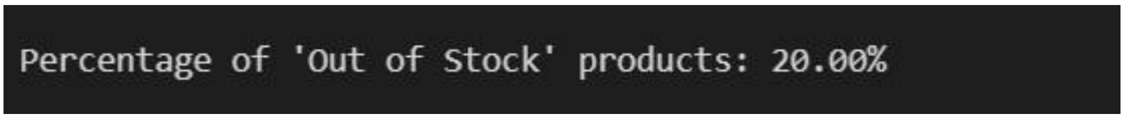
```
Total 'In Stock' products: 8
```

14. Percentage of products "Out of Stock":

Solution:

out_of_stock_percentage = (df[df['Availability'] == 'Out of Stock'].shape[0] / len(df)) * 100 print("\nPercentage of 'Out of Stock' products: {:.2f}%".format(out_of_stock_percentage))

Output:



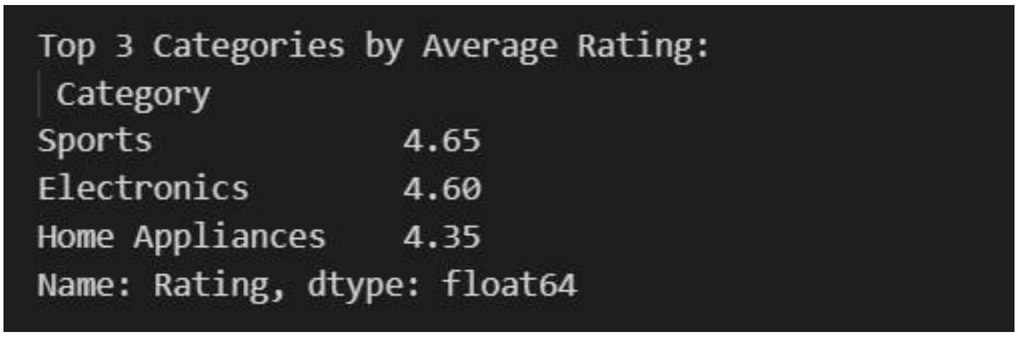
```
Percentage of 'Out of Stock' products: 20.00%
```

15. Top 3 categories with highest average ratings:

Solution:

```
top3_categories_rating =
df.groupby('Category')['Rating'].mean().sort_values(ascending=Fa
l se).head(3) print("\nTop 3 Categories by Average Rating:\n",
top3_categories_rating)
```

Output:



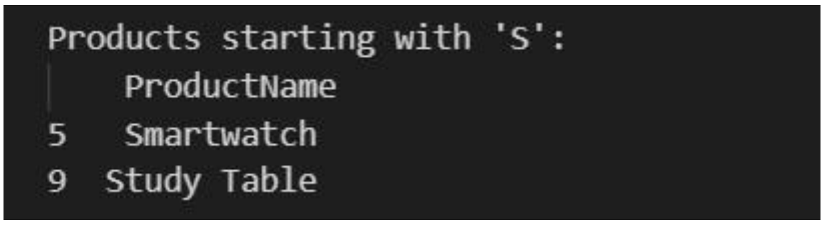
```
Top 3 Categories by Average Rating:
 Category
Sports              4.65
Electronics         4.60
Home Appliances     4.35
Name: Rating, dtype: float64
```

16. Products whose name starts with 'S':

Solution:

```
products_starting_S = df[df['ProductName'].str.startswith('S')]
print("\nProducts starting with 'S':\n",
products_starting_S[['ProductName']])
```

Output:



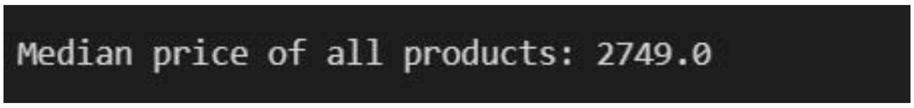
```
Products starting with 'S':
    ProductName
5   Smartwatch
9  Study Table
```

17. Median price of all products: **Solution:**

median_price = df['Price'].median()

print("\nMedian price of all products:",

median_price) **Output:**



```
Median price of all products: 2749.0
```

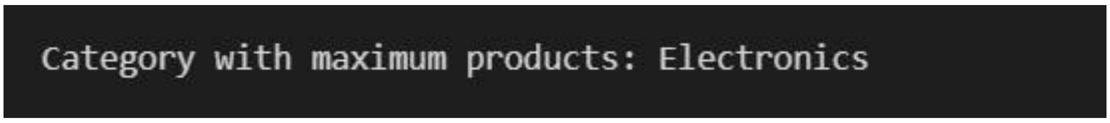
18. Category with maximum number of products:

Solution: max_products_category =

df['Category'].value_counts().idxmax()

print("\nCategory with maximum products:",

max_products_category) **Output:**



```
Category with maximum products: Electronics
```

