

```
pip install plotly
```

Requirement already satisfied: plotly in c:\users\admin\appdata\local\programs\python\python312\lib\site-packages (6.0.1)

Requirement already satisfied: narwhals>=1.15.1 in c:\users\admin\appdata\local\programs\python\python312\lib\site-packages (from plotly) (1.34.1)

Requirement already satisfied: packaging in c:\users\admin\appdata\local\programs\python\python312\lib\site-packages (from plotly) (24.0)

Note: you may need to restart the kernel to use updated packages.

[notice] A new release of pip is available: 24.0 -> 25.0.1

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

```
import pandas as pd
```

```
import plotly.express as px # 'ps' should be 'px' for plotly.express
```

```
import plotly.graph_objects as go
```

```
import plotly.io as pio
```

```
import plotly.colors as colors # 'colours' should be 'colors'
```

```
pio.templates.default = "plotly_white"
```

```
data = pd.read_csv("Sample - Superstore.csv" , encoding = 'latin-1')
```

```
data.head()
```

	Row ID	Order ID	Order Date	Ship Date	Ship Mode
Customer ID \					
0	1	CA-2016-152156	11/8/2016	11/11/2016	Second Class
CG-12520					
1	2	CA-2016-152156	11/8/2016	11/11/2016	Second Class
CG-12520					
2	3	CA-2016-138688	6/12/2016	6/16/2016	Second Class
DV-13045					
3	4	US-2015-108966	10/11/2015	10/18/2015	Standard Class
S0-20335					
4	5	US-2015-108966	10/11/2015	10/18/2015	Standard Class
S0-20335					

	Customer Name	Segment	Country	City	...	\
0	Claire Gute	Consumer	United States	Henderson	...	
1	Claire Gute	Consumer	United States	Henderson	...	
2	Darrin Van Huff	Corporate	United States	Los Angeles	...	
3	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	

	Postal Code	Region	Product ID	Category	Sub-
Category \					
0	42420	South	FUR-B0-10001798	Furniture	Bookcases

1	42420	South	FUR-CH-10000454	Furniture	Chairs
2	90036	West	OFF-LA-10000240	Office Supplies	Labels
3	33311	South	FUR-TA-10000577	Furniture	Tables
4	33311	South	OFF-ST-10000760	Office Supplies	Storage

		Product Name	Sales
Quantity \			
0		Bush Somerset Collection Bookcase	261.9600
2			
1		Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400
3			
2		Self-Adhesive Address Labels for Typewriters b...	14.6200
2			
3		Bretford CR4500 Series Slim Rectangular Table	957.5775
5			
4		Eldon Fold 'N Roll Cart System	22.3680
2			

	Discount	Profit
0	0.00	41.9136
1	0.00	219.5820
2	0.00	6.8714
3	0.45	-383.0310
4	0.20	2.5164

[5 rows x 21 columns]

data.describe()

	Row ID	Postal Code	Sales	Quantity
Discount \				
count	9994.000000	9994.000000	9994.000000	9994.000000
9994.000000				
mean	4997.500000	55190.379428	229.858001	3.789574
0.156203				
std	2885.163629	32063.693350	623.245101	2.225110
0.206452				
min	1.000000	1040.000000	0.444000	1.000000
0.000000				
25%	2499.250000	23223.000000	17.280000	2.000000
0.000000				
50%	4997.500000	56430.500000	54.490000	3.000000
0.200000				
75%	7495.750000	90008.000000	209.940000	5.000000
0.200000				

```
max    9994.000000  99301.000000  22638.480000   14.000000
0.800000
```

```
Profit
count  9994.000000
mean    28.656896
std     234.260108
min    -6599.978000
25%     1.728750
50%     8.666500
75%    29.364000
max     8399.976000
```

```
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

```
data["Order Date"] = pd.to_datetime(data["Order Date"])
data["Ship Date"] = pd.to_datetime(data["Ship Date"])
```

```
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
```

```
data.head()
```

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	
Customer ID \						
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	S0-20335
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	S0-20335

  

	Customer Name	Segment	Country	City	...	\
0	Claire Gute	Consumer	United States	Henderson	...	
1	Claire Gute	Consumer	United States	Henderson	...	
2	Darrin Van Huff	Corporate	United States	Los Angeles	...	

3	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...

	Postal Code	Region	Product ID	Category	Sub-
Category \					
0	42420	South	FUR-B0-10001798	Furniture	Bookcases
1	42420	South	FUR-CH-10000454	Furniture	Chairs
2	90036	West	OFF-LA-10000240	Office Supplies	Labels
3	33311	South	FUR-TA-10000577	Furniture	Tables
4	33311	South	OFF-ST-10000760	Office Supplies	Storage

	Product Name	Sales
Quantity \		
0	Bush Somerset Collection Bookcase	261.9600
2		
1	Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400
3		
2	Self-Adhesive Address Labels for Typewriters b...	14.6200
2		
3	Bretford CR4500 Series Slim Rectangular Table	957.5775
5		
4	Eldon Fold 'N Roll Cart System	22.3680
2		

	Discount	Profit
0	0.00	41.9136
1	0.00	219.5820
2	0.00	6.8714
3	0.45	-383.0310
4	0.20	2.5164

[5 rows x 21 columns]

```
data["Order Month"] = data["Order Date"].dt.month
data["Order Year"] = data["Order Date"].dt.year
data["Order Week"] = data["Order Date"].dt.dayofweek
```

```
data.head()
```

Row ID	Order ID	Order Date	Ship Date	Ship Mode		
Customer ID \						
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-

```

13045
3      4  US-2015-108966 2015-10-11 2015-10-18  Standard Class  S0-
20335
4      5  US-2015-108966 2015-10-11 2015-10-18  Standard Class  S0-
20335

```

	Customer Name	Segment	Country	City	...	\
0	Claire Gute	Consumer	United States	Henderson	...	
1	Claire Gute	Consumer	United States	Henderson	...	
2	Darrin Van Huff	Corporate	United States	Los Angeles	...	
3	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	

	Category	Sub-Category	\
0	Furniture	Bookcases	
1	Furniture	Chairs	
2	Office Supplies	Labels	
3	Furniture	Tables	
4	Office Supplies	Storage	

	Product Name	Sales
Quantity \		
0	Bush Somerset Collection Bookcase	261.9600
2		
1	Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400
3		
2	Self-Adhesive Address Labels for Typewriters b...	14.6200
2		
3	Bretford CR4500 Series Slim Rectangular Table	957.5775
5		
4	Eldon Fold 'N Roll Cart System	22.3680
2		

	Discount	Profit	Order Month	Order Year	Order Week
0	0.00	41.9136	11	2016	1
1	0.00	219.5820	11	2016	1
2	0.00	6.8714	6	2016	6
3	0.45	-383.0310	10	2015	6
4	0.20	2.5164	10	2015	6

[5 rows x 24 columns]

## Monthly sales analysis

```

sales_by_month = data.groupby("Order Month")
["Sales"].sum().reset_index()

sales_by_month

```

	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

```
fig = px.line(sales_by_month,
              x= "Order Month",
              y= "Sales",
              title= "Monthly Sales Analysis")
```

```
fig.show()
```

```
{
  "config": {
    "plotlyServerURL": "https://plot.ly",
    "data": [
      {
        "hvertemplate": "Order  
Month=%{x}<br>Sales=%{y}<extra></extra>",
        "legendgroup": "",
        "line": {
          "color": "#636efa",
          "dash": "solid",
          "marker": {
            "symbol": "circle",
            "mode": "lines",
            "name": "",
            "orientation": "v",
            "showlegend": false,
            "type": "scatter",
            "x": "bdata",
            "y": "bdata"
          }
        },
        "bdata": "AQAAAAIAAADAAAAABAAAAAUAAAAGAAAABwAAAAgAAAAJAAACgAAAAaAAAAMAAAA",
        "dtype": "i4",
        "xaxis": "x",
        "y": "bdata",
        "dtype": "f8",
        "yaxis": "y"
      }
    ],
    "layout": {
      "legend": {
        "tracegroupgap": 0,
        "template": {
          "data": {
            "bar": [
              {
                "error_x": {
                  "color": "#2a3f5f",
                  "error_y": {
                    "color": "#2a3f5f",
                    "marker": {
                      "line": {
                        "color": "white",
                        "width": 0.5,
                        "pattern": {
                          "fillmode": "overlay",
                          "size": 10,
                          "solidity": 0.2
                        },
                        "type": "bar"
                      },
                      "barpolar": [
                        {
                          "marker": {
                            "line": {
                              "color": "white",
                              "width": 0.5,
                              "pattern": {
                                "fillmode": "overlay",
                                "size": 10,
                                "solidity": 0.2
                              },
                              "type": "barpolar"
                            }
                        }
                      ],
                      "carpet": [
                        {
                          "aaxis": {
                            "endlinecolor": "#2a3f5f",
                            "gridcolor": "#C8D4E3",
                            "linecolor": "#C8D4E3",
                            "minorgridcolor": "#C8D4E3",
                            "startlinecolor": "#2a3f5f",
                            "baxis": {
                              "endlinecolor": "#2a3f5f",
                              "gridcolor": "#C8D4E3",
                              "linecolor": "#C8D4E3",
                              "minorgridcolor": "#C8D4E3",
                              "startlinecolor": "#2a3f5f",
                              "type": "carpet"
                            }
                        }
                      ],
                      "choropleth": [
                        {
                          "colorbar": {
                            "outlinewidth": 0,
                            "ticks": "",
                            "type": "choropleth"
                          },
                          "contour": [
                            {
                              "colorbar": {
                                "outlinewidth": 0,
                                "ticks": "",
                                "colorscale": [
                                  [0, "#0d0887"],
                                  [0.1111111111111111, "#46039f"],
                                  [0.2222222222222222, "#7201a8"],
                                  [0.3333333333333333, "#9c179e"],
                                  [0.4444444444444444, "#bd3786"],
                                  [0.5555555555555556, "#d8576b"],
                                  [0.6666666666666666, "#ed7953"],
                                  [0.7777777777777778, "#fb9f3a"],
                                  [0.8888888888888888, "#fdca26"],
                                ]
                              }
                            }
                          ]
                        }
                      ]
                    }
                  }
                }
              }
            ]
          }
        }
      }
    }
  }
}
```

```

[1,"#f0f921"]], "type": "contour"}], "contourcarpet": [{"colorbar":
{"linewidth":0, "ticks":"","type": "contourcarpet"}], "heatmap":
[{"colorbar": {"linewidth":0, "ticks":"","colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "heatmap"}], "histogram": [{"marker": {"pattern":
{"fillmode": "overlay", "size":10, "solidity":0.2}}, "type": "histogram"}],
"histogram2d": [{"colorbar": {"linewidth":0, "ticks":"","colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2d"}], "histogram2dcontour":
[{"colorbar": {"linewidth":0, "ticks":"","colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2dcontour"}], "mesh3d": [{"colorbar":
{"linewidth":0, "ticks":"","type": "mesh3d"}], "parcoords": [{"line":
{"colorbar": {"linewidth":0, "ticks":"","type": "parcoords"}], "pie":
[{"automargin":true, "type": "pie"}], "scatter": [{"fillpattern":
{"fillmode": "overlay", "size":10, "solidity":0.2}, "type": "scatter"}], "sc
atter3d": [{"line": {"colorbar": {"linewidth":0, "ticks":"","marker":
{"colorbar":
{"linewidth":0, "ticks":"","type": "scatter3d"}], "scattercarpet":
[{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scattercarpet"}], "scattergeo":
[{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scattergeo"}], "scattergl":
[{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scattergl"}], "scattermap":
[{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scattermap"}], "scattermapbox":
[{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scattermapbox"}], "scatterpolar"
: [{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scatterpolar"}], "scatterpolargl
": [{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scatterpolargl"}], "scatterterna
ry": [{"marker": {"colorbar":
{"linewidth":0, "ticks":"","type": "scatterternary"}], "surface":
[{"colorbar": {"linewidth":0, "ticks":"","colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],

```



```

[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type": "surface"}], "table": [{"cells": {"fill":
{"color": "#EBF0F8"}, "line": {"color": "white"}}, "header": {"fill":
{"color": "#C8D4E3"}, "line":
{"color": "white"}}, "type": "table"}]], "layout": {"annotationdefaults":
{"arrowcolor": "#2a3f5f", "arrowhead": 0, "arrowwidth": 1}, "autotypenumbers
": "strict", "coloraxis": {"colorbar":
{"outlinewidth": 0, "ticks": ""}}, "colorscale": {"diverging":
[[0, "#8e0152"], [0.1, "#c51b7d"], [0.2, "#de77ae"], [0.3, "#f1b6da"],
[0.4, "#fde0ef"], [0.5, "#f7f7f7"], [0.6, "#e6f5d0"], [0.7, "#b8e186"],
[0.8, "#7fbcb4"], [0.9, "#4d9221"], [1, "#276419"]], "sequential":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"], [1, "#f0f921"]], "sequentialminus":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"], [1, "#f0f921"]]]}, "colorway":
["#636efa", "#EF553B", "#00cc96", "#ab63fa", "#FFA15A", "#19d3f3", "#FF6692",
"#B6E880", "#FF97FF", "#FECB52"], "font": {"color": "#2a3f5f"}, "geo":
{"bgcolor": "white", "lakecolor": "white", "landcolor": "white", "showlakes"
: true, "showland": true, "subunitcolor": "#C8D4E3"}, "hoverlabel":
{"align": "left"}, "hovermode": "closest", "mapbox":
{"style": "light"}, "paper_bgcolor": "white", "plot_bgcolor": "white", "pola
r": {"angularaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}, "bgcolor": "wh
ite", "radialaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}}, "scene":
{"xaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}, "yaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}, "zaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}}, "shapedefaults": {"line": {"color": "#2a3f5f"}}, "ternary": {"aaxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "baxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "bgcolor": "wh
ite", "caxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}}, "title":
{"x": 5.0e-2}, "xaxis":

```

```
{
  "automargin": true,
  "gridcolor": "#EBF0F8",
  "linecolor": "#EBF0F8",
  "ticks": "",
  "title": {
    "standoff": 15,
    "zerolinecolor": "#EBF0F8",
    "zerolinewidth": 2,
    "yaxis": {
      "automargin": true,
      "gridcolor": "#EBF0F8",
      "linecolor": "#EBF0F8",
      "ticks": "",
      "title": {
        "standoff": 15,
        "zerolinecolor": "#EBF0F8",
        "zerolinewidth": 2
      }
    },
    "title": {
      "text": "Monthly Sales Analysis",
      "xaxis": {
        "anchor": "y",
        "domain": [0, 1]
      },
      "title": {
        "text": "Order Month"
      },
      "yaxis": {
        "anchor": "x",
        "domain": [0, 1]
      },
      "title": {
        "text": "Sales"
      }
    }
  }
}
```

```
data.head()
```

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class

Customer Name	Segment	Country	City	...
Claire Gute	Consumer	United States	Henderson	...
Claire Gute	Consumer	United States	Henderson	...
Darrin Van Huff	Corporate	United States	Los Angeles	...
Sean O'Donnell	Consumer	United States	Fort Lauderdale	...
Sean O'Donnell	Consumer	United States	Fort Lauderdale	...

Category	Sub-Category	...
Furniture	Bookcases	...
Furniture	Chairs	...
Office Supplies	Labels	...
Furniture	Tables	...
Office Supplies	Storage	...

Product Name	Sales
Bush Somerset Collection Bookcase	261.9600
Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400
Self-Adhesive Address Labels for Typewriters b...	14.6200
Bretford CR4500 Series Slim Rectangular Table	957.5775
Eldon Fold 'N Roll Cart System	22.3680

2

	Discount	Profit	Order Month	Order Year	Order Week
0	0.00	41.9136	11	2016	1
1	0.00	219.5820	11	2016	1
2	0.00	6.8714	6	2016	6
3	0.45	-383.0310	10	2015	6
4	0.20	2.5164	10	2015	6

[5 rows x 24 columns]

## Sales by Category

```
sales_by_category = data.groupby("Category")
["Sales"].sum().reset_index()
```

sales\_by\_category

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

```
fig = px.pie(sales_by_category,
             values='Sales',
             names='Category',
             hole=0.5,
             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()
```

```
{"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"domain":
{"x":[0,1],"y":[0,1]},"hole":0.5,"hovertemplate":"Category=%
{label}<br>Sales=%{value}<extra></extra>","labels":
["Furniture","Office
Supplies","Technology"],"legendgroup":"","name":"","showlegend":true,"
textinfo":"percent+label","textposition":"inside","type":"pie","values
":
{"bdata":"xY8xl9+kJkHTTWIqjvElQUJg5RB0hClB","dtype":"f8"}}],"layout":
{"legend":{"tracegroupgap":0,"margin":{"t":60},"piecolorway":
["rgb(102, 197, 204)","rgb(246, 207, 113)","rgb(248, 156,
116)","rgb(220, 176, 242)","rgb(135, 197, 95)","rgb(158, 185,
243)","rgb(254, 136, 177)","rgb(201, 219, 116)","rgb(139, 224,
164)","rgb(180, 151, 231)","rgb(179, 179, 179)"],"template":{"data":
{"bar":{"error_x":{"color":"#2a3f5f"},"error_y":
```

```

{"color": "#2a3f5f"}, "marker": {"line":
{"color": "white", "width": 0.5}, "pattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}}, "type": "bar"}], "barpo
lar": [{"marker": {"line": {"color": "white", "width": 0.5}, "pattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}}, "type": "barpolar"}], "
carpet": [{"aaxis":
{"endlinecolor": "#2a3f5f", "gridcolor": "#C8D4E3", "linecolor": "#C8D4E3",
"minorgridcolor": "#C8D4E3", "startlinecolor": "#2a3f5f"}, "baxis":
{"endlinecolor": "#2a3f5f", "gridcolor": "#C8D4E3", "linecolor": "#C8D4E3",
"minorgridcolor": "#C8D4E3", "startlinecolor": "#2a3f5f"}, "type": "carpet"
}], "choropleth": [{"colorbar":
{"outlinewidth": 0, "ticks": ""}, "type": "choropleth"}], "contour":
[{"colorbar": {"outlinewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "contour"}], "contourcarpet": [{"colorbar":
{"outlinewidth": 0, "ticks": ""}, "type": "contourcarpet"}], "heatmap":
[{"colorbar": {"outlinewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "heatmap"}], "histogram": [{"marker": {"pattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}}, "type": "histogram"}],
"histogram2d": [{"colorbar": {"outlinewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2d"}], "histogram2dcontour":
[{"colorbar": {"outlinewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2dcontour"}], "mesh3d": [{"colorbar":
{"outlinewidth": 0, "ticks": ""}, "type": "mesh3d"}], "parcoords": [{"line":
{"colorbar": {"outlinewidth": 0, "ticks": ""}, "type": "parcoords"}], "pie":
[{"automargin": true, "type": "pie"}], "scatter": [{"fillpattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}, "type": "scatter"}], "sc
atter3d": [{"line": {"colorbar": {"outlinewidth": 0, "ticks": ""}, "marker":
{"colorbar":
{"outlinewidth": 0, "ticks": ""}, "type": "scatter3d"}], "scattercarpet":

```

```

[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattercarpet"}}, "scattergeo":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattergeo"}}, "scattergl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattergl"}}, "scattermap":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattermap"}}, "scattermapbox":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattermapbox"}}, "scatterpolar":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterpolar"}}, "scatterpolargl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterpolargl"}}, "scatterternary":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterternary"}}, "surface":
[{"colorbar":{"linewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"surface"}}, "table":[{"cells":{"fill":
{"color":"#EBF0F8"},"line":{"color":"white"},"header":{"fill":
{"color":"#C8D4E3"},"line":
{"color":"white"},"type":"table"}]], "layout":{"annotationdefaults":
{"arrowcolor":"#2a3f5f","arrowhead":0,"arrowwidth":1},"autotypenumbers":
"strict","coloraxis":{"colorbar":
{"linewidth":0,"ticks":"","colorscale":{"diverging":
[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],
[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],
[0.8,"#7fb341"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]],"sequentialminus":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]]},"colorway":
["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692",
"#B6E880","#FF97FF","#FECB52"],"font":{"color":"#2a3f5f"},"geo":
{"bgcolor":"white","lakecolor":"white","landcolor":"white","showlakes":
true,"showland":true,"subunitcolor":"#C8D4E3"},"hoverlabel":
{"align":"left"},"hovermode":"closest","mapbox":
{"style":"light"},"paper_bgcolor":"white","plot_bgcolor":"white","polar":
{"angularaxis":

```

```
{
  "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": "", "bgcolor": "white", "radialaxis": {
    "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""
  }, "scene": {
    "xaxis": {
      "backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"
    }, "yaxis": {
      "backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"
    }, "zaxis": {
      "backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"
    }
  }, "shapedefaults": {
    "line": { "color": "#2a3f5f" }
  }, "ternary": {
    "aaxis": {
      "gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""
    }, "baxis": {
      "gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""
    }, "caxis": {
      "gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""
    }
  }, "title": {
    "x": 5.0e-2, "xaxis": {
      "automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""
    }, "title": {
      "standoff": 15, "zerolinecolor": "#EBF0F8", "zerolinewidth": 2
    }, "yaxis": {
      "automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""
    }, "title": {
      "standoff": 15, "zerolinecolor": "#EBF0F8", "zerolinewidth": 2
    }
  }, "title": {
    "font": { "size": 24 }, "text": "Sales Analysis by Category"
  }
}
```

## Sales Analysis by Sub Category

data.head()

	Row ID	Customer ID	Order ID	Order Date	Ship Date	Ship Mode	
0	1	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	
1	2	CA-2016-152156	2016-11-08	2016-11-11	Second Class	CG-12520	
2	3	CA-2016-138688	2016-06-12	2016-06-16	Second Class	DV-13045	
3	4	US-2015-108966	2015-10-11	2015-10-18	Standard Class	S0-20335	
4	5	US-2015-108966	2015-10-11	2015-10-18	Standard Class	S0-20335	
0		Customer Name	Segment	Country	City	...	\
0		Claire Gute	Consumer	United States	Henderson	...	
1		Claire Gute	Consumer	United States	Henderson	...	
2		Darrin Van Huff	Corporate	United States	Los Angeles	...	
3		Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	

```
4 Sean O'Donnell Consumer United States Fort Lauderdale ...
```

```
Category Sub-Category \
0 Furniture Bookcases
1 Furniture Chairs
2 Office Supplies Labels
3 Furniture Tables
4 Office Supplies Storage
```

```
Product Name Sales
Quantity \
0 Bush Somerset Collection Bookcase 261.9600
2
1 Hon Deluxe Fabric Upholstered Stacking Chairs,... 731.9400
3
2 Self-Adhesive Address Labels for Typewriters b... 14.6200
2
3 Bretford CR4500 Series Slim Rectangular Table 957.5775
5
4 Eldon Fold 'N Roll Cart System 22.3680
2
```

```
Discount Profit Order Month Order Year Order Week
0 0.00 41.9136 11 2016 1
1 0.00 219.5820 11 2016 1
2 0.00 6.8714 6 2016 6
3 0.45 -383.0310 10 2015 6
4 0.20 2.5164 10 2015 6
```

```
[5 rows x 24 columns]
```

```
Sales_by_subcategory = data.groupby('Sub-Category')
['Sales'].sum().reset_index()
```

```
Sales_by_subcategory
```

```
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

```
fig = px.bar(sales_by_subcategory,
             x='Sub-Category',
             y='Sales',
             title="Sales analysis any sub-category")
```

```
fig.show()
```

```
{
  "config": {
    "plotlyServerURL": "https://plot.ly",
    "data": [
      {
        "hovertemplate": "Sub-Category=%{x}<br>Sales=%{y}<extra></extra>",
        "legendgroup": "",
        "marker": {
          "color": "#636efa",
          "pattern": {
            "shape": ""
          },
          "name": "",
          "orientation": "v",
          "showlegend": false,
          "textposition": "auto",
          "type": "bar",
          "x": [
            "Accessories",
            "Appliances",
            "Art",
            "Binders",
            "Bookcases",
            "Chairs",
            "Copiers",
            "Envelopes",
            "Fasteners",
            "Furnishings",
            "Labels",
            "Machines",
            "Paper",
            "Phones",
            "Storage",
            "Supplies",
            "Tables"
          ],
          "xaxis": "x",
          "y": [
            "gZVDi6JuBEFrvHSTwkD6QJzEILCye9pAoBov3aXUCEHQRNjw/wv8QP7UeGkEDBRB16NwPcBAAkE/NV66GRfQQMP1KFyPoKdAyXa+n5Jj9kAtsp3vJ2PIQF66SQy1GQdB8KfGS/Mo80Coxks3XCQUQaAaL90cUwtBqMZLNzHK5kBMN4lBrEMJQQ==",
            "dtype": "f8"
          ],
          "yaxis": "y"
        ],
        "layout": {
          "barmode": "relative",
          "legend": {
            "tracegroupgap": 0,
            "template": {
              "data": {
                "bar": [
                  {
                    "error_x": {
                      "color": "#2a3f5f",
                      "error_y": {
                        "color": "#2a3f5f",
                        "marker": {
                          "line": {
                            "color": "white",
                            "width": 0.5,
                            "pattern": {
                              "fillmode": "overlay",
                              "size": 10,
                              "solidity": 0.2
                            },
                            "type": "bar"
                          },
                          "barpolar": [
                            {
                              "marker": {
                                "line": {
                                  "color": "white",
                                  "width": 0.5,
                                  "pattern": {
                                    "fillmode": "overlay",
                                    "size": 10,
                                    "solidity": 0.2
                                  },
                                    "type": "barpolar"
                                }
                              },
                              "carpet": [
                                {
                                  "aaxis": {
                                    "endlinecolor": "#2a3f5f",
                                    "gridcolor": "#C8D4E3",
                                    "linecolor": "#C8D4E3",
                                    "minorgridcolor": "#C8D4E3",
                                    "startlinecolor": "#2a3f5f",
                                    "baxis": {
                                      "endlinecolor": "#2a3f5f",
                                      "gridcolor": "#C8D4E3",
                                      "linecolor": "#C8D4E3",
                                      "minorgridcolor": "#C8D4E3",
                                      "startlinecolor": "#2a3f5f",
                                      "type": "carpet"
                                    }
                                }
                              ],
                              "choropleth": [
                                {
                                  "colorbar": {
                                    "outlinewidth": 0,
                                    "ticks": "",
                                    "type": "choropleth"
                                  }
                                }
                              ],
                              "contour": [
                                {
                                  "colorbar": {
                                    "outlinewidth": 0,
                                    "ticks": "",
                                    "colorscale": [
                                      [0, "#0d0887"],
                                      [0.11111111111111111, "#46039f"],
                                      [0.22222222222222222, "#7201a8"],
                                      [0.33333333333333333, "#9c179e"],
                                      [0.44444444444444444, "#bd3786"],
                                      [0.55555555555555556, "#d8576b"],
                                      [0.66666666666666666, "#ed7953"],
                                      [0.77777777777777778, "#fb9f3a"],
                                      [0.88888888888888888, "#fdca26"],
                                      [1, "#f0921"]
                                    ],
                                    "type": "contour"
                                  }
                                }
                              ],
                              "contourcarpet": [
                                {
                                  "colorbar": {
                                    "outlinewidth": 0,
                                    "ticks": "",
                                    "type": "contourcarpet"
                                  }
                                }
                              ],
                              "heatmap": [
                                {
                                  "colorbar": {
                                    "outlinewidth": 0,
                                    "ticks": "",
                                    "type": "heatmap"
                                  }
                                }
                              ]
                            }
                          }
                        }
                      }
                    }
                  }
                }
              }
            }
          }
        }
      }
    ]
  }
}
```



```
[{"colorbar":{"linewidth":0,"ticks":"","","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"heatmap"},"histogram":[{"marker":{"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2},"type":"histogram"}],
"histogram2d":[{"colorbar":{"linewidth":0,"ticks":"","","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"histogram2d"},"histogram2dcontour":
{"colorbar":{"linewidth":0,"ticks":"","","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"histogram2dcontour"},"mesh3d":[{"colorbar":
{"linewidth":0,"ticks":"","","type":"mesh3d"},"parcoords":[{"line":
{"colorbar":{"linewidth":0,"ticks":"",""},"type":"parcoords"}],"pie":
[{"automargin":true,"type":"pie"}],"scatter":[{"fillpattern":
{"fillmode":"overlay","size":10,"solidity":0.2},"type":"scatter"},"sc
atter3d":[{"line":{"colorbar":{"linewidth":0,"ticks":"",""},"marker":
{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scatter3d"},"scattercarpet":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scattercarpet"}],"scattergeo":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scattergeo"}],"scattergl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scattergl"}],"scattermap":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scattermap"}],"scattermapbox":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scattermapbox"}],"scatterpolar":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scatterpolar"}],"scatterpolargl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scatterpolargl"}],"scatterterna
ry":[{"marker":{"colorbar":
{"linewidth":0,"ticks":"",""},"type":"scatterternary"}],"surface":
[{"colorbar":{"linewidth":0,"ticks":"","","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
```

```

[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type": "surface"}], "table": [{"cells": {"fill":
{"color": "#EBF0F8"}, "line": {"color": "white"}}, "header": {"fill":
{"color": "#C8D4E3"}, "line":
{"color": "white"}}, "type": "table"}]], "layout": {"annotationdefaults":
{"arrowcolor": "#2a3f5f", "arrowhead": 0, "arrowwidth": 1}, "autotypenumbers
": "strict", "coloraxis": {"colorbar":
{"linewidth": 0, "ticks": ""}, "colorscale": {"diverging":
[[0, "#8e0152"], [0.1, "#c51b7d"], [0.2, "#de77ae"], [0.3, "#f1b6da"],
[0.4, "#fde0ef"], [0.5, "#f7f7f7"], [0.6, "#e6f5d0"], [0.7, "#b8e186"],
[0.8, "#7fb341"], [0.9, "#4d9221"], [1, "#276419"]], "sequential":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"], [1, "#f0f921"]], "sequentialminus":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"], [1, "#f0f921"]]]}, "colorway":
["#636efa", "#EF553B", "#00cc96", "#ab63fa", "#FFA15A", "#19d3f3", "#FF6692",
"#B6E880", "#FF97FF", "#FECB52"]}, "font": {"color": "#2a3f5f"}, "geo":
{"bgcolor": "white", "lakecolor": "white", "landcolor": "white", "showlakes"
: true, "showland": true, "subunitcolor": "#C8D4E3"}, "hoverlabel":
{"align": "left"}, "hovermode": "closest", "mapbox":
{"style": "light"}, "paper_bgcolor": "white", "plot_bgcolor": "white", "pola
r": {"angularaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}, "bgcolor": "wh
ite", "radialaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}}, "scene":
{"xaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}, "yaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}, "zaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "lineco
lor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0
F8"}}, "shapedefaults": {"line": {"color": "#2a3f5f"}}, "ternary": {"aaxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "baxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "bgcolor": "wh
ite", "caxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}}, "title":
{"x": 5.0e-2}, "xaxis":
{"automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks"
: "", "title":

```

```
{
  "standoff": 15,
  "zerolinecolor": "#EBF0F8",
  "zerolinewidth": 2,
  "yaxis": {
    "automargin": true,
    "gridcolor": "#EBF0F8",
    "linecolor": "#EBF0F8",
    "ticks": "",
    "title": {
      "standoff": 15,
      "zerolinecolor": "#EBF0F8",
      "zerolinewidth": 2
    }
  },
  "title": {
    "text": "Sales analysis any sub-category",
    "xaxis": {
      "anchor": "y",
      "domain": [0, 1],
      "title": {
        "text": "Sub-Category"
      }
    },
    "yaxis": {
      "anchor": "x",
      "domain": [0, 1],
      "title": {
        "text": "Sales"
      }
    }
  }
}
```

## Monthly profit analysis

```
data.head()
```

Row ID	Order ID	Order Date	Ship Date	Ship Mode
Customer ID \				
0 1	CA-2016-152156	2016-11-08	2016-11-11	Second Class CG-
12520				
1 2	CA-2016-152156	2016-11-08	2016-11-11	Second Class CG-
12520				
2 3	CA-2016-138688	2016-06-12	2016-06-16	Second Class DV-
13045				
3 4	US-2015-108966	2015-10-11	2015-10-18	Standard Class SO-
20335				
4 5	US-2015-108966	2015-10-11	2015-10-18	Standard Class SO-
20335				

Customer Name	Segment	Country	City	...	\
0 Claire Gute	Consumer	United States	Henderson	...	
1 Claire Gute	Consumer	United States	Henderson	...	
2 Darrin Van Huff	Corporate	United States	Los Angeles	...	
3 Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	
4 Sean O'Donnell	Consumer	United States	Fort Lauderdale	...	

Category	Sub-Category	\
0 Furniture	Bookcases	
1 Furniture	Chairs	
2 Office Supplies	Labels	
3 Furniture	Tables	
4 Office Supplies	Storage	

Product Name	Sales
Quantity \	
0 Bush Somerset Collection Bookcase	261.9600
2	
1 Hon Deluxe Fabric Upholstered Stacking Chairs,...	731.9400
3	
2 Self-Adhesive Address Labels for Typewriters b...	14.6200
2	
3 Bretford CR4500 Series Slim Rectangular Table	957.5775

```
5
4 Eldon Fold 'N Roll Cart System 22.3680
2
```

	Discount	Profit	Order Month	Order Year	Order Week
0	0.00	41.9136	11	2016	1
1	0.00	219.5820	11	2016	1
2	0.00	6.8714	6	2016	6
3	0.45	-383.0310	10	2015	6
4	0.20	2.5164	10	2015	6

```
[5 rows x 24 columns]
```

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

	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

```
fig = px.line(profit_by_month, x= 'Order Month', y='Profit', title=
'Monthly_profit_analysis')
fig.show()
```

```
{"config":{"plotlyServerURL":"https://plot.ly"},"data":
[{"hovertemplate":"Order
Month=%{x}<br>Profit=%{y}<extra></extra>","legendgroup":"","line":
{"color":"#636efa","dash":"solid"},"marker":
{"symbol":"circle"},"mode":"lines","name":"","orientation":"v","showle
gend":false,"type":"scatter","x":
{"bdata":"AQAAAAIAAADAAAAABAAAAUAAAAAGAAAAABwAAAAgAAAAJAAACgAAAAsAAAAM
AAAA","dtype":"i4"},"xaxis":"x","y":
{"bdata":"Xwf0GTnXwUDV52orThvEQHS1Ffur7NtAn6ut2LehxkBtxf6y0+LVQM9m1edy
ydRAMZkqGFUEy0Ck3740PETVQHLYqDUv/
+FAVcGopAIK30D4U+0ljVHhQAN4CyQmLeVA","dtype":"f8"},"yaxis":"y"}],"layo
ut":{"legend":{"tracegroupgap":0},"template":{"data":{"bar":
[{"error_x":{"color":"#2a3f5f"},"error_y":
{"color":"#2a3f5f"},"marker":{"line":
{"color":"white","width":0.5},"pattern":
```

```

{"fillmode":"overlay","size":10,"solidity":0.2}},{"type":"bar"}]],"barpo
lar":[{"marker":{"line":{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},{"type":"barpolar"}]],"
carpet":[{"aaxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"baxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"type":"carpet"
}],{"choropleth":[{"colorbar":
{"outlinewidth":0,"ticks":"","type":"choropleth"}]],"contour":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]]],"type":"contour"}]],"contourcarpet":[{"colorbar":
{"outlinewidth":0,"ticks":"","type":"contourcarpet"}]],"heatmap":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]]],"type":"heatmap"}]],"histogram":[{"marker":{"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},{"type":"histogram"}]],
"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]]],"type":"histogram2d"}]],"histogram2dcontour":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]]],"type":"histogram2dcontour"}]],"mesh3d":[{"colorbar":
{"outlinewidth":0,"ticks":"","type":"mesh3d"}]],"parcoords":[{"line":
{"colorbar":{"outlinewidth":0,"ticks":"","type":"parcoords"}]],"pie":
[{"automargin":true,"type":"pie"}]],"scatter":[{"fillpattern":
{"fillmode":"overlay","size":10,"solidity":0.2},"type":"scatter"}]],"sc
atter3d":[{"line":{"colorbar":{"outlinewidth":0,"ticks":"","type":"scatter3d"}]],"scattercarpet":
[{"marker":{"colorbar":
{"outlinewidth":0,"ticks":"","type":"scattercarpet"}]],"scattergeo":

```

```
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scattergeo"}],"scattergl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scattergl"}],"scattermap":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scattermap"}],"scattermapbox":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scattermapbox"}],"scatterpolar":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scatterpolar"}],"scatterpolargl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scatterpolargl"}],"scatterternary":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":""},"type":"scatterternary"}],"surface":
[{"colorbar":{"linewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"surface"}],"table":{"cells":{"fill":
{"color":"#EBF0F8"},"line":{"color":"white"},"header":{"fill":
{"color":"#C8D4E3"},"line":
{"color":"white"},"type":"table"}],"layout":{"annotationdefaults":
{"arrowcolor":"#2a3f5f","arrowhead":0,"arrowwidth":1},"autotypenumbers":
"strict","coloraxis":{"colorbar":
{"linewidth":0,"ticks":""},"colorscale":{"diverging":
[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],
[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],
[0.8,"#7fb341"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"sequentialminus":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]},"colorway":
["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692",
"#B6E880","#FF97FF","#FECB52"],"font":{"color":"#2a3f5f"},"geo":
{"bgcolor":"white","lakecolor":"white","landcolor":"white","showlakes":
true,"showland":true,"subunitcolor":"#C8D4E3"},"hoverlabel":
{"align":"left"},"hovermode":"closest"},"mapbox":
{"style":"light"},"paper_bgcolor":"white","plot_bgcolor":"white","polar":
{"angularaxis":
{"gridcolor":"#EBF0F8","linecolor":"#EBF0F8","ticks":"","bgcolor":"white","radialaxis":
```





```

{"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"domain":
{"x":[0,1],"y":[0,1]},"hole":0.5,"hovertemplate":"Category=%
{label}<br>Profit=%{value}<extra></extra>","labels":
["Furniture","Office
Supplies","Technology"],"legendgroup":"","name":"","showlegend":true,"
textinfo":"percent+label","textposition":"inside","type":"pie","values
":
{"bdata":"liG0ddEE0kAqqRPQrOf9Q0tztZV3wQFB","dtype":"f8"}}],"layout":
{"legend":{"tracegroupgap":0,"margin":{"t":60},"piecolorway":
["rgb(102, 197, 204)","rgb(246, 207, 113)","rgb(248, 156,
116)","rgb(220, 176, 242)","rgb(135, 197, 95)","rgb(158, 185,
243)","rgb(254, 136, 177)","rgb(201, 219, 116)","rgb(139, 224,
164)","rgb(180, 151, 231)","rgb(179, 179, 179)"],"template":{"data":
{"bar":{"error_x":{"color":"#2a3f5f"},"error_y":
{"color":"#2a3f5f"},"marker":{"line":
{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"bar"}},{"barpo
lar":{"marker":{"line":{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"barpolar"}},
"carpet":[{"aaxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"baxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"type":"carpet"
}], "choropleth":[{"colorbar":
{"outlinewidth":0,"ticks":"","type":"choropleth"}],"contour":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"contour"}],"contourcarpet":[{"colorbar":
{"outlinewidth":0,"ticks":"","type":"contourcarpet"}],"heatmap":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"heatmap"}],"histogram":[{"marker":{"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"histogram"}],
"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"histogram2d"}],"histogram2dcontour":
[{"colorbar":{"outlinewidth":0,"ticks":"","colorscale":

```



```

[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"histogram2dcontour"},"mesh3d":[{"colorbar":
{"linewidth":0,"ticks":"","type":"mesh3d"},"parcoords":[{"line":
{"colorbar":{"linewidth":0,"ticks":"","type":"parcoords"},"pie":
[{"automargin":true,"type":"pie"}],"scatter":[{"fillpattern":
{"fillmode":"overlay","size":10,"solidity":0.2},"type":"scatter"}],"scatter3d":[{"line":{"colorbar":{"linewidth":0,"ticks":"","type":"scatter3d"},"marker":
{"colorbar":
{"linewidth":0,"ticks":"","type":"scatter3d"},"scattercarpet":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattercarpet"},"scattergeo":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattergeo"},"scattergl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattergl"},"scattermap":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattermap"},"scattermapbox":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scattermapbox"},"scatterpolar":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterpolar"},"scatterpolargl":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterpolargl"},"scatterternary":
[{"marker":{"colorbar":
{"linewidth":0,"ticks":"","type":"scatterternary"},"surface":
[{"colorbar":{"linewidth":0,"ticks":"","type":"surface":
[{"colorbar":{"linewidth":0,"ticks":"","type":"surface":
[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"surface"},"table":[{"cells":{"fill":
{"color":"#EBF0F8"},"line":{"color":"white"},"header":{"fill":
{"color":"#C8D4E3"},"line":
{"color":"white"},"type":"table"}]},"layout":{"annotationdefaults":
{"arrowcolor":"#2a3f5f","arrowhead":0,"arrowwidth":1},"autotypenumbers":
"strict","coloraxis":{"colorbar":
{"linewidth":0,"ticks":"","type":"coloraxis":
{"linewidth":0,"ticks":"","type":"coloraxis":
[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],
[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],
[0.8,"#7fb341"],[0.9,"#4d9221"],[1,"#276419"]],"sequential":
[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]],"sequentialminus":

```

```
[["0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]], "colorway":
["#636efa", "#EF553B", "#00cc96", "#ab63fa", "#FFA15A", "#19d3f3", "#FF6692",
"#B6E880", "#FF97FF", "#FECB52"], "font": {"color": "#2a3f5f"}, "geo":
{"bgcolor": "white", "lakecolor": "white", "landcolor": "white", "showlakes":
true, "showland": true, "subunitcolor": "#C8D4E3"}, "hoverlabel":
{"align": "left"}, "hovermode": "closest", "mapbox":
{"style": "light"}, "paper_bgcolor": "white", "plot_bgcolor": "white", "polar":
{"angularaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}, "bgcolor": "white", "radialaxis":
{"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}}, "scene":
{"xaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}, "yaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}, "zaxis":
{"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}}, "shapedefaults": {"line": {"color": "#2a3f5f"}}, "ternary": {"aaxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "baxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "bgcolor": "white", "caxis":
{"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}}, "title":
{"x": 5.0e-2, "xaxis":
{"automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": "", "title":
{"standoff": 15}, "zerolinecolor": "#EBF0F8", "zerolinewidth": 2}, "yaxis":
{"automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": "", "title":
{"standoff": 15}, "zerolinecolor": "#EBF0F8", "zerolinewidth": 2}}}, "title":
{"font": {"size": 24}, "text": "Profit Analysis by Category"}}
```

## Profit by sub category

```
profit_by_subcategory = data.groupby('Sub-Category')
['Profit'].sum().reset_index()
fig = px.bar(profit_by_subcategory, x= 'Sub-Category', y='Profit',
title= 'profit analysis by Sub-Category')

fig.show()
```

```

{"config":{"plotlyServerURL":"https://plot.ly"},"data":
[{"hovertemplate":"Sub-Category=%{x}<br>Profit=%{y}<extra></
extra>","legendgroup":"","marker":{"color":"#636efa","pattern":
{"shape":"","},"name":"","orientation":"v","showlegend":false,"textposi
tion":"auto","type":"bar","x":
["Accessories","Appliances","Art","Binders","Bookcases","Chairs","Copi
ers","Envelopes","Fasteners","Furnishings","Labels","Machines","Paper"
,"Phones","Storage","Supplies","Tables"],"xaxis":"x","y":
{"bdata":"woanVxR65EDaPXlYgLbRQPT91HjJf7lAQj7o2XCD3UAnMQisHCGrwFXBqKSK
99lAT6+UZToo60A0ETY8LTS7QEymCkYlrI1A2ht8YZKByUAv3SQGQaq1QK+UZYiDcapANK
K0N7Kg4EBPQBNhd7zlQFvTv000x9RAz/dT42WUksCHp1fKXk/
RwA==","dtype":"f8"},"yaxis":"y"}],"layout":
{"barmode":"relative","legend":{"tracegroupgap":0},"template":{"data":
{"bar":[{"error_x":{"color":"#2a3f5f"},"error_y":
{"color":"#2a3f5f"},"marker":{"line":
{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"bar"}],"barpo
lar":[{"marker":{"line":{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"barpolar"}],"
carpet":[{"aaxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"baxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"type":"carpet"
}],"choropleth":[{"colorbar":
{"outlinewidth":0,"ticks":"","},"type":"choropleth"}],"contour":
[{"colorbar":{"outlinewidth":0,"ticks":"","},"colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"contour"}],"contourcarpet":[{"colorbar":
{"outlinewidth":0,"ticks":"","},"type":"contourcarpet"}],"heatmap":
[{"colorbar":{"outlinewidth":0,"ticks":"","},"colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"heatmap"}],"histogram":[{"marker":{"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}},"type":"histogram"}],
"histogram2d":[{"colorbar":{"outlinewidth":0,"ticks":"","},"colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]],"type":"histogram2d"}],"histogram2dcontour":
[{"colorbar":{"outlinewidth":0,"ticks":"","},"colorscale":

```

```

[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type": "histogram2dcontour"}], "mesh3d": [{"colorbar":
{"linewidth":0,"ticks":"","type":"mesh3d"}], "parcoords": [{"line":
{"colorbar": {"linewidth":0,"ticks":""}, "type": "parcoords"}], "pie":
[{"automargin":true, "type": "pie"}], "scatter": [{"fillpattern":
{"fillmode": "overlay", "size":10, "solidity":0.2}, "type": "scatter"}], "scatter3d": [{"line": {"colorbar": {"linewidth":0,"ticks":""}, "marker":
{"colorbar":
{"linewidth":0,"ticks":""}, "type": "scatter3d"}], "scattercarpet":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scattercarpet"}], "scattergeo":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scattergeo"}], "scattergl":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scattergl"}], "scattermap":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scattermap"}], "scattermapbox":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scattermapbox"}], "scatterpolar":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scatterpolar"}], "scatterpolargl":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scatterpolargl"}], "scatterternary":
[{"marker": {"colorbar":
{"linewidth":0,"ticks":""}, "type": "scatterternary"}], "surface":
[{"colorbar": {"linewidth":0,"ticks":"","colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type": "surface"}], "table": [{"cells": {"fill":
{"color": "#EBF0F8"}, "line": {"color": "white"}}, "header": {"fill":
{"color": "#C8D4E3"}, "line":
{"color": "white"}}, "type": "table"}], "layout": {"annotationdefaults":
{"arrowcolor": "#2a3f5f", "arrowhead":0, "arrowwidth":1}, "autotypenumbers": "strict", "coloraxis": {"colorbar":
{"linewidth":0,"ticks":""}, "colorscale": {"diverging":
[[0,"#8e0152"],[0.1,"#c51b7d"],[0.2,"#de77ae"],[0.3,"#f1b6da"],
[0.4,"#fde0ef"],[0.5,"#f7f7f7"],[0.6,"#e6f5d0"],[0.7,"#b8e186"],
[0.8,"#7fb341"],[0.9,"#4d9221"],[1,"#276419"]], "sequential":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]], "sequentialminus":

```

```
[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],[1,"#f0f921"]]],"colorway":
["#636efa","#EF553B","#00cc96","#ab63fa","#FFA15A","#19d3f3","#FF6692",
"#B6E880","#FF97FF","#FECB52"],"font":{"color":"#2a3f5f"},"geo":
{"bgcolor":"white","lakecolor":"white","landcolor":"white","showlakes":
true,"showland":true,"subunitcolor":"#C8D4E3"},"hoverlabel":
{"align":"left"},"hovermode":"closest","mapbox":
{"style":"light"},"paper_bgcolor":"white","plot_bgcolor":"white","pola
r":{"angularaxis":
{"gridcolor":"#EBF0F8","linecolor":"#EBF0F8","ticks":""},"bgcolor":"wh
ite","radialaxis":
{"gridcolor":"#EBF0F8","linecolor":"#EBF0F8","ticks":""}}},"scene":
{"xaxis":
{"backgroundcolor":"white","gridcolor":"#DFE8F3","gridwidth":2,"lineco
lor":"#EBF0F8","showbackground":true,"ticks":"","zerolinecolor":"#EBF0
F8"},"yaxis":
{"backgroundcolor":"white","gridcolor":"#DFE8F3","gridwidth":2,"lineco
lor":"#EBF0F8","showbackground":true,"ticks":"","zerolinecolor":"#EBF0
F8"},"zaxis":
{"backgroundcolor":"white","gridcolor":"#DFE8F3","gridwidth":2,"lineco
lor":"#EBF0F8","showbackground":true,"ticks":"","zerolinecolor":"#EBF0
F8"}},{"shapedefaults":{"line":{"color":"#2a3f5f"}},{"ternary":{"aaxis":
{"gridcolor":"#DFE8F3","linecolor":"#A2B1C6","ticks":""},"baxis":
{"gridcolor":"#DFE8F3","linecolor":"#A2B1C6","ticks":""},"bgcolor":"wh
ite","caxis":
{"gridcolor":"#DFE8F3","linecolor":"#A2B1C6","ticks":""}}},"title":
{"x":5.0e-2},"xaxis":
{"automargin":true,"gridcolor":"#EBF0F8","linecolor":"#EBF0F8","ticks"
":"","title":
{"standoff":15},"zerolinecolor":"#EBF0F8","zerolinewidth":2},"yaxis":
{"automargin":true,"gridcolor":"#EBF0F8","linecolor":"#EBF0F8","ticks"
":"","title":
{"standoff":15},"zerolinecolor":"#EBF0F8","zerolinewidth":2}}},"title"
:{"text":"profit analysis by Sub-Category"},"xaxis":
{"anchor":"y","domain":[0,1],"title":{"text":"Sub-Category"}},{"yaxis":
{"anchor":"x","domain":[0,1],"title":{"text":"Profit"}}}]}
```

## Sales and progit - customer segment

```
sales_profit_by_segment =
data.groupby('Segment').agg({'Sales':'sum','Profit':'sum'}).reset_inde
x()

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()

```

```

{"config":{"plotlyServerURL":"https://plot.ly"},"data":[{"marker":
{"color":"rgb(102, 197, 204)","name":"Sales","type":"bar","x":
["Consumer","Corporate","Home Office"],"y":
{"bdata":"hetRWLm4MUGoNc27xIwlQU5iEJhUORpB","dtype":"f8"}},{ "marker":
{"color":"rgb(246, 207, 113)","name":"Profit","type":"bar","x":
["Consumer","Corporate","Home Office"],"y":
{"bdata":"swxxrDlfAEEbL90ksnT2QMuhRbZVce1A","dtype":"f8"}}], "layout":
{"template":{"data":{"bar":[{"error_x":{"color":"#2a3f5f"},"error_y":
{"color":"#2a3f5f"},"marker":{"line":
{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}}, "type":"bar"}], "barpo
lar":[{"marker":{"line":{"color":"white","width":0.5},"pattern":
{"fillmode":"overlay","size":10,"solidity":0.2}}, "type":"barpolar"}], "
carpet":[{"aaxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"baxis":
{"endlinecolor":"#2a3f5f","gridcolor":"#C8D4E3","linecolor":"#C8D4E3",
"minorgridcolor":"#C8D4E3","startlinecolor":"#2a3f5f"},"type":"carpet"
}], "choropleth":[{"colorbar":
{"linewidth":0,"ticks":"","type":"choropleth"}], "contour":
[{"colorbar":{"linewidth":0,"ticks":"","type":"contour"}, {"colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],
[0.2222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type":"contour"}], "contourcarpet":[{"colorbar":
{"linewidth":0,"ticks":"","type":"contourcarpet"}], "heatmap":
[{"colorbar":{"linewidth":0,"ticks":"","type":"heatmap"}, {"colorscale":
[[0,"#0d0887"],[0.1111111111111111,"#46039f"],

```



```

[0.222222222222222222,"#7201a8"],[0.3333333333333333,"#9c179e"],
[0.4444444444444444,"#bd3786"],[0.5555555555555556,"#d8576b"],
[0.6666666666666666,"#ed7953"],[0.7777777777777778,"#fb9f3a"],
[0.8888888888888888,"#fdca26"],
[1,"#f0f921"]], "type": "heatmap"}], "histogram": [{"marker": {"pattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}}, "type": "histogram"}],
"histogram2d": [{"colorbar": {"linewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2d"}], "histogram2dcontour":
[{"colorbar": {"linewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],
[1, "#f0f921"]], "type": "histogram2dcontour"}], "mesh3d": [{"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "mesh3d"}], "parcoords": [{"line":
{"colorbar": {"linewidth": 0, "ticks": ""}, "type": "parcoords"}], "pie":
[{"automargin": true, "type": "pie"}], "scatter": [{"fillpattern":
{"fillmode": "overlay", "size": 10, "solidity": 0.2}, "type": "scatter"}], "sc
atter3d": [{"line": {"colorbar": {"linewidth": 0, "ticks": ""}, "marker":
{"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scatter3d"}], "scattercarpet":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scattercarpet"}], "scattergeo":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scattergeo"}], "scattergl":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scattergl"}], "scattermap":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scattermap"}], "scattermapbox":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scattermapbox"}], "scatterpolar":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scatterpolar"}], "scatterpolargl":
[{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scatterpolargl"}], "scatterterna
ry": [{"marker": {"colorbar":
{"linewidth": 0, "ticks": ""}, "type": "scatterternary"}], "surface":
[{"colorbar": {"linewidth": 0, "ticks": ""}, "colorscale":
[[0, "#0d0887"], [0.1111111111111111, "#46039f"],
[0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"],
[0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"],
[0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"],
[0.8888888888888888, "#fdca26"],

```

```

[1,"#f0f921"]]], "type": "surface"}], "table": [{"cells": {"fill": {"color": "#EBF0F8"}, "line": {"color": "white"}}, "header": {"fill": {"color": "#C8D4E3"}, "line": {"color": "white"}}, "type": "table"}]], "layout": {"annotationdefaults": {"arrowcolor": "#2a3f5f", "arrowhead": 0, "arrowwidth": 1}, "autotypenumbers": "strict", "coloraxis": {"colorbar": {"linewidth": 0, "ticks": ""}, "colorscale": {"diverging": [[0, "#8e0152"], [0.1, "#c51b7d"], [0.2, "#de77ae"], [0.3, "#fb6bda"], [0.4, "#fde0ef"], [0.5, "#f7f7f7"], [0.6, "#e6f5d0"], [0.7, "#b8e186"], [0.8, "#7fb341"], [0.9, "#4d9221"], [1, "#276419"]], "sequential": [[0, "#0d0887"], [0.1111111111111111, "#46039f"], [0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"], [0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"], [0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"], [0.8888888888888888, "#fdca26"], [1, "#f0f921"]], "sequentialminus": [[0, "#0d0887"], [0.1111111111111111, "#46039f"], [0.2222222222222222, "#7201a8"], [0.3333333333333333, "#9c179e"], [0.4444444444444444, "#bd3786"], [0.5555555555555556, "#d8576b"], [0.6666666666666666, "#ed7953"], [0.7777777777777778, "#fb9f3a"], [0.8888888888888888, "#fdca26"], [1, "#f0f921"]]]}, "colorway": ["#636efa", "#EF553B", "#00cc96", "#ab63fa", "#FFA15A", "#19d3f3", "#FF6692", "#B6E880", "#FF97FF", "#FECB52"]}, "font": {"color": "#2a3f5f"}, "geo": {"bgcolor": "white", "lakecolor": "white", "landcolor": "white", "showlakes": true, "showland": true, "subunitcolor": "#C8D4E3"}, "hoverlabel": {"align": "left"}, "hovermode": "closest", "mapbox": {"style": "light"}, "paper_bgcolor": "white", "plot_bgcolor": "white", "polar": {"angularaxis": {"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}, "bgcolor": "white", "radialaxis": {"gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": ""}}, "scene": {"xaxis": {"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}, "yaxis": {"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}, "zaxis": {"backgroundcolor": "white", "gridcolor": "#DFE8F3", "gridwidth": 2, "linecolor": "#EBF0F8", "showbackground": true, "ticks": "", "zerolinecolor": "#EBF0F8"}}, "shapedefaults": {"line": {"color": "#2a3f5f"}}, "ternary": {"aaxis": {"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "baxis": {"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}, "bgcolor": "white", "caxis": {"gridcolor": "#DFE8F3", "linecolor": "#A2B1C6", "ticks": ""}}, "title": {"x": 5.0e-2}, "xaxis": {"automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks": "", "title": {"standoff": 15}, "zerolinecolor": "#EBF0F8", "zerolinewidth": 2}, "yaxis": {"automargin": true, "gridcolor": "#EBF0F8", "linecolor": "#EBF0F8", "ticks":

```



```
: {"text": "Sales and Profit Analysis by Customer Segment"}, {"xaxis": {"title": {"text": "Customer Segment"}}, {"yaxis": {"title": {"text": "Amount"}}}]}
```

## Sales to profit ratio

```
sales_profit_by_segment =
data.groupby('Segment').agg({'Sales': 'sum', 'Profit': 'sum'}).reset_index()
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