Team Id: PNT2022TMID49356

Global sales data analytics with an Interactive Dashboard

Dataset used: https://www.kaggle.com/apoorvaappz/global-super-store- dataset

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np

%matplotlib inline
```

```
#Data Loading
```

```
df = pd.read_excel('/content/Global_Superstore2.xlsx') df.head()
```

```
   Row ID          Order ID    Order Date     Ship Date       Ship Mode
Customer ID    ¥
0    32298     CA-2012-124891   31-07-2012     31-07-2012        Same Day
RH-19495
1    26341       IN-2013-77878  05-02-2013     07-02-2013    Second  Class
JR-16210
2    25330       IN-2013-71249  17-10-2013     18-10-2013      First  Class
CR-12730
3    13524    ES-2013-1579342   28-01-2013     30-01-2013      First  Class
KM-16375
4    47221        SG-2013-4320  05-11-2013     06-11-2013        Same Day
RH-9495

       Customer Name        Segment             City           State    ...
¥
0        Rick Hansen       Consumer    New York City        New York    ...

1      Justin Ritter      Corporate       Wollongong  New South Wales   ...

2       Craig Reiter       Consumer         Brisbane       Queensland   ...

3   Katherine Murray    Home Office           Berlin           Berlin   ...

4        Rick Hansen       Consumer            Dakar           Dakar    ...


          Product ID      Category  Sub-Category      ¥
0    TEC-AC-10003033    Technology   Accessories
1    FUR-CH-10003950     Furniture        Chairs
2    TEC-PH-10004664    Technology        Phones
3    TEC-PH-10004583    Technology        Phones
```

```
4  TEC-SHA-10000501     Technology        Copiers

                                                      Product Name        Sales
Quantity   ¥
0  Plantronics CS510 - Over-the-Head monaural Wir...             2309.650
7
1          Novimex Executive Leather Armchair, Black             3709.395
9
2                     Nokia Smart Phone, with Caller ID          5175.171
9
3                        Motorola Smart Phone, Cordless          2892.510
5
4                        Sharp Wireless Fax, High-Speed          2832.960
8

  Discount      Profit   Shipping Cost    Order Priority 0
       0.0   762.1845            933.57          Critical
1      0.1 -288.7650             923.63          Critical
2      0.1   919.9710            915.49            Medium
3      0.1   -96.5400            910.16            Medium
4      0.0   311.5200            903.04          Critical

[5 rows x 24 columns]
```

```
df.columns.values
```

```
array(['Row ID', 'Order ID', 'Order Date', 'Ship Date', 'Ship Mode', 'Customer
        ID', 'Customer Name', 'Segment', 'City', 'State', 'Country', 'Postal
        Code', 'Market', 'Region', 'Product ID', 'Category', 'Sub-Category',
        'Product Name', 'Sales',
'Quantity',
        'Discount', 'Profit', 'Shipping Cost', 'Order Priority'],
       dtype=object)
```

```
df.describe()
```

```
               Row ID     Postal Code          Sales       Quantity
Discount   ¥
count    51290.00000      9994.000000     51290.000000    51290.000000
51290.000000
mean     25645.50000     55190.379428       246.490581         3.476545
0.142908
std        14806.29199   32063.693350       487.565361         2.278766
0.212280
min          1.00000      1040.000000         0.444000         1.000000
0.000000
25%      12823.25000    23223.000000       30.758625        2.000000
0.000000
50%      25645.50000    56430.500000       85.053000        3.000000
```

```
0.000000
75%     38467.75000    90008.000000      251.053200        5.000000
0.200000
max     51290.00000    99301.000000    22638.480000       14.000000
0.850000

                 Profit   Shipping Cost
count      51290.000000    51290.000000
mean          28.610982       26.375915
std          174.340972       57.296804
min        -6599.978000        0.000000
25%            0.000000        2.610000
50%            9.240000        7.790000
75%           36.810000       24.450000
max         8399.976000      933.570000
```

