Apple Iphone sales analysis

```python
In [1]: import pandas as pd
        import numpy as np
        import plotly.express as px
        import plotly.graph_objects as go
```

```python
In [2]: df=pd.read_csv("C:/Users/DELL/Desktop/Python/apple_products.csv")
```

```python
In [3]: df.head()
```

Out[3]:

	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	MOBEXRGVPK7PFEJZ	4.5	2 GB

```python
In [4]: df.info
```

```
Out[4]:    <bound method DataFrame.info of                                    Product Name  \
           0         APPLE iPhone 8 Plus (Gold, 64 GB)
           1    APPLE iPhone 8 Plus (Space Grey, 256 GB)
           2       APPLE iPhone 8 Plus (Silver, 256 GB)
           3            APPLE iPhone 8 (Silver, 256 GB)
           4              APPLE iPhone 8 (Gold, 256 GB)
           ..                                       ...
           57             APPLE iPhone SE (Black, 64 GB)
           58          APPLE iPhone 11 (Purple, 64 GB)
           59           APPLE iPhone 11 (White, 64 GB)
           60           APPLE iPhone 11 (Black, 64 GB)
           61              APPLE iPhone 11 (Red, 64 GB)

                                          Product URL  Brand  Sale Price  \
           0   https://www.flipkart.com/apple-iphone-8-plus-g...  Apple       49900
           1   https://www.flipkart.com/apple-iphone-8-plus-s...  Apple       84900
           2   https://www.flipkart.com/apple-iphone-8-plus-s...  Apple       84900
           3   https://www.flipkart.com/apple-iphone-8-silver...  Apple       77000
           4   https://www.flipkart.com/apple-iphone-8-gold-2...  Apple       77000
           ..                                         ...   ...         ...
           57  https://www.flipkart.com/apple-iphone-se-black...  Apple       29999
           58  https://www.flipkart.com/apple-iphone-11-purpl...  Apple       46999
           59  https://www.flipkart.com/apple-iphone-11-white...  Apple       46999
           60  https://www.flipkart.com/apple-iphone-11-black...  Apple       46999
           61  https://www.flipkart.com/apple-iphone-11-red-6...  Apple       46999

                 Mrp  Discount Percentage  Number Of Ratings  Number Of Reviews  \
           0   49900                    0               3431                356
           1   84900                    0               3431                356
           2   84900                    0               3431                356
           3   77000                    0              11202                794
           4   77000                    0              11202                794
           ..    ...                  ...                ...                ...
           57  39900                   24              95909               8161
           58  54900                   14              43470               3331
           59  54900                   14              43470               3331
           60  54900                   14              43470               3331
           61  54900                   14              43470               3331

                          Upc  Star Rating   Ram
           0   MOBEXRGV7EHHTGUH          4.6  2 GB
           1   MOBEXRGVAC6TJT4F          4.6  2 GB
           2   MOBEXRGVGETABXWZ          4.6  2 GB
           3   MOBEXRGVMZWUHCBA          4.5  2 GB
           4   MOBEXRGVPK7PFEJZ          4.5  2 GB
           ..               ...          ...   ...
           57  MOBFWQ6BR3MK7AUG          4.5  4 GB
           58  MOBFWQ6BTFFJKGKE          4.6  4 GB
```

```
59  MOBFWQ6BVWVEH3XE        4.6  4 GB
60  MOBFWQ6BXGJCEYNY        4.6  4 GB
61  MOBFWQ6BYYV3FCU7        4.6  4 GB

[62 rows x 11 columns]>
```

To check null values

In [5]: `print(df.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
```

To view descriptive info

In [6]: `df.describe()`

Out[6]:

	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	Star Rating
count	62.000000	62.000000	62.000000	62.000000	62.000000	62.000000
mean	80073.887097	88058.064516	9.951613	22420.403226	1861.677419	4.575806
std	34310.446132	34728.825597	7.608079	33768.589550	2855.883830	0.059190
min	29999.000000	39900.000000	0.000000	542.000000	42.000000	4.500000
25%	49900.000000	54900.000000	6.000000	740.000000	64.000000	4.500000
50%	75900.000000	79900.000000	10.000000	2101.000000	180.000000	4.600000
75%	117100.000000	120950.000000	14.000000	43470.000000	3331.000000	4.600000
max	140900.000000	149900.000000	29.000000	95909.000000	8161.000000	4.700000

To view top 10 iphones which is sale in india

```
In [7]:  highest=df.sort_values(by=["Star Rating"],ascending=False)
         highest.head(10)
         print(highest['Product Name']) # to view product names only
```

```
20        APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)
17          APPLE iPhone 11 Pro Max (Space Grey, 64 GB)
16       APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)
15               APPLE iPhone 11 Pro Max (Gold, 64 GB)
14              APPLE iPhone 11 Pro Max (Gold, 256 GB)
                              ...
45               APPLE iPhone 12 Mini (Black, 64 GB)
28               APPLE iPhone 12 Mini (White, 64 GB)
23        Apple iPhone SE (White, 256 GB) (Includes EarP...
41               APPLE iPhone 12 Pro (Pacific Blue, 512 GB)
27               APPLE iPhone 12 Pro (Graphite, 256 GB)
Name: Product Name, Length: 62, dtype: object
```

Lets have a look at the number of ratings of the highest rated Iphones on flipkart
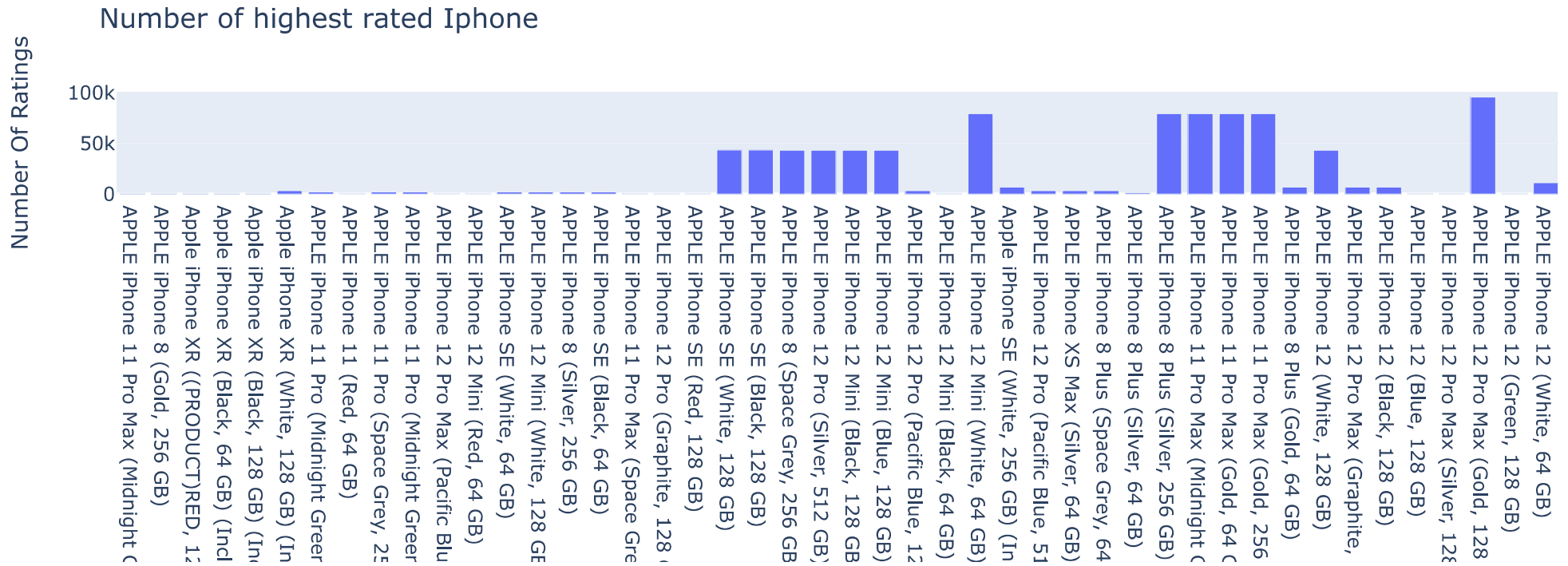
```
In [8]:  iphone=highest['Product Name'].value_counts()
```

```
In [9]:  iphone
```

```
Out[9]:  APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)                        1
         APPLE iPhone 8 (Gold, 256 GB)                                         1
         Apple iPhone XR ((PRODUCT)RED, 128 GB) (Includes EarPods, Power Adapter)    1
         Apple iPhone XR (Black, 64 GB) (Includes EarPods, Power Adapter)       1
         Apple iPhone XR (Black, 128 GB) (Includes EarPods, Power Adapter)      1
                                                                              ..
         APPLE iPhone 8 Plus (Space Grey, 256 GB)                              1
         APPLE iPhone 12 Pro Max (Graphite, 256 GB)                            1
         Apple iPhone XR (Coral, 128 GB) (Includes EarPods, Power Adapter)     1
         APPLE iPhone 11 Pro (Space Grey, 512 GB)                              1
         APPLE iPhone 12 Pro (Graphite, 256 GB)                                1
         Name: Product Name, Length: 62, dtype: int64
```

```
In [10]:  iphone=highest['Product Name'].value_counts()
          labels=iphone.index
          counts=highest['Number Of Ratings']
```

```
fig= px.bar(highest,x=labels,y=counts,title='Number of highest rated Iphone')
fig.show()
```


Number of highest rated Iphone

Graph based on number of ratings
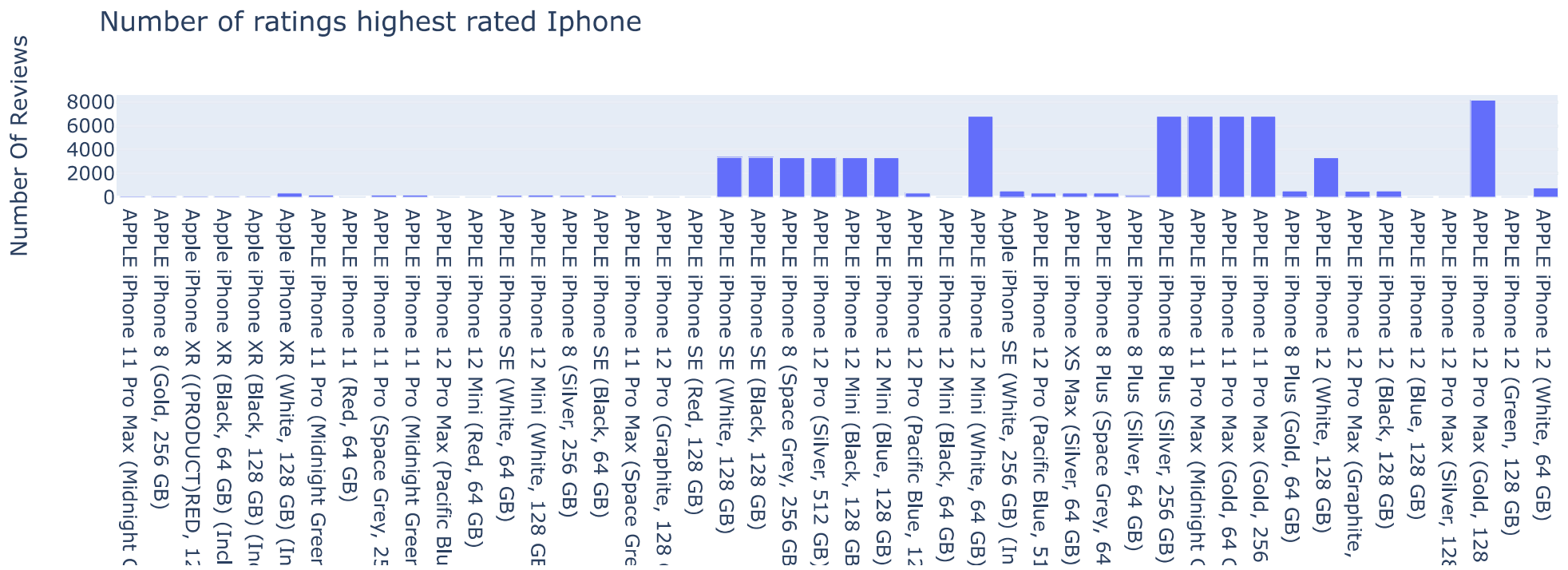
```
In [11]: iphone=highest['Product Name'].value_counts()
         labels=iphone.index
         counts=highest['Number Of Reviews']
         fig= px.bar(highest,x=labels,y=counts,title='Number of ratings highest rated Iphone')
         fig.show()
```

Number of ratings highest rated Iphone

Number Of Reviews

8000
6000
4000
2000
0

APPLE iPhone 11 Pro Max (Midnight G
APPLE iPhone 8 (Gold, 256 GB)
Apple iPhone XR ((PRODUCT)RED, 12
Apple iPhone XR (Black, 64 GB) (Incl
Apple iPhone XR (Black, 128 GB) (In
Apple iPhone XR (White, 128 GB) (In
APPLE iPhone 11 Pro (Midnight Greer
APPLE iPhone 11 (Red, 64 GB)
