In [1]:
```
# !pip install bs4 ydata-profiling python-dotenv
```
In [2]:
```
# ! echo usr ='xxxxxxxxxxxxxxxxxxx' > credential.env                                            #removed credentials
```
In [3]:
```
# !cat credential.env
```
In [4]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import re
import requests
from bs4 import BeautifulSoup
from dotenv import dotenv_values
from ydata_profiling import ProfileReport
import warnings
warnings.filterwarnings('ignore')
```
Send Request to website

Targeted website

- i created dummy website using open source data from kaggle

In [5]:
```
url = 'https://datawebscrapping.vercel.app/super_store.html'
```
In [6]:
```
usr = dotenv_values('/credential.env')
```
In [7]:
```
response =  requests.get(url ,{'user_agent':usr['usr']})
response
```
Out[7]:
```
<Response [200]>
```
Using bs4 to extract data from website

In [8]:
```
soup =  BeautifulSoup(response.text , 'html.parser')
```
In [9]:
```
articles = soup.find_all('div', {'class':'article'})
```
Saving Each Articles in new text files (automatic)

In [10]:
```
count = 0
for i in articles:
    if i:
        with open(f"article{count+1}.txt", 'w') as arti:
            # print(i.text)
            arti.write(i.text)
            count+=1
    j = i.find('h2')
    if j:
        with open('article_title.txt','a') as tit:
            tit.write(j.text+'\n')
print('Process Done')
```
```
Process Done
```
Scrap Tables

In [11]:
```
tables = soup.find_all('table',{'class':'dataframe sample_1000_r'})[0]
#tables
```
In [12]:
```
columns = tables.find_all('th')
columns
```
Out[12]:
```
[<th>Row ID</th>,
 <th>Order ID</th>,
 <th>Order Date</th>,
 <th>Ship Date</th>,
 <th>Ship Mode</th>,
 <th>Customer ID</th>,
 <th>Segment</th>,
 <th>Country</th>,
 <th>City</th>,
 <th>State</th>,
 <th>Postal Code</th>,
 <th>Region</th>,
 <th>Product ID</th>,
 <th>Category</th>,
 <th>Sub-Category</th>,
 <th>Product Name</th>,
 <th>Sales</th>,
 <th>Quantity</th>,
 <th>Profit</th>]
```
In [13]:
```
#extracting column /variables from table
column =  [i.text.strip() for i in columns]
column
```
Out[13]:
```
['Row ID',
 'Order ID',
 'Order Date',
 'Ship Date',
 'Ship Mode',
 'Customer ID',
 'Segment',
 'Country',
 'City',
 'State',
 'Postal Code',
 'Region',
 'Product ID',
 'Category',
 'Sub-Category',
 'Product Name',
 'Sales',
 'Quantity',
 'Profit']
```
In [14]:
```
rows =  tables.find_all('tr')
rows[0]         #checking
```
Out[14]:
```
<tr style="text-align: right;">
<th>Row ID</th>
<th>Order ID</th>
<th>Order Date</th>
<th>Ship Date</th>
<th>Ship Mode</th>
<th>Customer ID</th>
<th>Segment</th>
<th>Country</th>
<th>City</th>
<th>State</th>
<th>Postal Code</th>
<th>Region</th>
<th>Product ID</th>
<th>Category</th>
<th>Sub-Category</th>
<th>Product Name</th>
<th>Sales</th>
<th>Quantity</th>
<th>Profit</th>
</tr>
```
In [15]:
```
row = []
for r in rows[1:]:
    k = r.find_all('td')
    row_data = [i.text.strip() for i in k]
    row.append(row_data)
```
In [16]:
```
row[0]
```
Out[16]:
```
['579',
 'CA-2017-118640',
 '7/20/2017',
 '7/26/2017',
 'Standard Class',
 'CS-11950',
 'Consumer',
 'United States',
 'Chicago',
 'Illinois',
 '60610',
 'Central',
 'OFF-ST-10002974',
 'Office Supplies',
 'Storage',
 'Trav-L-File Heavy-Duty Shuttle II, Black',
 '$69.71',
 '2',
 '$8.71']
```
Table Scrapping Done lets create dataframe to store these values

In [17]:
```
df = pd.DataFrame(row , columns=column)
```
In [18]:
```
df.head()
# table looks good
```
Out[18]:

	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Segment	Country	City	State	Postal Code	Region	Product ID	Category	Sub-Category	Product Name	Sales	Quantity	Profit
0	579	CA-2017-118640	7/20/2017	7/26/2017	Standard Class	CS-11950	Consumer	United States	Chicago	Illinois	60610	Central	OFF-ST-10002974	Office Supplies	Storage	Trav-L-File Heavy-Duty Shuttle II, Black	$69.71	2	$8.71
1	5523	CA-2016-110982	06-05-2016	06-07-2016	First Class	CK-12205	Consumer	United States	Santa Clara	California	95051	West	OFF-BI-10000829	Office Supplies	Binders	Avery Non-Stick Binders	$21.55	6	$7.00
2	6415	CA-2017-142671	11-10-2017	11/14/2017	Second Class	DR-12940	Home Office	United States	Hollywood	Florida	33021	South	OFF-BI-10004099	Office Supplies	Binders	GBC VeloBinder Strips	$11.52	5	$-7.68
3	9487	CA-2017-130505	10-12-2017	10-12-2017	Same Day	NF-18385	Consumer	United States	Wheeling	West Virginia	26003	East	FUR-TA-10001932	Furniture	Tables	Chromcraft 48" x 96" Racetrack Double Pedestal...	$673.34	3	$-76.95
4	9436	CA-2015-119627	8/17/2015	8/23/2015	Standard Class	SC-20725	Consumer	United States	Peoria	Arizona	85345	West	TEC-AC-10001142	Technology	Accessories	First Data FD10 PIN Pad	$252.80	4	$-31.60

Data Cleaning/Preprocessing/Cleansing/Transformation

remove un_necessary columns/variables

In [19]:
```
#making all variables name to lower case  with '_'
df.columns =  df.columns.str.lower().str.replace(" ", "_")
```
In [20]:
```
df.drop(inplace =True ,  columns =['row_id', 'postal_code', 'country'] )
```
In [21]:
```
df.info()
```
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 16 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   order_id      1000 non-null   object
 1   order_date    1000 non-null   object
 2   ship_date     1000 non-null   object
 3   ship_mode     1000 non-null   object
 4   customer_id   1000 non-null   object
 5   segment       1000 non-null   object
 6   city          1000 non-null   object
 7   state         1000 non-null   object
 8   region        1000 non-null   object
 9   product_id    1000 non-null   object
 10  category      1000 non-null   object
 11  sub-category  1000 non-null   object
 12  product_name  1000 non-null   object
 13  sales         1000 non-null   object
 14  quantity      1000 non-null   object
 15  profit        1000 non-null   object
dtypes: object(16)
memory usage: 125.1+ KB
```
The data is not in the correct format:

1. order_date and ship_date are objects instead of datetime.
2. sales, quantity, and profit should be integers or floats instead of objects.

First Change datetime

In [22]:
```
#data format 7/20/2017
date_cols = df[['order_date','ship_date']]
```
In [23]:
```
for col in date_cols:
    df[col] =df[col].str.replace('/', '-').str.strip()
    df[col] = pd.to_datetime(df[col] ,  format = '%m-%d-%Y')
print('process done')
```
```
process done
```
In [24]:
```
df.info()
```
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 16 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   order_id      1000 non-null   object
 1   order_date    1000 non-null   datetime64[ns]
 2   ship_date     1000 non-null   datetime64[ns]
 3   ship_mode     1000 non-null   object
 4   customer_id   1000 non-null   object
 5   segment       1000 non-null   object
 6   city          1000 non-null   object
 7   state         1000 non-null   object
 8   region        1000 non-null   object
 9   product_id    1000 non-null   object
 10  category      1000 non-null   object
 11  sub-category  1000 non-null   object
 12  product_name  1000 non-null   object
 13  sales         1000 non-null   object
 14  quantity      1000 non-null   object
 15  profit        1000 non-null   object
dtypes: datetime64[ns](2), object(14)
memory usage: 125.1+ KB
```
Now date variables look good now need to change dtypes for sales, quantity,profit

In [25]:
```
#$69.71 i want to extract only 69.71 either use regex or replace😅
```
In [26]:
```
re.findall('\d+\.\d+','$69.71')[0]
```
Out[26]:
```
'69.71'
```
In [27]:
```
df.sales = df.sales.apply(lambda x :float(re.findall('\d+\.\d+',x)[0]))
```
In [28]:
```
df.profit = df.profit.apply(lambda x :re.sub(r"[^\d.-]","",x))
```
In [29]:
```
df.profit.replace('-',0,inplace =True)
```
In [30]:
```
num_col =df[['profit','quantity']]
```
In [31]:
```
for i in num_col:
    df[i] = pd.to_numeric(df[i])
```
In [32]:
```
df.info()
```
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 16 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   order_id      1000 non-null   object
 1   order_date    1000 non-null   datetime64[ns]
 2   ship_date     1000 non-null   datetime64[ns]
 3   ship_mode     1000 non-null   object
 4   customer_id   1000 non-null   object
 5   segment       1000 non-null   object
 6   city          1000 non-null   object
 7   state         1000 non-null   object
 8   region        1000 non-null   object
 9   product_id    1000 non-null   object
 10  category      1000 non-null   object
 11  sub-category  1000 non-null   object
 12  product_name  1000 non-null   object
 13  sales         1000 non-null   float64
 14  quantity      1000 non-null   int64
 15  profit        1000 non-null   float64
dtypes: datetime64[ns](2), float64(2), int64(1), object(11)
memory usage: 125.1+ KB
```
Data Loooking fine now i can do some analysis using this data now

In [33]:
```
#do some quick EDA

report  =  ProfileReport(df)
report.to_file('quick_report.html')
```
```
Summarize dataset: 100%  34/34 [00:05&lt;00:00,  3.15it/s, Completed]
Generate report structure: 100%  1/1 [00:13&lt;00:00, 13.88s/it]
Render HTML: 100%  1/1 [00:01&lt;00:00,  1.37s/it]
Export report to file: 100%  1/1 [00:00&lt;00:00, 35.99it/s]
```

Data Analysis and Visualization

Sales Trends:

- How sales trends changed over time? Are there any noticeable patterns or seasonality?