```
df.info()
```

```
<class        'pandas.core.frame.DataFrame'>
RangeIndex: 51290 entries, 0 to 51289 Data
columns (total 24 columns):
 #   Column          Non-Null Count  Dtype
----  -------          ---------------  ------
 0    Row ID           51290 non-null     int64
 1    Order ID         51290 non-null     object
 2    Order Date       51290 non-null     object
 3    Ship Date        51290 non-null     object
 4    Ship Mode        51290 non-null     object
 5    Customer ID      51290 non-null     object
 6    Customer Name    51290 non-null     object
 7    Segment          51290 non-null     object
 8    City             51290 non-null     object
 9    State            51290 non-null     object
 10   Country          51290 non-null     object
 11   Postal Code      9994 non-null      float64
 12   Market           51290 non-null     object
 13   Region           51290 non-null     object
 14   Product ID       51290 non-null     object
 15   Category         51290 non-null     object
 16   Sub-Category     51290 non-null     object
 17   Product Name     51290 non-null     object
 18   Sales            51290 non-null     float64
 19   Quantity         51290 non-null     int64
 20   Discount         51290 non-null     float64
 21   Profit           51290 non-null     float64
 22   Shipping Cost    51290 non-null     float64
 23   Order Priority   51290 non-null     object
dtypes: float64(5), int64(2), object(17) memory
usage: 9.4+ MB
```

```
df['Order Date'] = pd.to_datetime(df['Order Date']) df.info()
```

```
<class       'pandas.core.frame.DataFrame'>
RangeIndex: 51290 entries, 0 to 51289 Data
columns (total 24 columns):
 #   Column          Non-Null Count  Dtype
----  -------          ---------------  ------
 0    Row ID           51290 non-null     int64
 1    Order ID         51290 non-null     object
 2    Order Date       51290 non-null     datetime64[ns]
 3    Ship Date        51290 non-null     object
 4    Ship Mode        51290 non-null     object
 5    Customer ID      51290 non-null     object
 6    Customer Name    51290 non-null     object
 7    Segment          51290 non-null     object
 8    City             51290 non-null     object
 9    State            51290 non-null     object
 10   Country          51290 non-null     object
 11   Postal Code      9994 non-null      float64
 12   Market           51290 non-null     object
 13   Region           51290 non-null     object
 14   Product ID       51290 non-null     object
 15   Category         51290 non-null     object
 16   Sub-Category     51290 non-null     object
 17   Product Name     51290 non-null     object
 18   Sales            51290 non-null     float64
 19   Quantity         51290 non-null     int64
 20   Discount         51290 non-null     float64
 21   Profit           51290 non-null     float64
 22   Shipping Cost    51290 non-null     float64
 23   Order Priority   51290 non-null     object
dtypes: datetime64[ns](1), float64(5), int64(2), object(16) memory
usage: 9.4+ MB
```

```
a = df.groupby(['Order Date', 'Profit'])
a.first()
```

```
                         Row ID          Order ID     Ship Date          Ship
Mode    ¥
Order Date Profit


2011-01-01     -26.055      11731      IT-2011-3647632    05-01-2011       Second
Class
                15.342      22254         IN-2011-47883    08-01-2011     Standard
Class
                29.640      48883          HU-2011-1220    05-01-2011       Second
Class
                36.036      22253         IN-2011-47883    08-01-2011     Standard
Class
                37.770      22255         IN-2011-47883    08-01-2011     Standard
```

```
Class
...                          ...                   ...           ...                .
..
2014-12-31     166.440      42474        OD-2014-9490    05-01-2015    Standard
Class
               180.240      15297     ES-2014-5281275    04-01-2015      Second
Class
               216.720      15693     ES-2014-1695428    02-01-2015      Second
Class
               251.400      12929     ES-2014-3458802    05-01-2015    Standard
Class
               301.466       1783      MX-2014-116267    03-01-2015      Second
Class

                         Customer ID        Customer Name          Segment
City   ¥
Order Date Profit

2011-01-01   -26.055           EM-14140        Eugene Moren        Home Office
Stockholm
               15.342          JH-15985          Joseph Holt          Consumer    Wagga
Wagga
               29.640            AT-735       Annie Thurman           Consumer
Budapest
               36.036          JH-15985          Joseph Holt          Consumer    Wagga
Wagga
               37.770          JH-15985          Joseph Holt          Consumer    Wagga
Wagga
...                                 ...                   ...              ...
...
2014-12-31      166.440         MW-8235   Mitch Willingham           Corporate
Juba
                180.240        SS-20515    Shirley Schmidt        Home Office
Madrid
                216.720        RD-19480          Rick Duston          Consumer
Caen
                251.400        JG-15805           John Grady        Corporate
Maidenhead
               301.466         EB-13975           Erica  Bern       Corporate      São
Paulo

                                         State            Country    ...
Region    ¥
  Order Date Profit                                                   ...

  2011-01-01 -26.055                Stockholm              Sweden    ...       North

               15.342          New South Wales          Australia    ...     Oceania

               29.640                 Budapest            Hungary    ...        EMEA
               36.036       New  South  Wales          Australia  ...  Oceania
               37.770       New  South  Wales          Australia  ...  Oceania

...                                       ...               ...  ...      ...
2014-12-31      166.440  Central Equatoria          South Sudan  ...   Africa
                180.240               Madrid              Spain  ...    South
                216.720      Lower Normandy              France  ...  Central
                251.400              England     United Kingdom  ...    North
                301.466            São Paulo             Brazil  ...    South


                                Product ID          Category Sub-Category    ¥
Order Date   Profit
2011-01-01   -26.055      OFF-PA-10001492       Office Supplies         Paper
               15.342      OFF-PA-10001968       Office Supplies         Paper
               29.640     OFF-TEN-10001585       Office Supplies       Storage
               36.036      OFF-SU-10000618       Office Supplies      Supplies
               37.770      FUR-FU-10003447             Furniture   Furnishings
...                                    ...                   ...           ...
2014-12-31      166.440   TEC-CAN-10004291            Technology       Copiers
                180.240    TEC-CO-10002284            Technology       Copiers
                216.720    OFF-ST-10002159       Office Supplies       Storage
                251.400    TEC-PH-10003683            Technology        Phones
                301.466    TEC-CO-10000137            Technology       Copiers

                                                      Product Name       Sales
¥
Order Date Profit

2011-01-01     -26.055                       Enermax Note Cards, Premium      44.865

                15.342   Eaton         Computer Printout Paper, 8.5 x 11      55.242

                29.640                          Tenex Box, Single Width      66.120

                36.036                        Acme Trimmer, High Speed     120.366

                37.770                       Eldon Light Bulb, Duo Pack     113.670

...                                                              ...         ...
```

```
2014-12-31      166.440               Canon Wireless Fax, Digital          378.300

                180.240               Hewlett Copy Machine, Color          530.220

                216.720              Fellowes Lockers, Wire Frame          557.280

                251.400                 Motorola Audio Dock, VoIP          867.300

                301.466                  Canon Wireless Fax, Color        1264.466


                         Quantity   Discount  Shipping   Cost   Order  Priority

Order Date    Profit
2011-01-01    -26.055           3      0.500           4.82              High

               15.342           2      0.100           1.80            Medium

               29.640           4      0.000           8.17              High

               36.036           3      0.100           9.72            Medium

               37.770           5      0.100            4.70            Medium

...                           ...        ...            ...               ...
2014-12-31      166.440         1      0.000          11.71            Medium

                180.240         2      0.000          48.00            Medium

                216.720         3      0.100          51.79            Medium

                251.400         5      0.000          53.16            Medium

                301.466         5      0.002         253.25              High


[50867 rows x 22 columns]
```

```
df.nunique()
```

```
Row ID              51290
Order ID            25035
Order Date           1430
Ship Date            1464
Ship Mode               4
Customer ID          1590
Customer Name         795
```

```
Segment                 3
City                 3636
State                1094
Country               147
Postal Code           631
Market                  7
Region                 13
Product ID          10292
Category                3
Sub-Category           17
Product Name         3788
Sales               22995
Quantity               14
Discount               27
Profit              24575
Shipping Cost       10037
Order Priority          4
dtype: int64
```

```
df['Ship Mode'] = df['Ship Mode'].astype('category')
df['Segment'] = df['Segment'].astype('category') df['Country']
= df['Country'].astype('category') df['Market'] =
df['Market'].astype('category') df['Region'] =
df['Region'].astype('category') df['Category'] =
df['Category'].astype('category')
df['Sub-Category'] = df['Sub-Category'].astype('category') df['Order
Priority'] = df['Order Priority'].astype('category')
```

```
df.info()
```

```
<class        'pandas.core.frame.DataFrame'>
RangeIndex: 51290 entries, 0 to 51289 Data
columns (total 24 columns):
 #   Column          Non-Null Count  Dtype
----  --------         ----------------  ------
 0    Row ID           51290 non-null     int64
 1    Order ID         51290 non-null     object
 2    Order Date       51290 non-null     datetime64[ns]
 3    Ship Date        51290 non-null     object
 4    Ship Mode        51290 non-null     category
 5    Customer ID      51290 non-null     object
 6    Customer Name    51290 non-null     object
 7    Segment          51290 non-null     category
 8    City             51290 non-null     object
 9    State            51290 non-null     object
 10   Country          51290 non-null     category
 11   Postal Code      9994 non-null      float64
 12   Market           51290 non-null     category
 13   Region           51290 non-null     category
 14   Product ID       51290 non-null     object
 15   Category         51290 non-null     category
 16   Sub-Category       51290 non-null     category
 17   Product Name       51290 non-null     object
 18   Sales              51290 non-null     float64
 19   Quantity           51290 non-null     int64
 20   Discount           51290 non-null     float64
 21   Profit             51290 non-null     float64
 22   Shipping Cost      51290 non-null     float64
 23   Order Priority     51290 non-null     category
dtypes: category(8), datetime64[ns](1), float64(5), int64(2), object(8)
memory usage: 6.7+ MB
```

```
def remove_leading_spaces(df):
    for cols in df.columns:
        if df[cols].dtypes in ['object','category']: df[cols]
            = df[cols].str.strip()
        return df
df = remove_leading_spaces(df)
df.head(3)
```

```
   Row ID          Order ID Order Date       Ship Date       Ship Mode
Customer ID    ¥
0    32298      CA-2012-124891   2012-07-31     31-07-2012         Same Day     RH-
19495
1    26341       IN-2013-77878   2013-05-02     07-02-2013      Second Class     JR-
16210
2    25330       IN-2013-71249   2013-10-17     18-10-2013       First Class     CR-
12730

   Customer Name       Segment              City              State   ...   ¥
0     Rick Hansen      Consumer    New York City           New York   ...
1   Justin Ritter       Corporate        Wollongong     New South Wales   ...
2    Craig Reiter        Consumer          Brisbane         Queensland   ...

        Product ID       Category Sub-Category       ¥
0   TEC-AC-10003033      Technology    Accessories
1   FUR-CH-10003950       Furniture          Chairs
2   TEC-PH-10004664      Technology          Phones

                                             Product Name         Sales
Quantity    ¥
0   Plantronics CS510 - Over-the-Head monaural Wir...            2309.650
7
1            Novimex Executive Leather Armchair, Black          3709.395
9
2                     Nokia Smart Phone, with Caller ID         5175.171
9

    Discount      Profit     Shipping Cost   Order   Priority
 0       0.0    762.1845            933.57           Critical
```

```
1        0.1 -288.7650             923.63            Critical
2        0.1   919.9710            915.49              Medium

[3 rows x 24 columns]
```

```
df.groupby(['Country']).count()[['Order ID']]
```

```
               Order ID
Country
Afghanistan          55
Albania              16
Algeria             196
Angola              122
Argentina           390
...                 ...
Venezuela           194
Vietnam             265
Yemen                30
Zambia              102
Zimbabwe             80

[147 rows x 1 columns]
```

```
df.groupby(['City']).count()[['Order ID']]
```

```
                            Order ID
City
Aachen                            17
Aalen                              1
Aalst                              4
Aba                               25
Abadan                            11
...                              ...
Zwedru                             1
Zwickau                            3
Zwolle                             2
eMbalenhle                         2
Águas Lindas de Goiás              4

[3636 rows x 1 columns]
```

```
df.groupby(['Product ID']).count()[['Order ID']]
```

```
                     Order ID
Product ID
FUR-ADV-10000002            2
FUR-ADV-10000108            3
FUR-ADV-10000183            8
FUR-ADV-10000188            5
FUR-ADV-10000190            1
...                       ...
```

```
TEC-STA-10004181            6
TEC-STA-10004536            5
TEC-STA-10004542            5
TEC-STA-10004834            2
TEC-STA-10004927            1

[10292 rows x 1 columns]
```

```
top5 = df.groupby(['Country']).sum()[['Quantity']].nlargest(n=5,
columns=['Quantity'])
top5
```

```
                  Quantity
Country
United States        37873
France               10804
Australia            10673
Mexico               10011
Germany               7745
```

```
df.groupby(['Product ID']).count()[['Order ID']].nlargest(n=5,
columns=['Order ID'])
```

```
                    Order ID
Product ID
OFF-AR-10003651           35
OFF-AR-10003829           31
OFF-BI-10002799           30
OFF-BI-10003708           30
FUR-CH-10003354           28
```

```
top5 = df.groupby(['Country']).sum()[['Quantity']].nlargest(n=5,
columns=['Quantity'])
df2 = df.groupby(['Product Name']).sum()[['Profit']].nlargest(n=5,
columns=['Profit'])
df2
```

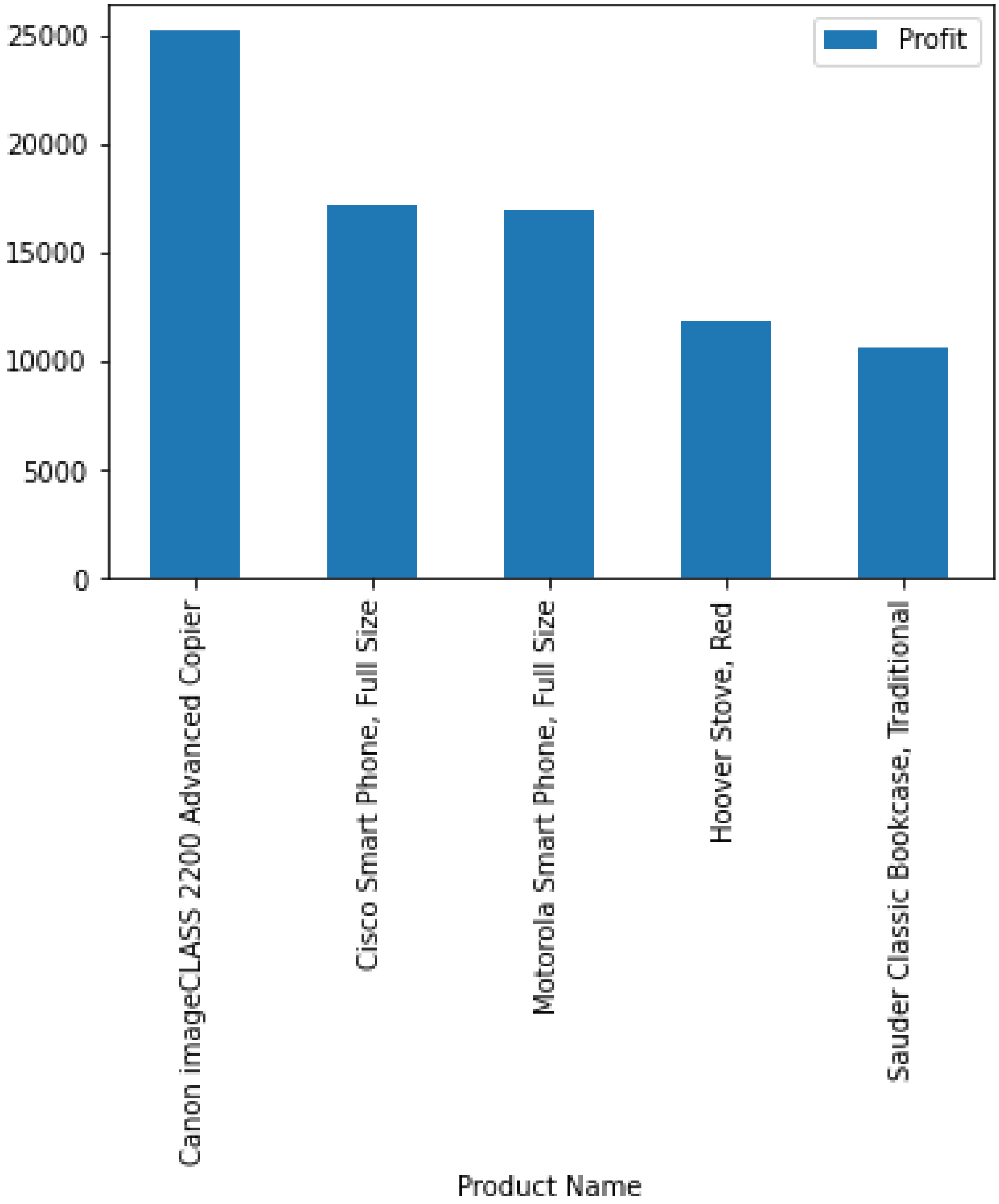
```
                                               Profit
Product Name
Canon imageCLASS 2200 Advanced Copier      25199.9280
Cisco Smart Phone, Full Size               17238.5206
Motorola Smart Phone, Full Size            17027.1130
Hoover Stove, Red                          11807.9690
Sauder Classic Bookcase, Traditional       10672.0730
```

```
                                                                   #Data
Exploration

#TOP 5 PRODUCT BY TOTAL PROFIT
```

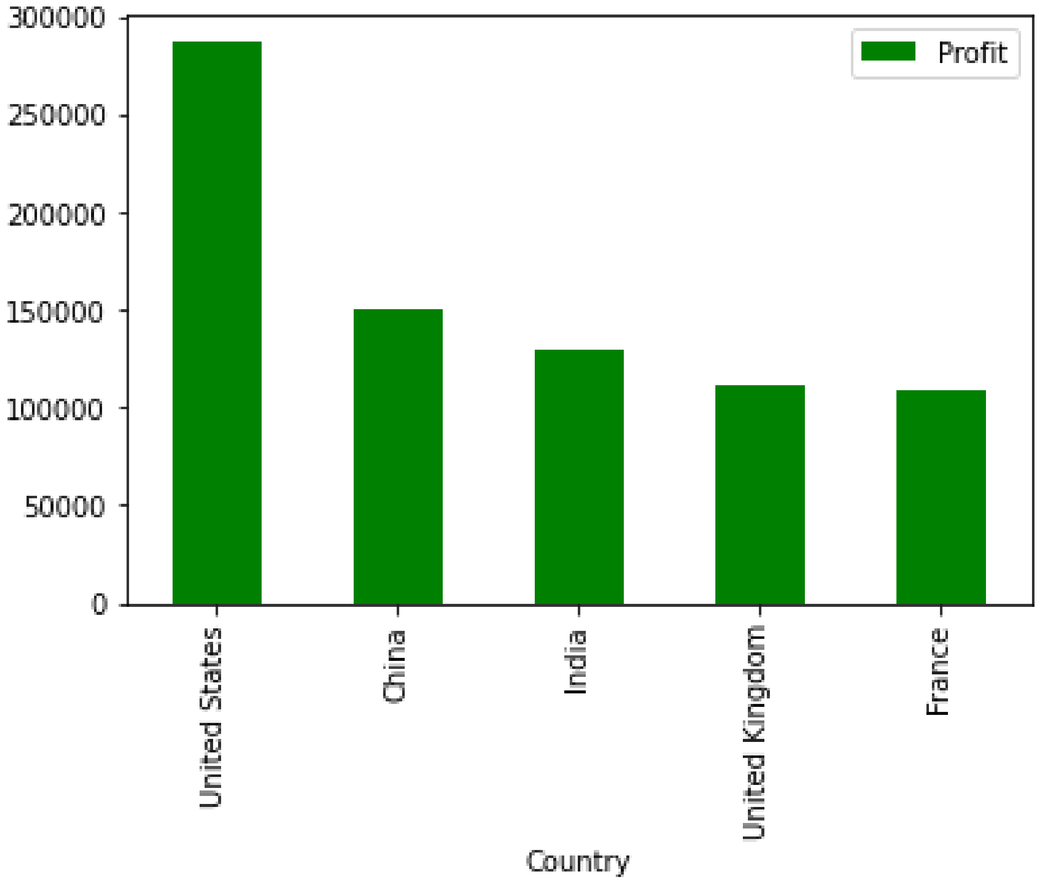
```
df.groupby(['Product Name']).sum()
[['Profit']].sort_values(by="Profit",ascending=False).nlargest(n=5,
columns=['Profit']).plot.bar()
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f72f856d2d0>
```



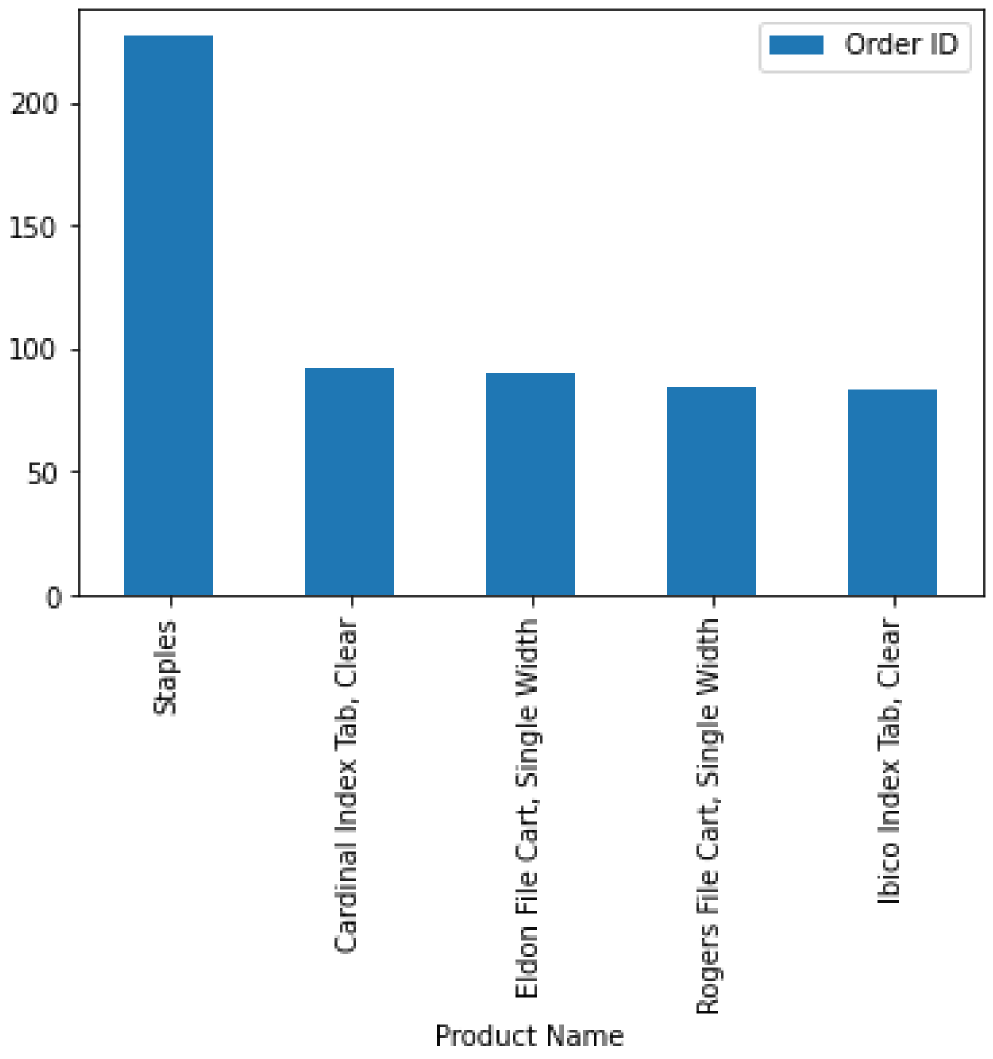
```
#TOP 5 COUNTRY BY TOTAL PROFIT
```

```
df.groupby(['Country']).sum()
[['Profit']].sort_values(by="Profit",ascending=False).nlargest(n=5,
columns=['Profit']).plot.bar(color="green")
plt.show()
```



```
#TOP 5 PRODUCT BY TOTAL ORDER

df.groupby(['Product Name']).count()[['Order ID']].sort_values(by="Order
ID",ascending=False).nlargest(n=5, columns=['Order ID']).plot.bar()
plt.show()
```

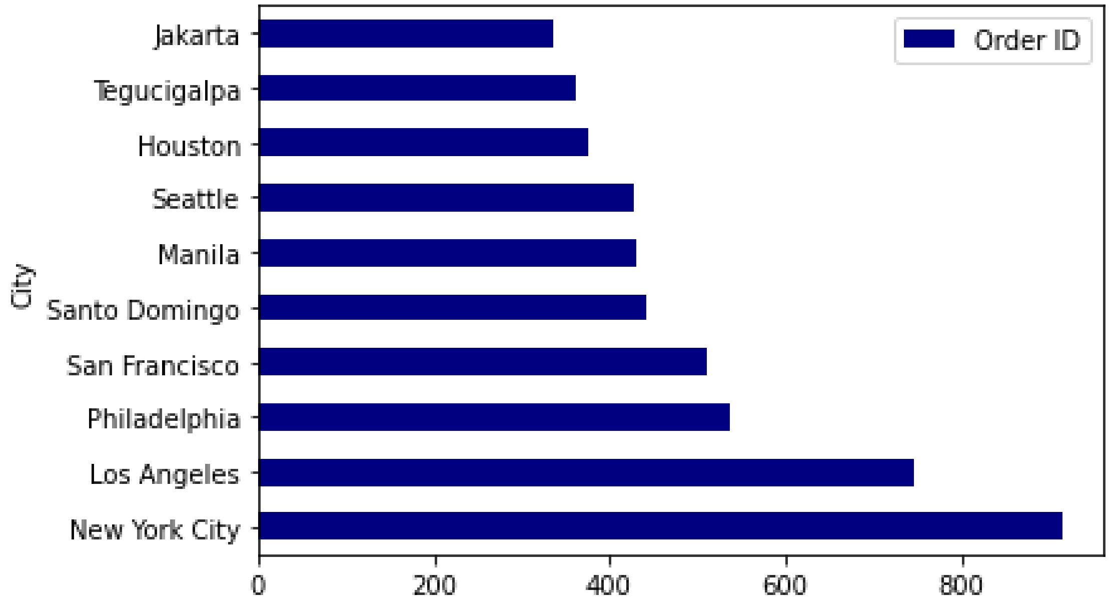


```
df.groupby(['Product Name']).count()[['Order ID']].nlargest(n=5,
columns=['Order ID'])
```

```
                                       Order  ID
Product Name
Staples                                      227
Cardinal Index Tab, Clear                     92
Eldon File Cart, Single Width                 90
Rogers File Cart, Single Width                84
Ibico Index Tab, Clear                        83
```

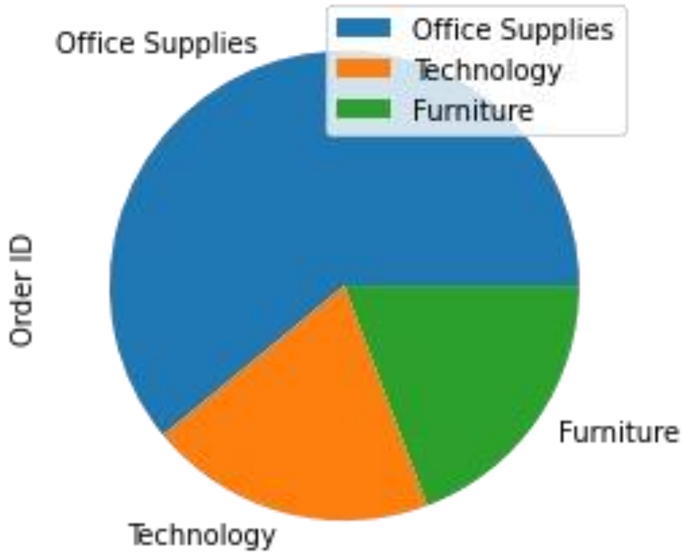
```
#TOP 10 CITY BY TOTAL ORDER
```

```
df.groupby(['City']).count()[['Order ID']].sort_values(by="Order
ID",ascending=True).nlargest(n=10, columns=['Order
ID']).plot.barh(color='navy')
plt.show()
```



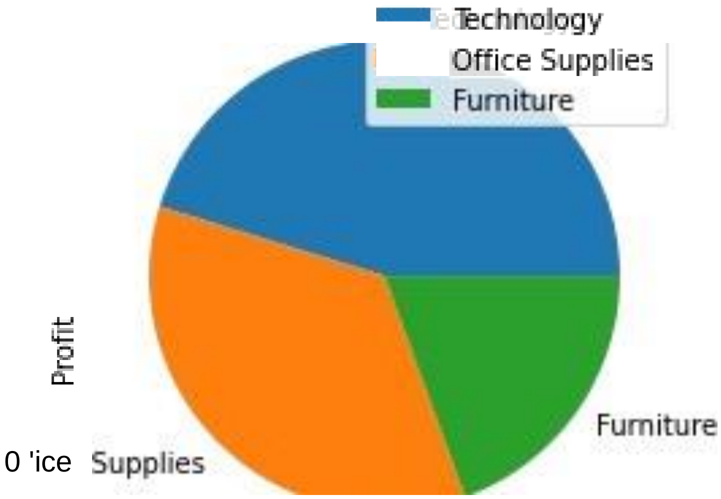
```
#TOTAL ORDER BY CATEGORY

df.groupby(['Category']).count()[['Order ID']].sort_values(by="Order
ID",ascending=False).nlargest(n=5, columns=['Order ID']).plot.pie(subplots=True)
plt.show()
```



```
#TOTAL PROFIT BY CATEGORY

df.groupby(['Category']).sum()
[['Profit']].sort_values(by="Profit",ascending=False).nlargest(n=5,
columns=['Profit']).plot.pie(subplots=True)
plt.show()
```


Technology
Office Supplies
Furniture
Profit
Furniture
0 'ice Supplies