19. Top 7 products with most reviews:

Solution: top7_most_reviews

=

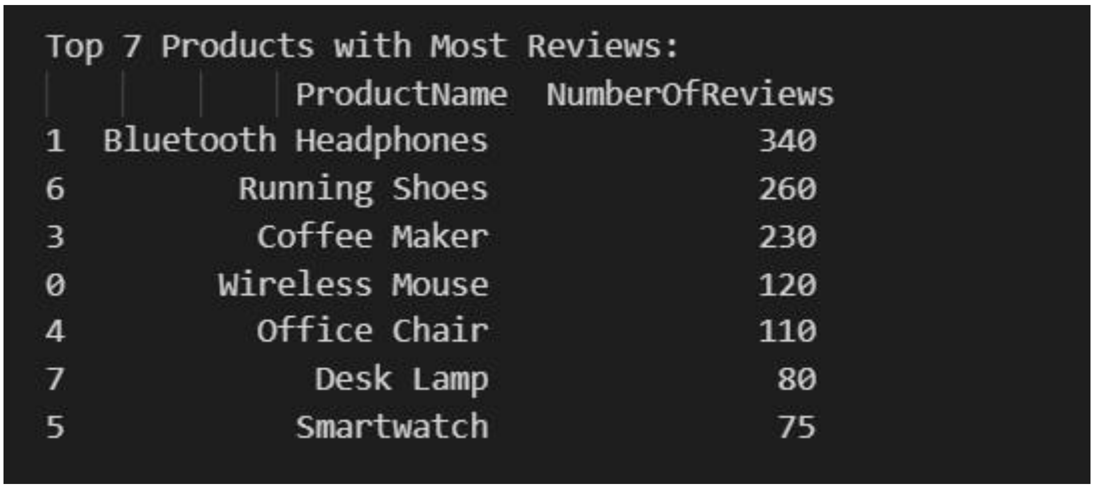
df.sort_values(by='NumberOfReviews',

ascending=False).head(7)

print("\nTop 7 Products with Most Reviews:\n",

top7_most_reviews[['ProductName',

'NumberOfReviews']]) **Output:**



```
Top 7 Products with Most Reviews:
          ProductName  NumberOfReviews
1  Bluetooth Headphones              340
6         Running Shoes              260
3          Coffee Maker              230
0        Wireless Mouse              120
4          Office Chair              110
7             Desk Lamp               80
5            Smartwatch               75
```

20. Create PriceCategory column (High/Medium/Low):

Solution:

def price_category(price):

if price > 3000:

return 'High'   elif price

>= 1000:   return

'Medium'   else:

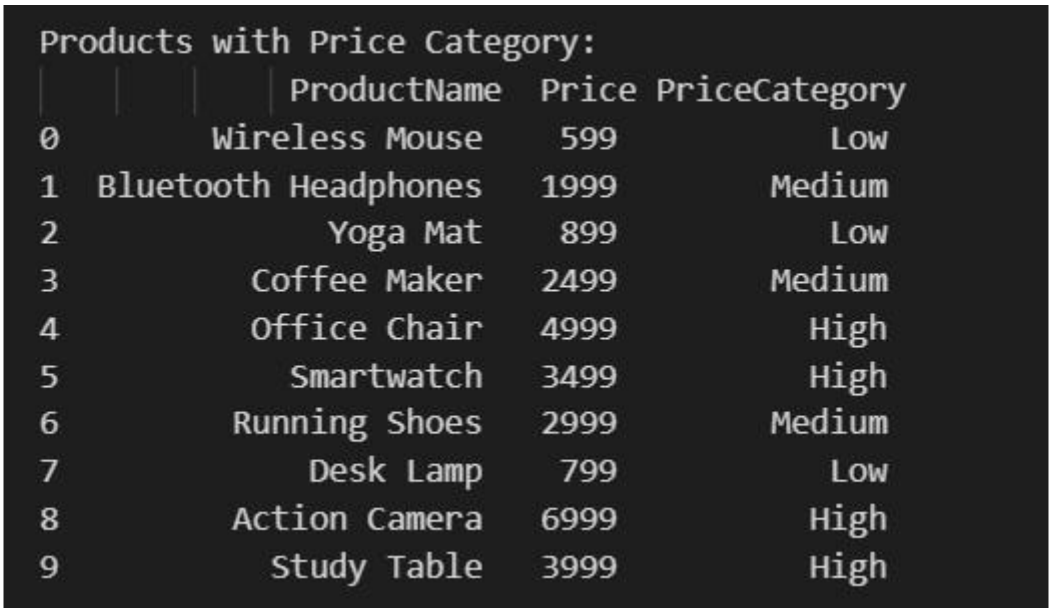
return 'Low' df['PriceCategory'] =

df['Price'].apply(price_category)

print("\nProducts with Price Category:\n",

df[['ProductName', 'Price', 'PriceCategory']])

Output:



```
Products with Price Category:
            ProductName  Price PriceCategory
0        Wireless Mouse    599           Low
1  Bluetooth Headphones   1999        Medium
2              Yoga Mat    899           Low
3          Coffee Maker   2499        Medium
4          Office Chair   4999          High
5            Smartwatch   3499          High
6         Running Shoes   2999        Medium
7             Desk Lamp    799           Low
8         Action Camera   6999          High
9           Study Table   3999          High
```