APPLE iPhone 11 Pro (Space Grey, 25
APPLE iPhone 11 Pro (Midnight Greer
APPLE iPhone 12 Pro Max (Pacific Blu
APPLE iPhone 12 Mini (Red, 64 GB)
APPLE iPhone SE (White, 64 GB)
APPLE iPhone 12 Mini (White, 128 GE
APPLE iPhone 8 (Silver, 256 GB)
APPLE iPhone SE (Black, 64 GB)
APPLE iPhone 11 Pro Max (Space Gre
APPLE iPhone 12 Pro (Graphite, 128 (
APPLE iPhone SE (Red, 128 GB)
APPLE iPhone SE (White, 128 GB)
APPLE iPhone SE (Black, 128 GB)
APPLE iPhone 8 (Space Grey, 256 GB
APPLE iPhone 12 Pro (Silver, 512 GB)
APPLE iPhone 12 Mini (Black, 128 GB
APPLE iPhone 12 Mini (Blue, 128 GB)
APPLE iPhone 12 Pro (Pacific Blue, 12
APPLE iPhone 12 Mini (Black, 64 GB)
APPLE iPhone 12 Mini (White, 64 GB)
Apple iPhone SE (White, 256 GB) (In
APPLE iPhone 12 Pro (Pacific Blue, 51
APPLE iPhone XS Max (Silver, 64 GB)
APPLE iPhone 8 Plus (Space Grey, 64
APPLE iPhone 8 Plus (Silver, 64 GB)
APPLE iPhone 8 Plus (Silver, 256 GB)
APPLE iPhone 11 Pro Max (Midnight C
APPLE iPhone 11 Pro Max (Gold, 64 C
APPLE iPhone 11 Pro Max (Gold, 256
APPLE iPhone 8 Plus (Gold, 64 GB)
APPLE iPhone 12 (White, 128 GB)
APPLE iPhone 12 Pro Max (Graphite,
APPLE iPhone 12 (Black, 128 GB)
APPLE iPhone 12 (Blue, 128 GB)
APPLE iPhone 12 Pro Max (Silver, 128
APPLE iPhone 12 Pro Max (Gold, 128
APPLE iPhone 12 (Green, 128 GB)
APPLE iPhone 12 (White, 64 GB)

sales vs rating using scatter plot

```
In [12]: fig= px.scatter(data_frame=df,x='Number Of Ratings', y = "Sale Price",size="Discount Percentage",trendline='ols',
                title="Relationship between sale price and number of ratings")
         fig.show()
```

Relationship between sale price and number of ratings

In [13]:
```python
fig= px.scatter(data_frame=df,x='Number Of Ratings', y = "Discount Percentage",size="Sale Price",trendline='ols',
                title="Relationship between discount percentage and number of ratings")
fig.show()
```

Relationship between discount percentage and number of ratings