In [34]:
```
## these are custom color code i use chatgpt to generate these color code

# Warm Shades
warm_palette = ['#ff9999', '#ff6666', '#ff4d4d', '#ff3333', '#ff0000']

# Cool Blues
cool_blues_palette = ['#cce5ff', '#99c2ff', '#66b3ff', '#3399ff', '#007bff']

# Earth Tones
earth_tones_palette = ['#d9e3d8', '#b8d1c6', '#9ac9b3', '#6cb4a0', '#4e8c6f']

# Sunset Colors
sunset_palette = ['#ffcc99', '#ffb366', '#ff9933', '#ff6600', '#cc3300']

# Pastel Shades
pastel_palette = ['#f7c6c7', '#f7a6a8', '#f78180', '#f75050', '#d72027']
```
In [35]:
```
df['month'] = df.order_date.dt.month    # extraing month and year from date feature
df['year'] = df.order_date.dt.year
```
In [36]:
```
#int32 to int 64
df[['month','year']] = df[['month','year']].astype('int64')
```
In [37]:
```
df.info()
```
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 18 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   order_id      1000 non-null   object
 1   order_date    1000 non-null   datetime64[ns]
 2   ship_date     1000 non-null   datetime64[ns]
 3   ship_mode     1000 non-null   object
 4   customer_id   1000 non-null   object
 5   segment       1000 non-null   object
 6   city          1000 non-null   object
 7   state         1000 non-null   object
 8   region        1000 non-null   object
 9   product_id    1000 non-null   object
 10  category      1000 non-null   object
 11  sub-category  1000 non-null   object
 12  product_name  1000 non-null   object
 13  sales         1000 non-null   float64
 14  quantity      1000 non-null   int64
 15  profit        1000 non-null   float64
 16  month         1000 non-null   int64
 17  year          1000 non-null   int64
dtypes: datetime64[ns](2), float64(2), int64(3), object(11)
memory usage: 140.8+ KB
```
In [38]:
```
#pivot table
df.pivot_table(index ='year' ,columns= 'month' ,values= 'sales',aggfunc='sum').reset_index()
```
Out[38]:

month	year	1	2	3	4	5	6	7	8	9	10	11	12
0	2014	987.73	321.28	3688.71	1254.39	1982.63	3952.49	2232.41	1272.92	3667.53	2826.87	4009.14	4557.28
1	2015	919.45	221.60	2011.20	2987.48	629.76	3314.64	3195.15	3243.56	4824.11	688.05	6429.57	7224.19
2	2016	2358.98	1241.72	3225.47	880.06	3052.49	2978.58	3474.89	4716.15	5303.58	1483.89	5478.64	6335.38
3	2017	2926.41	1763.55	4605.40	3115.98	3286.28	5015.95	4131.55	3916.49	6227.49	3793.36	7557.62	8411.40

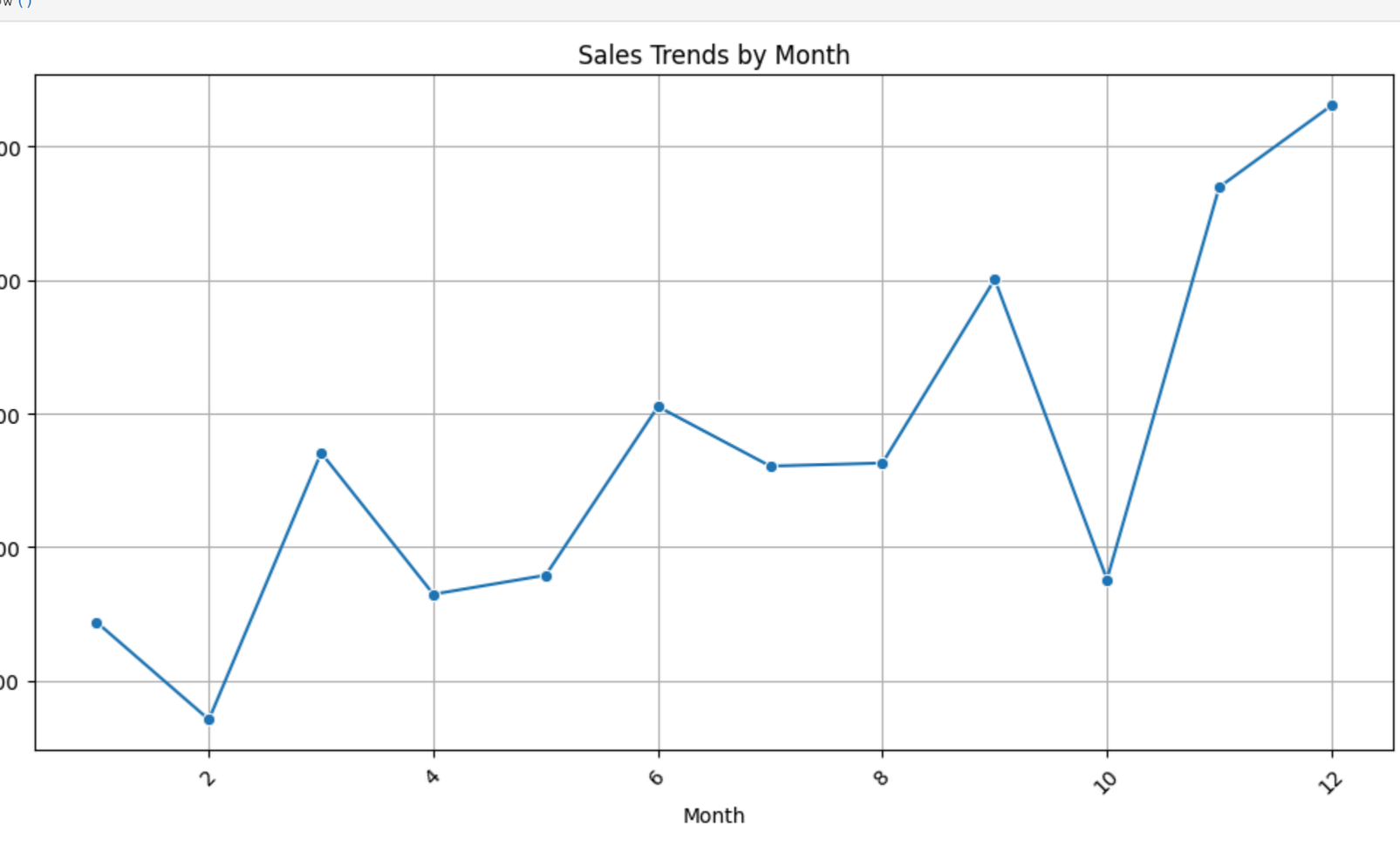
In [39]:
```
sales_by_month = df.groupby('month').agg(Sales = ('sales','sum')).reset_index()
sales_by_month
```
Out[39]:

	month	Sales
0	1	7192.57
1	2	3548.15
2	3	13530.78
3	4	8237.91
4	5	8951.16
5	6	15261.66
6	7	13034.00
7	8	13149.12
8	9	20022.71
9	10	8792.17
10	11	23474.97
11	12	26528.25

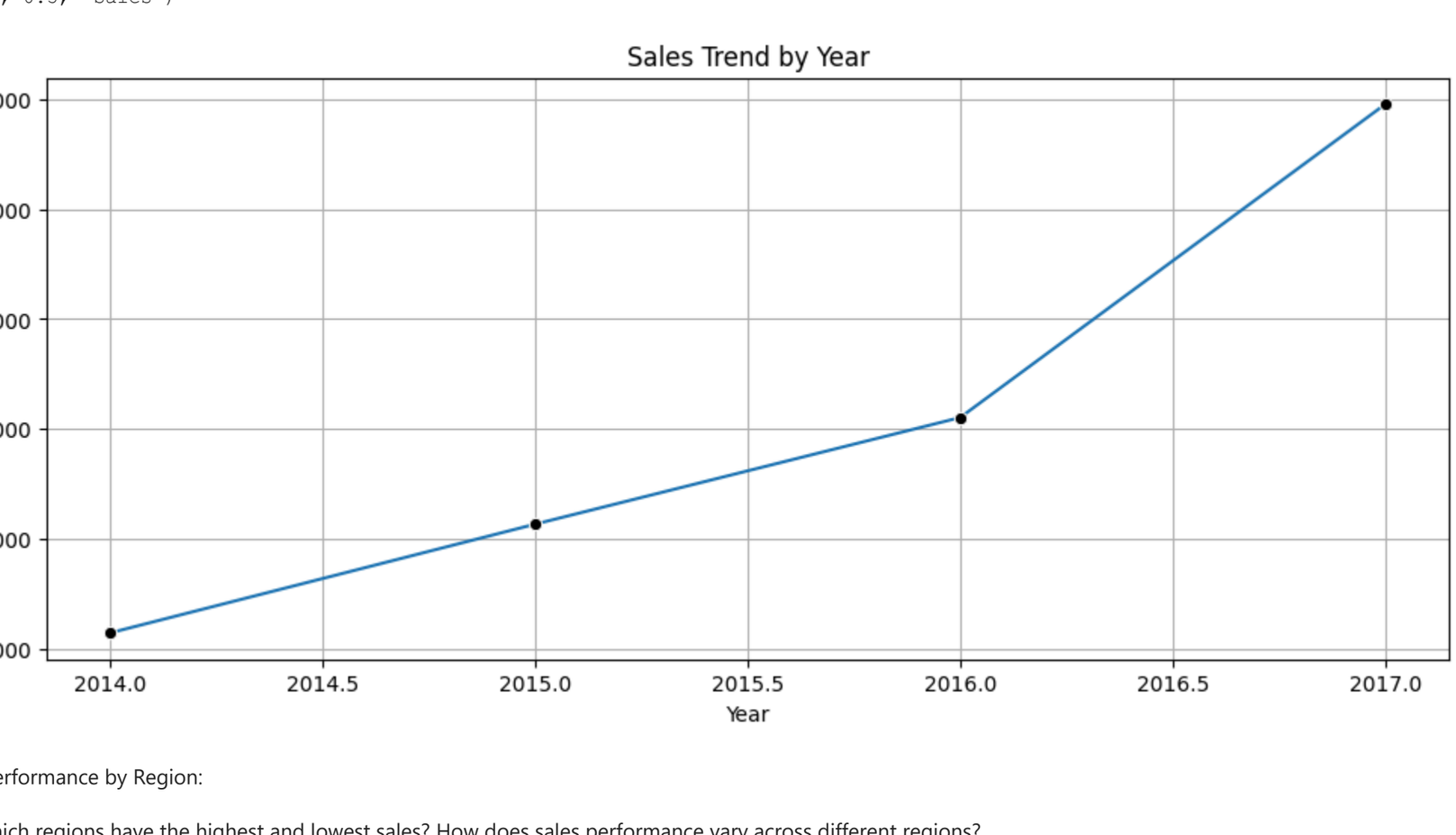
In [40]:
```
sales_by_year = df.groupby('year').agg(Sales = ('sales','sum')).reset_index()
sales_by_year
```
Out[40]:

	year	Sales
0	2014	30753.38
1	2015	35688.76
2	2016	40529.83
3	2017	54751.48

Sales by Month

In [41]:
```
plt.figure(figsize=(12, 6))
sns.lineplot(data=sales_by_month, x='month', y='Sales', marker='o', palette='#d9e3d8')
plt.title('Sales Trends by Month')
plt.xlabel('Month')
plt.ylabel('Sales')
plt.xticks(rotation=45)
plt.grid(True)
plt.show()
```


Sales by Year

In [42]:
```
plt.figure(figsize=(12, 5))
sns.lineplot(sales_by_year ,  x = 'year', y ='Sales' , marker ='o', markerfacecolor = 'black')
plt.grid(True)
plt.title('Sales Trend by Year')
plt.xlabel('Year')
plt.ylabel('Sales')
```
Out[42]:
```
Text(0, 0.5, 'Sales')
```


Sales Performance by Region:

- Which regions have the highest and lowest sales? How does sales performance vary across different regions?

In [43]:
```
(df.region.value_counts(normalize=True) * 100).reset_index()
```
Out[43]:

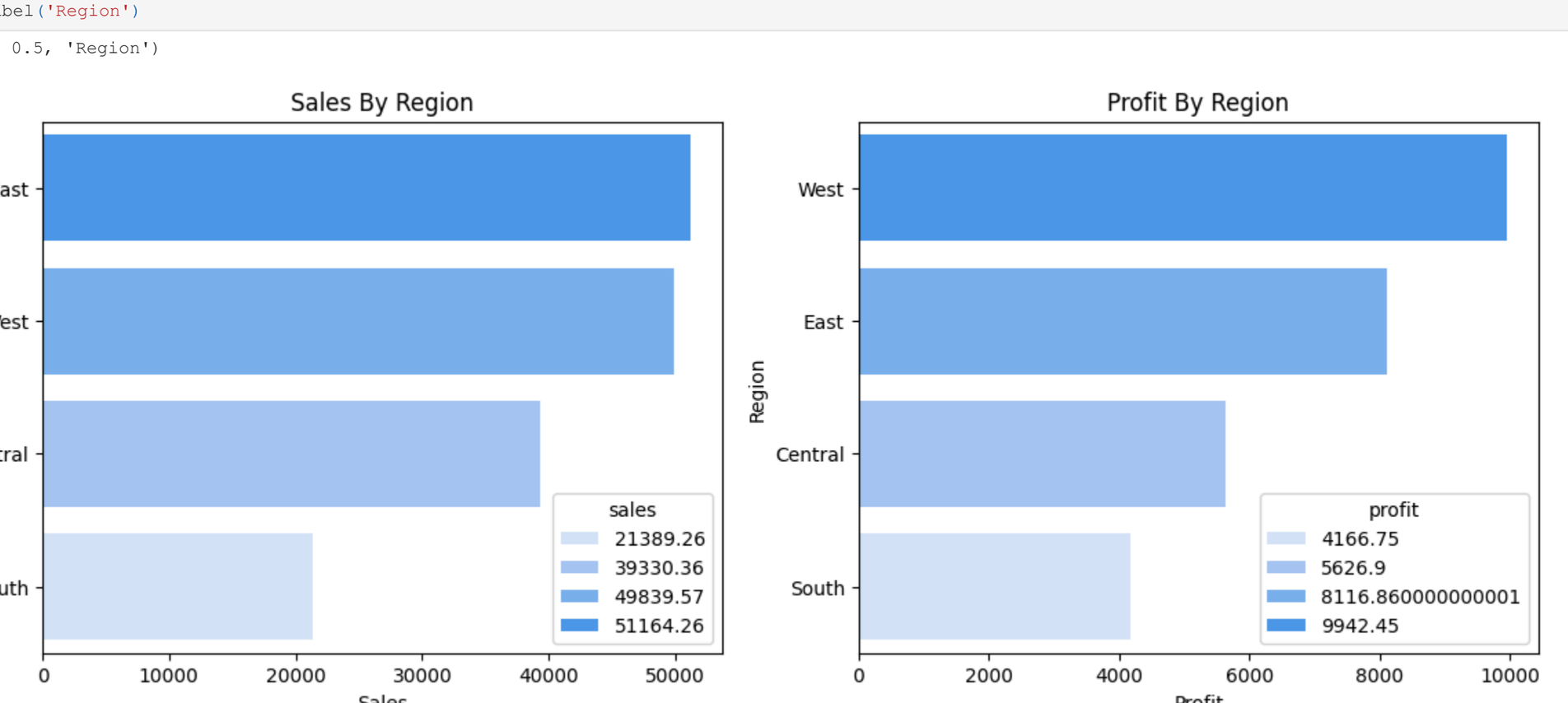
	region	proportion
0	East	29.1
1	West	29.0
2	Central	25.8
3	South	16.1

In [44]:
```
sales_by_region =  df.groupby('region').sales.sum().reset_index().sort_values(by = 'sales', ascending =False)
sales_by_region
```
Out[44]:

	region	sales
1	East	51164.26
3	West	49839.57
0	Central	39330.36
2	South	21389.26

In [45]:
```
profit_by_region =  df.groupby('region').profit.sum().reset_index().sort_values(by = 'profit', ascending =False)
profit_by_region
```
Out[45]:

	region	profit
3	West	9942.45
1	East	8116.86
0	Central	5626.90
2	South	4166.75

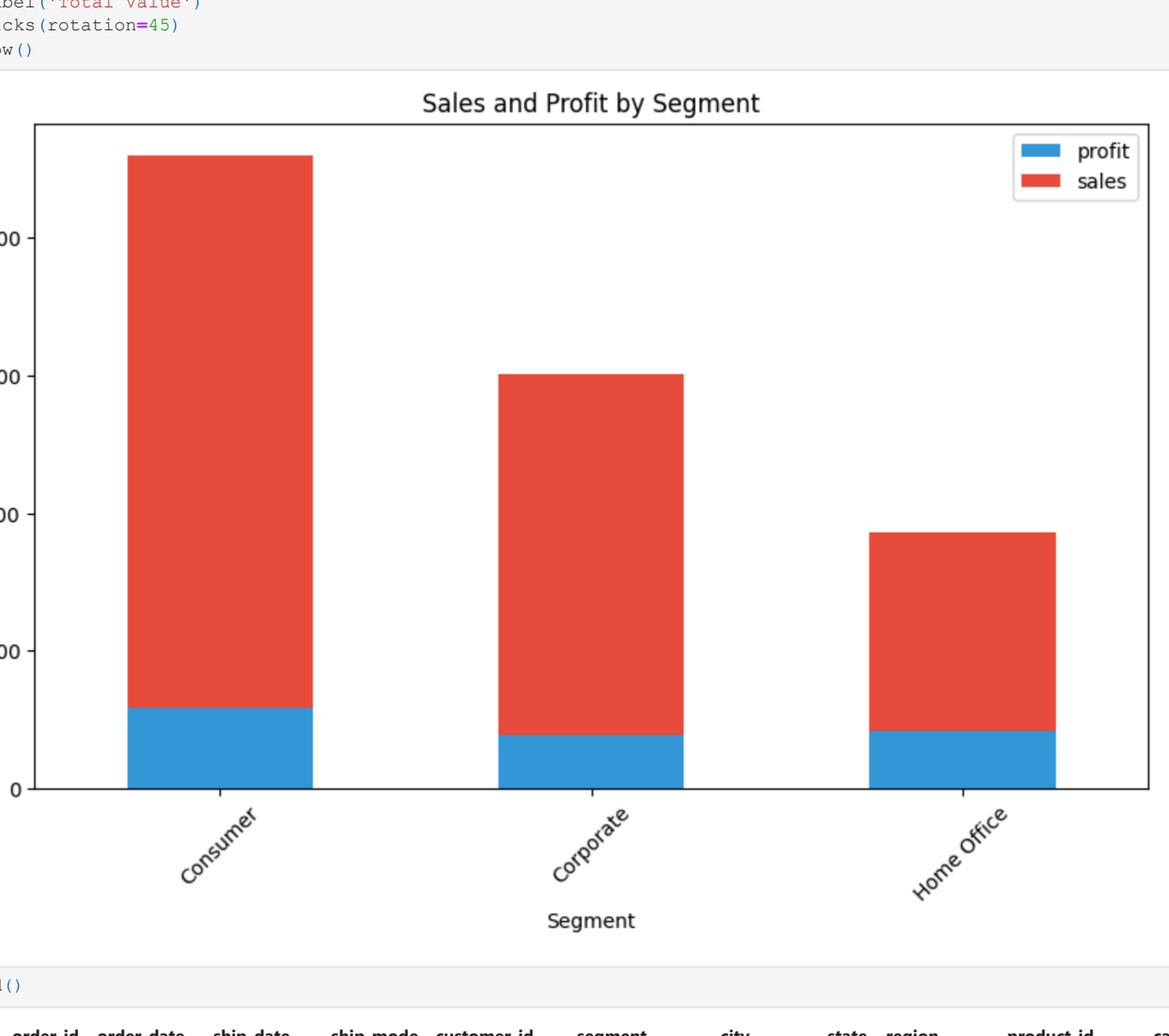
In [46]:
```
plt.figure(figsize = (14,5))
plt.subplot(1,2,1)
sns.barplot(sales_by_region, x = 'sales' ,y = 'region', hue = 'sales' ,  palette=cool_blues_palette)
plt.title('Sales By Region')
plt.xlabel('Sales')
plt.ylabel('Region')

plt.subplot(1,2,2)
sns.barplot(profit_by_region, x = 'profit' ,y = 'region', hue = 'profit' ,  palette=cool_blues_palette)
plt.title('Profit By Region')
plt.xlabel('Profit')
plt.ylabel('Region')
```
Out[46]:
```
Text(0, 0.5, 'Region')
```


Customer Segments:

- What are the sales and profit contributions from different customer segments? Which segment is the most profitable?

In [47]:
```
segment_contribution =df.pivot_table(index = 'segment',  values = ['sales','profit'], aggfunc ='sum' ).reset_index()
segment_contribution
```
Out[47]:

	segment	profit	sales
0	Consumer	11735.49	80296.81
1	Corporate	7721.59	52535.27
2	Home Office	8395.88	28891.37

In [48]:
```
segment_contribution.set_index('segment').plot(kind='bar', stacked=True, figsize=(10,6), color=['#3498db', '#e74c3c'])
plt.title('Sales and Profit by Segment')
plt.xlabel('Segment')
plt.ylabel('Total Value')
plt.xticks(rotation=45)
plt.show()
```


In [49]:
```
df.head()
```
Out[49]:

	order_id	order_date	ship_date	ship_mode	customer_id	segment	city	state	region	product_id	category	sub-category	product_name	sales	quantity	profit	month	year
0	CA-2017-118640	2017-07-20	2017-07-26	Standard Class	CS-11950	Consumer	Chicago	Illinois	Central	OFF-ST-10002974	Office Supplies	Storage	Trav-L-File Heavy-Duty Shuttle II, Black	69.71	2	8.71	7	2017
1	CA-2016-110982	2016-06-05	2016-06-07	First Class	CK-12205	Consumer	Santa Clara	California	West	OFF-BI-10000829	Office Supplies	Binders	Avery Non-Stick Binders	21.55	6	7.00	6	2016
2	CA-2017-142671	2017-11-10	2017-11-14	Second Class	DR-12940	Home Office	Hollywood	Florida	South	OFF-BI-10004099	Office Supplies	Binders	GBC VeloBinder Strips	11.52	5	-7.68	11	2017
3	CA-2017-130505	2017-10-12	2017-10-12	Same Day	NF-18385	Consumer	Wheeling	West Virginia	East	FUR-TA-10001932	Furniture	Tables	Chromcraft 48" x 96" Racetrack Double Pedestal...	673.34	3	-76.95	10	2017
4	CA-2015-119627	2015-08-17	2015-08-23	Standard Class	SC-20725	Consumer	Peoria	Arizona	West	TEC-AC-10001142	Technology	Accessories	First Data FD10 PIN Pad	252.80	4	-31.60	8	2015

category and sub category sales and profit

In [50]:
```
cat_subCat = df.groupby(['category','sub-category']).sales.sum().reset_index().sort_values(by = ['category','sales'],ascending =[True,False ])
sub_cat_subCat =cat_subCat.sort_values(by = 'sales', ascending=False)
```
In [51]:
```
x=  df.groupby('category').sales.sum().reset_index()
x
```
Out[51]:

	category	sales
0	Furniture	66927.72
1	Office Supplies	48086.39
2	Technology	46709.34

In [52]:
```
profit_cat =  df.groupby('category').profit.sum().reset_index().sort_values(by ='profit',ascending =False)
profit_cat
```
Out[52]:

	category	profit
2	Technology	15199.78
1	Office Supplies	13570.01
0	Furniture	-916.83

In [53]:
```
profit_Scat =  df.groupby('sub-category').profit.sum().reset_index().sort_values(by ='profit',ascending =False)
profit_Scat
```
Out[53]:

	sub-category	profit
6	Copiers	5487.94
0	Accessories	4245.45
3	Binders	3894.87
13	Phones	3279.48
12	Paper	3229.29
5	Chairs	3063.80
14	Storage	2704.90
11	Machines	2186.91
9	Furnishings	1476.56
1	Appliances	1244.22
10	Labels	971.31
7	Envelopes	752.72
2	Art	522.71
15	Supplies	190.21
8	Fasteners	59.78
4	Bookcases	-1045.95
16	Tables	-4411.24

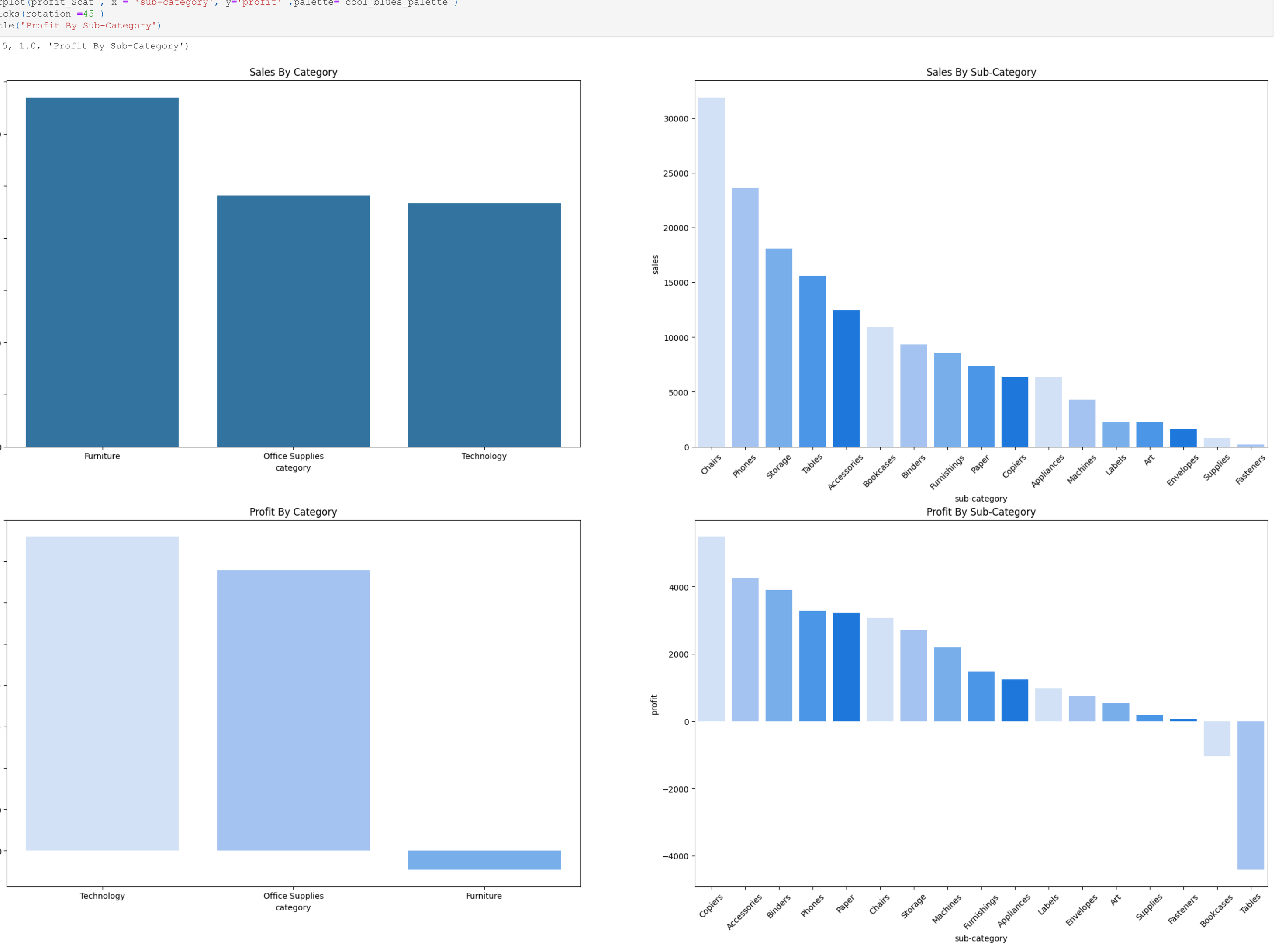
In [54]:
```
plt.figure(figsize =(28,18)),
plt.subplot(2,2,1)
sns.barplot(x , x ='category', y ='sales')
plt.title('Sales By Category')

plt.subplot(2,2,2)
sns.barplot(sub_cat_subCat , x = 'sub-category', y='sales' ,palette= cool_blues_palette )
plt.xticks(rotation =45 )
plt.title('Sales By Sub-Category')

plt.subplot(2,2,3)
sns.barplot(profit_cat , x = 'category', y='profit' ,palette= cool_blues_palette )
plt.title('Profit By Category')

plt.subplot(2,2,4)
sns.barplot(profit_Scat , x = 'sub-category', y='profit' ,palette= cool_blues_palette )
plt.xticks(rotation =45 )
plt.title('Profit By Sub-Category')
```
Out[54]:
```
Text(0.5, 1.0, 'Profit By Sub-Category')
```


Table scapping without bs4 using pandas

Pandas only scrapes/extracts tables from webpages with less control over data

- In BeautifulSoup (bs4), we can scrape whatever we want, including text, tables, and other content.
- Note: 😉 With Authorized Access

In [55]:
```
medals = pd.read_html('https://en.wikipedia.org/wiki/2024_Summer_Olympics_medal_table')
```
In [56]:
```
type(medals)
```
Out[56]:
```
list
```
In [57]:
```
len(medals)
```
Out[57]:
```
8
```
In [58]:
```
df = medals[3]
```
In [59]:
```
df.head()
```
Out[59]:

	Rank	NOC	Gold	Silver	Bronze	Total
0	1	United States‡	40	44	42	126
1	2	China	40	27	24	91
2	3	Japan	20	12	13	45
3	4	Australia	18	19	16	53
4	5	France*	16	26	22	64

Thank you🙃

In [60]:
```
!jupyter nbconvert --execute --to html /content/scrap.ipynb
```
```
[NbConvertApp] Converting notebook /content/scrap.ipynb to html
[NbConvertApp] Writing 2423343 bytes to /content/scrap.html
```
In [61]:
```
# !jupyter nbconvert --execute --to pdf /content/scrap.ipynb
```
In [ ]: