

EXPLORATORY DATA ANALYSIS (EDA)

```
In [3]: pip install pandas
```

```
Requirement already satisfied: pandas in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (2.0.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: tzdata>=2022.1 in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: numpy>=1.21.0 in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (from pandas) (1.24.3)
Requirement already satisfied: six>=1.5 in c:\users\hp\appdata\local\programs\python\python311\lib\site-packages (from python-dateutil>=2.8.2->pandas) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

```
[notice] A new release of pip available: 22.3.1 -> 23.1.2
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
In [2]: import pandas as pd
```

```
In [4]: df = pd.read_csv('apple_products.csv')
```

```
In [5]: df.head()
```

Out[5]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOI
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	M
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MO
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBI
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	M



In [6]: df.tail()

Out[6]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
57	APPLE iPhone SE (Black, 64 GB)	https://www.flipkart.com/apple-iphone-se-black...	Apple	29999	39900	24	95909	8161 MOI
58	APPLE iPhone 11 (Purple, 64 GB)	https://www.flipkart.com/apple-iphone-11-purpl...	Apple	46999	54900	14	43470	3331 M
59	APPLE iPhone 11 (White, 64 GB)	https://www.flipkart.com/apple-iphone-11-white...	Apple	46999	54900	14	43470	3331 MO
60	APPLE iPhone 11 (Black, 64 GB)	https://www.flipkart.com/apple-iphone-11-black...	Apple	46999	54900	14	43470	3331 MC
61	APPLE iPhone 11 (Red, 64 GB)	https://www.flipkart.com/apple-iphone-11-red-6...	Apple	46999	54900	14	43470	3331 MC



Product Name ==> product_name, productName

In [7]: df.count()

Out[7]:

Product Name	62
Product URL	62
Brand	62
Sale Price	62
Mrp	62
Discount Percentage	62
Number Of Ratings	62
Number Of Reviews	62
Upc	62
Star Rating	62
Ram	62
dtype: int64	

In [8]: df.describe()

Out[8]:

	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

In [10]: df['Mrp'].max() #Maximum amount of a product

Out[10]: 149900

In [11]: df['Mrp'].min() #Minimum amount of a product

Out[11]: 39900

In [14]: df[df['Mrp']==149900] #product with Maximum sales -- Mrp

Out[14]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
24	APPLE iPhone 12 Pro (Silver, 512 GB)	https://www.flipkart.com/apple-iphone-12-pro-s...	Apple	140900	149900		6	542 42
41	APPLE iPhone 12 Pro (Pacific Blue, 512 GB)	https://www.flipkart.com/apple-iphone-12-pro-p...	Apple	140900	149900		6	545 42 M

In [15]: df[df['Mrp']==39900] #product with Minimum sales -- Mrp

Out[15]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
52	APPLE iPhone SE (White, 64 GB)	https://www.flipkart.com/apple-iphone-se-white...	Apple	29999	39900	24	95807	8154 MOI
57	APPLE iPhone SE (Black, 64 GB)	https://www.flipkart.com/apple-iphone-se-black...	Apple	29999	39900	24	95909	8161 MOI

In [20]: `df.sort_values(by=['Star Rating'], ascending=False) #false and False, true and True`

Out[20]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
20	APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)	https://www.flipkart.com/apple-iphone-11-pro-m...	Apple	117100	117100	0	1078	101
17	APPLE iPhone 11 Pro Max (Space Grey, 64 GB)	https://www.flipkart.com/apple-iphone-11-pro-m...	Apple	117100	117100	0	1078	101
16	APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)	https://www.flipkart.com/apple-iphone-11-pro-m...	Apple	131900	131900	0	1078	101
15	APPLE iPhone 11 Pro Max (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-11-pro-m...	Apple	117100	117100	0	1078	101
14	APPLE iPhone 11 Pro Max (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-11-pro-m...	Apple	131900	131900	0	1078	101
...
45	APPLE iPhone 12 Mini (Black, 64 GB)	https://www.flipkart.com/apple-iphone-12-mini-...	Apple	59900	69900	14	740	64
28	APPLE iPhone 12 Mini (White, 64 GB)	https://www.flipkart.com/apple-iphone-12-mini-...	Apple	59900	69900	14	740	64
23	Apple iPhone SE (White, 256 GB)	https://www.flipkart.com/apple-iphone-se-white...	Apple	44999	54900	18	95909	8161

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
41	(Includes EarP... APPLE iPhone 12 Pro (Pacific Blue, 512 GB)	https://www.flipkart.com/apple-iphone-12-pro-p...	Apple	140900	149900	6	545	42 1
27	APPLE iPhone 12 Pro (Graphite, 256 GB)	https://www.flipkart.com/apple-iphone-12-pro-g...	Apple	120900	129900	6	545	42

```
In [23]: type(df['Product Name'])
```

```
Out[23]: pandas.core.series.Series
```

```
In [26]: listed_col = list(df['Product Name'])
```

```
In [27]: listed_col
```

```
Out[27]: ['APPLE iPhone 8 Plus (Gold, 64 GB)',  
          'APPLE iPhone 8 Plus (Space Grey, 256 GB)',  
          'APPLE iPhone 8 Plus (Silver, 256 GB)',  
          'APPLE iPhone 8 (Silver, 256 GB)',  
          'APPLE iPhone 8 (Gold, 256 GB)',  
          'APPLE iPhone 8 Plus (Silver, 64 GB)',  
          'APPLE iPhone 8 Plus (Space Grey, 64 GB)',  
          'APPLE iPhone 8 (Space Grey, 256 GB)',  
          'APPLE iPhone XS Max (Silver, 64 GB)',  
          'Apple iPhone XR ((PRODUCT)RED, 128 GB) (Includes EarPods, Power Adapter)',  
          'Apple iPhone XR (Black, 64 GB) (Includes EarPods, Power Adapter)',  
          'Apple iPhone XR (Coral, 128 GB) (Includes EarPods, Power Adapter)',  
          'Apple iPhone XR (Black, 128 GB) (Includes EarPods, Power Adapter)',  
          'Apple iPhone XR (White, 128 GB) (Includes EarPods, Power Adapter)',  
          'APPLE iPhone 11 Pro Max (Gold, 256 GB)',  
          'APPLE iPhone 11 Pro Max (Gold, 64 GB)',  
          'APPLE iPhone 11 Pro Max (Midnight Green, 256 GB)',  
          'APPLE iPhone 11 Pro Max (Space Grey, 64 GB)',  
          'APPLE iPhone 11 Pro (Midnight Green, 64 GB)',  
          'APPLE iPhone 11 Pro (Space Grey, 512 GB)',  
          'APPLE iPhone 11 Pro Max (Midnight Green, 64 GB)',  
          'APPLE iPhone 11 Pro (Midnight Green, 512 GB)',  
          'APPLE iPhone 11 Pro (Space Grey, 256 GB)',  
          'Apple iPhone SE (White, 256 GB) (Includes EarPods, Power Adapter)',  
          'APPLE iPhone 12 Pro (Silver, 512 GB)',  
          'APPLE iPhone 12 Pro Max (Pacific Blue, 256 GB)',  
          'APPLE iPhone 12 Mini (White, 128 GB)',  
          'APPLE iPhone 12 Pro (Graphite, 256 GB)',  
          'APPLE iPhone 12 Mini (White, 64 GB)',  
          'APPLE iPhone 12 (White, 128 GB)',  
          'APPLE iPhone 12 Pro (Graphite, 128 GB)',  
          'APPLE iPhone 12 Pro Max (Graphite, 256 GB)',  
          'APPLE iPhone 12 Pro Max (Graphite, 128 GB)',  
          'APPLE iPhone 12 Mini (Black, 128 GB)',  
          'APPLE iPhone 12 Mini (Blue, 128 GB)',  
          'APPLE iPhone 12 (Black, 128 GB)',  
          'APPLE iPhone 12 (Blue, 128 GB)',  
          'APPLE iPhone 12 Pro Max (Silver, 128 GB)',  
          'APPLE iPhone 12 Mini (Red, 64 GB)',  
          'APPLE iPhone 12 Pro Max (Gold, 128 GB)',  
          'APPLE iPhone 12 (Green, 128 GB)',  
          'APPLE iPhone 12 Pro (Pacific Blue, 512 GB)',  
          'APPLE iPhone 12 (White, 64 GB)',  
          'APPLE iPhone 12 (Black, 64 GB)',  
          'APPLE iPhone 12 (Red, 128 GB)',  
          'APPLE iPhone 12 Mini (Black, 64 GB)',  
          'APPLE iPhone 12 Pro (Pacific Blue, 128 GB)',  
          'APPLE iPhone 12 Pro Max (Pacific Blue, 128 GB)',  
          'APPLE iPhone 12 Pro Max (Silver, 256 GB)',  
          'APPLE iPhone 12 Pro Max (Gold, 256 GB)',  
          'APPLE iPhone 11 (White, 128 GB)',  
          'APPLE iPhone 11 (Red, 128 GB)',  
          'APPLE iPhone SE (White, 64 GB)',  
          'APPLE iPhone SE (Black, 128 GB)',  
          'APPLE iPhone SE (White, 128 GB)',  
          'APPLE iPhone SE (Red, 128 GB)',  
          'APPLE iPhone 11 (Black, 128 GB)',
```

```
'APPLE iPhone SE (Black, 64 GB)',  
'APPLE iPhone 11 (Purple, 64 GB)',  
'APPLE iPhone 11 (White, 64 GB)',  
'APPLE iPhone 11 (Black, 64 GB)',  
'APPLE iPhone 11 (Red, 64 GB)']
```

In [49]: `type(listed_col[1][6:15].strip())`

Out[49]: `str`

In [51]: `df['Model Name'] = df['Product Name'].str[6:15]`

In [54]: `df.head()`

Out[54]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews	MOI
0	APPLE iPhone 8 Plus (Gold, 64 GB)	https://www.flipkart.com/apple-iphone-8-plus-g...	Apple	49900	49900	0	3431	356	MOI
1	APPLE iPhone 8 Plus (Space Grey, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	M
2	APPLE iPhone 8 Plus (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-plus-s...	Apple	84900	84900	0	3431	356	MO
3	APPLE iPhone 8 (Silver, 256 GB)	https://www.flipkart.com/apple-iphone-8-silver...	Apple	77000	77000	0	11202	794	MOBI
4	APPLE iPhone 8 (Gold, 256 GB)	https://www.flipkart.com/apple-iphone-8-gold-2...	Apple	77000	77000	0	11202	794	M

In [55]: `df.tail()`

Out[55]:

	Product Name	Product URL	Brand	Sale Price	Mrp	Discount Percentage	Number Of Ratings	Number Of Reviews
57	APPLE iPhone SE (Black, 64 GB)	https://www.flipkart.com/apple-iphone-se-black-64-gb-purpl...	Apple	29999	39900	24	95909	8161 MOI
58	APPLE iPhone 11 (Purple, 64 GB)	https://www.flipkart.com/apple-iphone-11-purpl...	Apple	46999	54900	14	43470	3331 M
59	APPLE iPhone 11 (White, 64 GB)	https://www.flipkart.com/apple-iphone-11-white-64-gb-purpl...	Apple	46999	54900	14	43470	3331 MO
60	APPLE iPhone 11 (Black, 64 GB)	https://www.flipkart.com/apple-iphone-11-black-64-gb-purpl...	Apple	46999	54900	14	43470	3331 MC
61	APPLE iPhone 11 (Red, 64 GB)	https://www.flipkart.com/apple-iphone-11-red-64-gb-purpl...	Apple	46999	54900	14	43470	3331 MC



In []: