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In [1]: #I Phone Sales Analysis

In [2]: !pip install pandas numpy plotly

Requirement already satisfied: pandas in c:\users\ujjwal\jupyter_env\lib\site-packages (2.2.3)
Requirement already satisfied: numpy in c:\users\ujjwal\jupyter_env\lib\site-packages (2.2.4)
Requirement already satisfied: plotly in c:\users\ujjwal\jupyter_env\lib\site-packages (6.0.2)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas) (2025.2)
Requirement already satisfied: narwhals>=1.15.1 in c:\users\ujjwal\jupyter_env\lib\site-packages (from plotly) (1.35.0)
Requirement already satisfied: packaging in c:\users\ujjwal\jupyter_env\lib\site-packages (from plotly) (24.2)
Requirement already satisfied: six>=1.5 in c:\users\ujjwal\jupyter_env\lib\site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)
[notice] A new release of pip is available: 24.3.1 -> 25.0.1
[notice] To update, run: python.exe -m pip install --upgrade pip

In [3]: import pandas as pd
import numpy as np
import plotly.express as px
import plotly.graph_objects as go

In [4]: data = pd.read_csv("apple_products.csv")

In [5]: data

Out[5]:
```

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Upc	Star Rating	Ram
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOBEXRGV7EHHTGUH	4.6	2 GB
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVAC6TJT4F	4.6	2 GB
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVGETABXWZ	4.6	2 GB
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBEXRGVMZWUHCBA	4.5	2 GB
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	MOBEXRGVK7PFEJZ	4.5	2 GB
...
57	APPLE iPhone SE (Black, 64 GB)	https://www.flipkart.com/apple-iphone-se-black...	Apple	29999	39900	24	95909	8161	MOBFWQ6BR3MK7AUG	4.5	4 GB
58	APPLE iPhone 11 (Purple, 64 GB)	https://www.flipkart.com/apple-iphone-11-purpl...	Apple	46999	54900	14	43470	3331	MOBFWQ6BTFJJKGKE	4.6	4 GB
59	APPLE iPhone 11 (White, 64 GB)	https://www.flipkart.com/apple-iphone-11-white...	Apple	46999	54900	14	43470	3331	MOBFWQ6BVMVWEH3XE	4.6	4 GB
60	APPLE iPhone 11 (Black, 64 GB)	https://www.flipkart.com/apple-iphone-11-black...	Apple	46999	54900	14	43470	3331	MOBFWQ6B8XGCEYNY	4.6	4 GB
61	APPLE iPhone 11 (Red, 64 GB)	https://www.flipkart.com/apple-iphone-11-red-6...	Apple	46999	54900	14	43470	3331	MOBFWQ6BYV3FCU7	4.6	4 GB

62 rows x 11 columns

```
In [6]: data

Out[6]:
```

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Upc	Star Rating	Ram
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOBEXRGV7EHHTGUH	4.6	2 GB
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVAC6TJT4F	4.6	2 GB
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MOBEXRGVGETABXWZ	4.6	2 GB
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBEXRGVMZWUHCBA	4.5	2 GB
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	MOBEXRGVK7PFEJZ	4.5	2 GB
...
57	APPLE iPhone SE (Black, 64 GB)	https://www.flipkart.com/apple-iphone-se-black...	Apple	29999	39900	24	95909	8161	MOBFWQ6BR3MK7AUG	4.5	4 GB
58	APPLE iPhone 11 (Purple, 64 GB)	https://www.flipkart.com/apple-iphone-11-purpl...	Apple	46999	54900	14	43470	3331	MOBFWQ6BTFJJKGKE	4.6	4 GB
59	APPLE iPhone 11 (White, 64 GB)	https://www.flipkart.com/apple-iphone-11-white...	Apple	46999	54900	14	43470	3331	MOBFWQ6BVMVWEH3XE	4.6	4 GB
60	APPLE iPhone 11 (Black, 64 GB)	https://www.flipkart.com/apple-iphone-11-black...	Apple	46999	54900	14	43470	3331	MOBFWQ6B8XGCEYNY	4.6	4 GB
61	APPLE iPhone 11 (Red, 64 GB)	https://www.flipkart.com/apple-iphone-11-red-6...	Apple	46999	54900	14	43470	3331	MOBFWQ6BYV3FCU7	4.6	4 GB

62 rows x 11 columns

```
In [7]: print(data.isnull().sum())

Product Name      0
Product URL       0
Brand             0
Sale Price        0
Mrp              0
Discount Percentage 0
Number Of Ratings 0
Number Of Reviews 0
Upc              0
Star Rating      0
Ram              0
dtype: int64

In [8]: print(data.describe())
```

	Sale Price	Mrp	Discount Percentage	Number Of Ratings	
count	62.000000	62.000000	62.000000	62.000000	
mean	80673.807897	88058.864516	9.951613	22428.483226	
std	34310.446132	34728.825597	7.688879	33768.589558	
min	29999.000000	39900.000000	0.000000	542.000000	
25%	49900.000000	54900.000000	6.000000	740.000000	
50%	75900.000000	79900.000000	10.000000	2181.000000	
75%	117100.000000	128950.000000	14.000000	43470.000000	
max	149900.000000	149900.000000	29.000000	95909.000000	

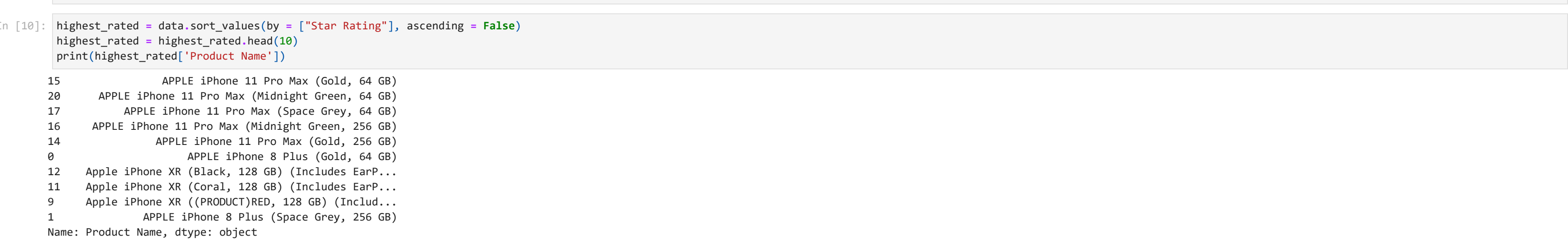
	Number Of Reviews	Star Rating
count	62.000000	62.000000
mean	1861.677419	4.575886
std	2855.883810	0.899190
min	42.000000	4.500000
25%	64.000000	4.500000
50%	180.000000	4.600000
75%	3331.000000	4.600000
max	8161.000000	4.700000

```
In [9]: #iphone sales analysis in India

In [10]: highest_rated = data.sort_values(by = ["Star Rating"], ascending = False)
highest_rated = highest_rated.head(10)
print(highest_rated['Product Name'])

15      APPLE iPhone 11 Pro Max (Gold, 64 GB)
16      APPLE iPhone 11 Pro Max (Space Grey, 64 GB)
17      APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)
18      APPLE iPhone 11 Pro Max (Gold, 256 GB)
19      APPLE iPhone 8 Plus (Gold, 64 GB)
20      APPLE iPhone 8 (Black, 128 GB) (Includes EarP...
21      Apple iPhone XR (Coral, 128 GB) (Includes EarP...
22      Apple iPhone XR ((PRODUCT)RED, 128 GB) (Includ...
23      APPLE iPhone 8 Plus (Space Grey, 256 GB)
24      Name: Product Name, dtype: object

In [11]:
```

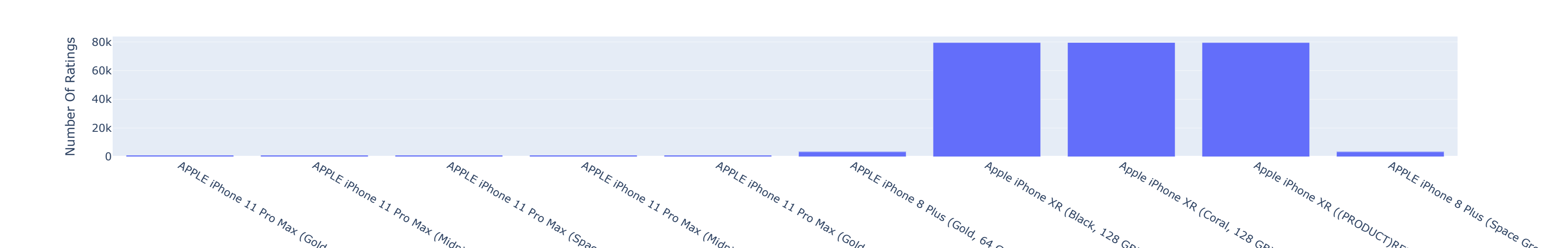


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In [12]: iphones

Out[12]:
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Product Name	count
APPLE iPhone 11 Pro Max (Gold, 64 GB)	1
APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)	1
APPLE iPhone 11 Pro Max (Space Grey, 64 GB)	1
APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)	1
APPLE iPhone 11 Pro Max (Gold, 256 GB)	1
APPLE iPhone 8 Plus (Gold, 64 GB)	1
Apple iPhone XR (Black, 128 GB) (Includes EarPods, Power Adapter)	1
Apple iPhone XR (Coral, 128 GB) (Includes EarPods, Power Adapter)	1
Apple iPhone XR ((PRODUCT)RED, 128 GB) (Includes EarPods, Power Adapter)	1
APPLE iPhone 8 Plus (Space Grey, 256 GB)	1
Name: count, dtype: int64	

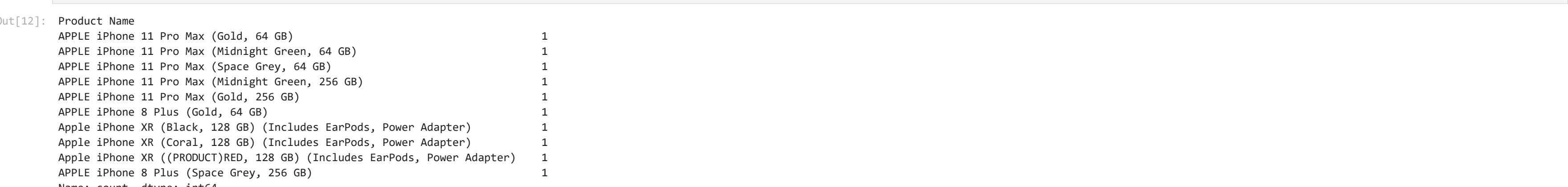
```
In [13]: iphones = highest_rated["Product Name"].value_counts()
lables = iphones.index
counts = highest_rated["Number Of Reviews"]
figure = px.bar(highest_rated, x=lables,y=counts,title = "Number Of reviews Of highest rated i phones")
figure.show()
```



```
In [14]: !pip install statsmodels

Collecting statsmodels
  Using cached statsmodels-0.14.4-cp313-cp313-win_and64.whl.metadata (9.5 kB)
Requirement already satisfied: numpy<3,>=1.22.3 in c:\users\ujjwal\jupyter_env\lib\site-packages (from statsmodels) (2.2.4)
Requirement already satisfied: scipy<1.9.2,>=1.8 in c:\users\ujjwal\jupyter_env\lib\site-packages (from statsmodels) (1.15.2)
Requirement already satisfied: pandas<=2.1.0,>=1.4 in c:\users\ujjwal\jupyter_env\lib\site-packages (from statsmodels) (2.2.3)
Collecting patsy>=0.5.6 (from statsmodels)
  Using cached patsy-1.0.1-py2.py3-none-any.whl.metadata (3.3 kB)
Requirement already satisfied: packaging>=21.3 in c:\users\ujjwal\jupyter_env\lib\site-packages (from statsmodels) (24.2)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas<=2.1.0,>=1.4->statsmodels) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas<=2.1.0,>=1.4->statsmodels) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\ujjwal\jupyter_env\lib\site-packages (from pandas<=2.1.0,>=1.4->statsmodels) (2025.2)
Requirement already satisfied: six>=1.5 in c:\users\ujjwal\jupyter_env\lib\site-packages (from python-dateutil>=2.8.2->pandas<=2.1.0,>=1.4->statsmodels) (1.17.0)
Using cached statsmodels-0.14.4-cp313-cp313-win_and64.whl (9.8 MB)
Using cached patsy-1.0.1-py2.py3-none-any.whl (232 kB)
Installing collected packages: patsy, statsmodels
Successfully installed patsy-1.0.1 statsmodels-0.14.4
[notice] A new release of pip is available: 24.3.1 -> 25.0.1
[notice] To update, run: python.exe -m pip install --upgrade pip

In [17]: import plotly.io as pio
figure = px.scatter(data_frame = data, x = "Number Of Ratings" , y="Sale Price" , size = "Discount Percentage" , trendline = "ols" , title = "Relationship between sales price and number of rating")
figure.show()
```



```
In [18]: figure = px.scatter(data_frame = data , x="Number Of Ratings" , y = "Discount Percentage",size = "Sale Price",trendline = "ols" , title = "Relationship between discount precentage and Number of ratings")
figure.show()
```

Relationship between discount percentage and Number of ratings

Number Of Ratings	Discount Percentage	Sale Price
~0	~14%	~110k
~0	~10%	~100k
~0	~6%	~90k
~0	~5%	~80k
~0	~4%	~70k
~0	~3%	~60k
~0	~2%	~50k
~0	~1%	~40k
~0	~0%	~30k
~0	~0%	~20k
~0	~0%	~10k
~0	~0%	~0k
~45k	~14%	~50k
~45k	~8%	~45k
~80k	~20%	~40k
~95k	~20%	~45k
~95k	~18%	~40k
~95k	~22%	~35k

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In [ ]:
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