

```
In [3]: import pandas as pd
import plotly.express as px
import plotly.graph_objects as go
import plotly.io as pio
import plotly.colors as colors
pio.templates.default="plotly_white"
```

```
In [4]: data=pd.read_csv("Sample - Superstore.csv",encoding='latin-1')
```

```
In [5]: data
```

Out[5]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment
0	1	CA-2016-152156	11/8/2016	11/11/2016	Second Class	CG-12520	Claire Gute	Consumer
1	2	CA-2016-152156	11/8/2016	11/11/2016	Second Class	CG-12520	Claire Gute	Consumer
2	3	CA-2016-138688	6/12/2016	6/16/2016	Second Class	DV-13045	Darrin Van Huff	Corporate
3	4	US-2015-108966	10/11/2015	10/18/2015	Standard Class	SO-20335	Sean O'Donnell	Consumer
4	5	US-2015-108966	10/11/2015	10/18/2015	Standard Class	SO-20335	Sean O'Donnell	Consumer
...
9989	9990	CA-2014-110422	1/21/2014	1/23/2014	Second Class	TB-21400	Tom Boeckenhauer	Consumer
9990	9991	CA-2017-121258	2/26/2017	3/3/2017	Standard Class	DB-13060	Dave Brooks	Consumer
9991	9992	CA-2017-121258	2/26/2017	3/3/2017	Standard Class	DB-13060	Dave Brooks	Consumer
9992	9993	CA-2017-121258	2/26/2017	3/3/2017	Standard Class	DB-13060	Dave Brooks	Consumer
9993	9994	CA-2017-119914	5/4/2017	5/9/2017	Second Class	CC-12220	Chris Cortes	Consumer

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment
--------	----------	------------	-----------	-----------	-------------	---------------	---------

9994 rows × 21 columns

In [6]: `data.head()`

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Count
0	1	CA-2016-152156	11/8/2016	11/11/2016	Second Class	CG-12520	Claire Gute	Consumer	United States
1	2	CA-2016-152156	11/8/2016	11/11/2016	Second Class	CG-12520	Claire Gute	Consumer	United States
2	3	CA-2016-138688	6/12/2016	6/16/2016	Second Class	DV-13045	Darrin Van Huff	Corporate	United States
3	4	US-2015-108966	10/11/2015	10/18/2015	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States
4	5	US-2015-108966	10/11/2015	10/18/2015	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States

5 rows × 21 columns

In [7]: `data.describe()`

Out[7]:

	Row ID	Postal Code	Sales	Quantity	Discount	Profit
count	9994.000000	9994.000000	9994.000000	9994.000000	9994.000000	9994.000000
mean	4997.500000	55190.379428	229.858001	3.789574	0.156203	28.656896
std	2885.163629	32063.693350	623.245101	2.225110	0.206452	234.260108
min	1.000000	1040.000000	0.444000	1.000000	0.000000	-6599.978000
25%	2499.250000	23223.000000	17.280000	2.000000	0.000000	1.728750
50%	4997.500000	56430.500000	54.490000	3.000000	0.200000	8.666500
75%	7495.750000	90008.000000	209.940000	5.000000	0.200000	29.364000
max	9994.000000	99301.000000	22638.480000	14.000000	0.800000	8399.976000

In [8]: `data.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9994 entries, 0 to 9993
Data columns (total 21 columns):
 #   Column           Non-Null Count  Dtype  
 ---  -- 
 0   Row ID          9994 non-null    int64  
 1   Order ID        9994 non-null    object  
 2   Order Date      9994 non-null    object  
 3   Ship Date       9994 non-null    object  
 4   Ship Mode       9994 non-null    object  
 5   Customer ID     9994 non-null    object  
 6   Customer Name   9994 non-null    object  
 7   Segment          9994 non-null    object  
 8   Country          9994 non-null    object  
 9   City              9994 non-null    object  
 10  State             9994 non-null    object  
 11  Postal Code     9994 non-null    int64  
 12  Region           9994 non-null    object  
 13  Product ID      9994 non-null    object  
 14  Category          9994 non-null    object  
 15  Sub-Category     9994 non-null    object  
 16  Product Name     9994 non-null    object  
 17  Sales             9994 non-null    float64 
 18  Quantity          9994 non-null    int64  
 19  Discount          9994 non-null    float64 
 20  Profit            9994 non-null    float64 
dtypes: float64(3), int64(3), object(15)
memory usage: 1.6+ MB
```

converting date columns

In [9]: `data['Order Date']=pd.to_datetime(data['Order Date'])`In [10]: `data.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9994 entries, 0 to 9993
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype  
--- 
 0   Row ID             9994 non-null    int64  
 1   Order ID           9994 non-null    object  
 2   Order Date          9994 non-null    datetime64[ns]
 3   Ship Date           9994 non-null    object  
 4   Ship Mode            9994 non-null    object  
 5   Customer ID         9994 non-null    object  
 6   Customer Name        9994 non-null    object  
 7   Segment              9994 non-null    object  
 8   Country              9994 non-null    object  
 9   City                 9994 non-null    object  
 10  State                9994 non-null    object  
 11  Postal Code          9994 non-null    int64  
 12  Region               9994 non-null    object  
 13  Product ID           9994 non-null    object  
 14  Category              9994 non-null    object  
 15  Sub-Category          9994 non-null    object  
 16  Product Name          9994 non-null    object  
 17  Sales                 9994 non-null    float64 
 18  Quantity              9994 non-null    int64  
 19  Discount              9994 non-null    float64 
 20  Profit                 9994 non-null    float64 
dtypes: datetime64[ns](1), float64(3), int64(3), object(14)
memory usage: 1.6+ MB
```

```
In [11]: data['Ship Date']=pd.to_datetime(data['Ship Date'])
```

```
In [12]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9994 entries, 0 to 9993
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype  
--- 
 0   Row ID             9994 non-null    int64  
 1   Order ID           9994 non-null    object  
 2   Order Date         9994 non-null    datetime64[ns]
 3   Ship Date          9994 non-null    datetime64[ns]
 4   Ship Mode          9994 non-null    object  
 5   Customer ID        9994 non-null    object  
 6   Customer Name      9994 non-null    object  
 7   Segment             9994 non-null    object  
 8   Country             9994 non-null    object  
 9   City                9994 non-null    object  
 10  State               9994 non-null    object  
 11  Postal Code        9994 non-null    int64  
 12  Region              9994 non-null    object  
 13  Product ID          9994 non-null    object  
 14  Category            9994 non-null    object  
 15  Sub-Category        9994 non-null    object  
 16  Product Name        9994 non-null    object  
 17  Sales               9994 non-null    float64 
 18  Quantity            9994 non-null    int64  
 19  Discount            9994 non-null    float64 
 20  Profit              9994 non-null    float64 
dtypes: datetime64[ns](2), float64(3), int64(3), object(13)
memory usage: 1.6+ MB
```

```
In [13]: data.head()
```

Out[13]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country	
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	Ang
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder

5 rows × 21 columns



In [14]:

```
data['Order Month']=data['Order Date'].dt.month
data['Order Year']=data['Order Date'].dt.year
data['Order week']=data['Order Date'].dt.dayofweek
```

In [15]:

```
data.head()
```

Out[15]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country	
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	Ang
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder

5 rows × 24 columns



Monthly sales analysis

```
In [16]: sales_of_month = data.groupby('Order Month')['Sales'].sum().reset_index()
```

```
In [17]: sales_of_month
```

Out[17]:

	Order Month	Sales
0	1	94924.8356
1	2	59751.2514
2	3	205005.4888
3	4	137762.1286
4	5	155028.8117
5	6	152718.6793
6	7	147238.0970
7	8	159044.0630
8	9	307649.9457
9	10	200322.9847
10	11	352461.0710
11	12	325293.5035

In [18]:

```
fig=px.line(sales_of_month,
            x='Order Month',
            y='Sales',
            title='Montly Sales Analysis')
fig.show()
```

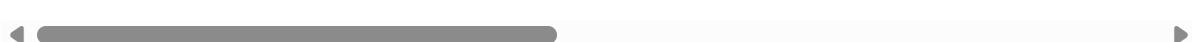
In [19]:

```
data.head()
```

Out[19]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country	
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States	Hender
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	Ang
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Lauder

5 rows × 24 columns



Sales_By Category

In [20]: `sales_by_category = data.groupby('Category')[['Sales']].sum().reset_index()`

In [21]: `sales_by_category`

Out[21]:

	Category	Sales
0	Furniture	741999.7953
1	Office Supplies	719047.0320
2	Technology	836154.0330

In [22]: `fig=px.pie(sales_by_category, values='Sales', names='Category', hole=0.3, color_discrete_sequence = px.colors.qualitative.Pastel)`

```
fig.update_traces(textposition='inside',textinfo='percent+label')
fig.update_layout(title_text='Sales Analysis By Category',title_font=dict(size=24))
fig.show()
```

Sales analysis by Sub-Category

```
In [23]: sales_by_subcategory=data.groupby('Sub-Category')['Sales'].sum().reset_index()
```

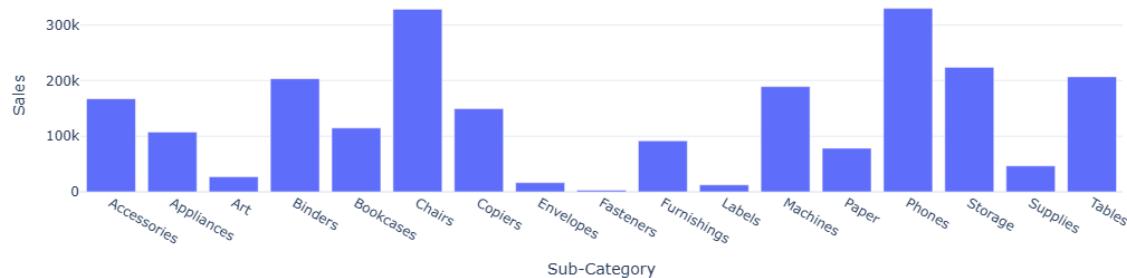
```
In [26]: sales_by_subcategory
```

```
Out[26]:
```

	Sub-Category	Sales
0	Accessories	167380.3180
1	Appliances	107532.1610
2	Art	27118.7920
3	Binders	203412.7330
4	Bookcases	114879.9963
5	Chairs	328449.1030
6	Copiers	149528.0300
7	Envelopes	16476.4020
8	Fasteners	3024.2800
9	Furnishings	91705.1640
10	Labels	12486.3120
11	Machines	189238.6310
12	Paper	78479.2060
13	Phones	330007.0540
14	Storage	223843.6080
15	Supplies	46673.5380
16	Tables	206965.5320

```
In [27]: fig=px.bar(sales_by_subcategory,
                  x ='Sub-Category',
                  y ='Sales',
                  title='Sales analysis by sub category')
fig.update_layout(title_font=dict(size=24))
fig.show()
```

Sales analysis by sub category



Monthly Profit analysis

```
In [28]: profit_by_month=data.groupby('Order Month')['Profit'].sum().reset_index()
```

```
In [29]: profit_by_month
```

Out[29]:

	Order Month	Profit
0	1	9134.4461
1	2	10294.6107
2	3	28594.6872
3	4	11587.4363
4	5	22411.3078
5	6	21285.7954
6	7	13832.6648
7	8	21776.9384
8	9	36857.4753
9	10	31784.0413
10	11	35468.4265
11	12	43369.1919

```
In [30]: fig=px.line(profit_by_month,
                  x='Order Month',
                  y='Profit',
                  title='Monthly profit analysis')
fig.show()
```

Monthly profit analysis



Profit by Category

```
In [31]: profit_by_category=data.groupby('Category')['Profit'].sum().reset_index()
```

```
In [32]: profit_by_category
```

	Category	Profit
0	Furniture	18451.2728
1	Office Supplies	122490.8008
2	Technology	145454.9481

```
In [33]: fig=px.pie(profit_by_category,
                  values='Profit',
                  names='Category',
                  hole=0.3,
                  color_discrete_sequence=px.colors.qualitative.Pastel)
fig.update_traces(textposition='inside',textinfo='percent+label')
fig.update_layout(title_text='Profit analysis by category',title_font=dict(size=24))
fig.show()
```

Profit analysis by category



Profit analysis by Sub-category

```
In [34]: profit_by_Subcategory=data.groupby('Sub-Category')['Profit'].sum().reset_index()
```

```
In [35]: profit_by_Subcategory
```

```
Out[35]:
```

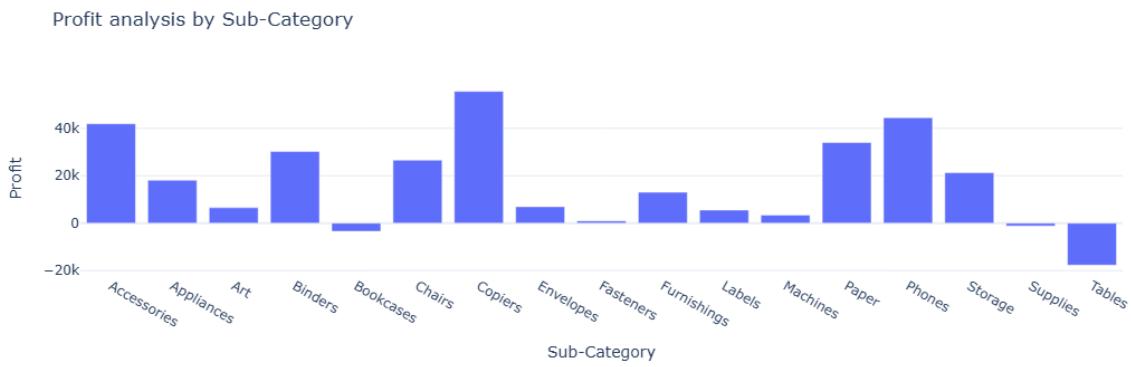
	Sub-Category	Profit
0	Accessories	41936.6357
1	Appliances	18138.0054
2	Art	6527.7870
3	Binders	30221.7633
4	Bookcases	-3472.5560
5	Chairs	26590.1663
6	Copiers	55617.8249
7	Envelopes	6964.1767
8	Fasteners	949.5182
9	Furnishings	13059.1436
10	Labels	5546.2540
11	Machines	3384.7569
12	Paper	34053.5693
13	Phones	44515.7306
14	Storage	21278.8264
15	Supplies	-1189.0995
16	Tables	-17725.4811

```
In [36]: fig=px.pie(profit_by_Subcategory,
                  values='Profit',
                  names='Sub-Category',
                  hole=0.3,
                  color_discrete_sequence=px.colors.qualitative.Pastel)
fig.update_traces(textposition='inside',textinfo='label+percent')
fig.update_layout(title_text='Profit analysis by Sub-Category',title_font=dict(size=16))
fig.show()
```

Profit analysis by Sub-Category



```
In [37]: fig=px.bar(profit_by_Subcategory,
                 y='Profit',
                 x='Sub-Category',
                 title='Profit analysis by Sub-Category')
fig.show()
```



sales and profit - Consumer segment

```
In [38]: data.head()
```

Out[38]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	Claire Gute	Consumer	United States
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045	Darrin Van Huff	Corporate	United States
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States

5 rows × 24 columns

In [39]: `sales_profit_by_segment=data.groupby('Segment').agg({'Sales': 'sum','Profit': 'sum'})`In [40]: `sales_profit_by_segment`

Out[40]:

	Segment	Sales	Profit
0	Consumer	1.161401e+06	134119.2092
1	Corporate	7.061464e+05	91979.1340
2	Home Office	4.296531e+05	60298.6785

In [41]: `color_palette=colors.qualitative.Pastel
fig=go.Figure()
fig.add_trace(go.Bar(x=sales_profit_by_segment['Segment'],
y=sales_profit_by_segment['Sales'],
name='Sales',
marker_color=color_palette[0]))
fig.add_trace(go.Bar(x=sales_profit_by_segment['Segment'],
y=sales_profit_by_segment['Profit'],
name='Profit',`

```

        marker_color=color_palette[1]))
fig.update_layout(title='Sales and Profit Analysis by customer Segment',
                  xaxis_title='Customer Segment',yaxis_title='Amount')
fig.show()

```



sales to profit ratio

```
In [42]: sales_profit_by_segment=data.groupby('Segment').agg({'Sales': 'sum', 'Profit': 'sum'})
```

```
In [44]: sales_profit_by_segment['Sales_to_Profit_Ratio']=sales_profit_by_segment['Sales'] / sales_profit_by_segment['Profit']
print(sales_profit_by_segment[['Segment', 'Sales_to_Profit_Ratio']])
```

	Segment	Sales_to_Profit_Ratio
0	Consumer	8.659471
1	Corporate	7.677245
2	Home Office	7.125416

```
In [ ]:
```