In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import matplotlib as mlp
import seaborn as sb
import seaborn as seabornInstance
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
%matplotlib inline
```

In [2]:
```
#grouping the retailer countries by region
sb.set()
dfreg = pd.DataFrame({"region":[],"Retailer country":[]})
dfreg = dfreg.append({"region":"Americas","Retailer country":"United States"}, ignore_index=True)
dfreg = dfreg.append({"region":"Americas","Retailer country":"Canada"}, ignore_index=True)
dfreg = dfreg.append({"region":"Americas","Retailer country":"Mexico"}, ignore_index=True)
dfreg = dfreg.append({"region":"Americas","Retailer country":"Brazil"}, ignore_index=True)
dfreg = dfreg.append({"region":"Asia","Retailer country":"Japan"}, ignore_index=True)
dfreg = dfreg.append({"region":"Asia","Retailer country":"China"}, ignore_index=True)
dfreg = dfreg.append({"region":"Asia","Retailer country":"Singapore"}, ignore_index=True)
dfreg = dfreg.append({"region":"Asia","Retailer country":"Korea"}, ignore_index=True)
dfreg = dfreg.append({"region":"Asia","Retailer country":"Australia"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Netherlands"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Sweden"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Finland"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Denmark"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"France"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"United Kingdom"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Austria"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Germany"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Belgium"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Italy"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Spain"}, ignore_index=True)
dfreg = dfreg.append({"region":"Europe","Retailer country":"Switzerland"}, ignore_index=True)
```

In [3]:
```
df = pd.read_csv(r"C:\Users\phamc\Documents\Data Science Project Working Folder\Retail Sales Marketing Data.csv")
df = pd.merge(df,dfreg, on="Retailer country")
df = df.dropna()
df.head(5)
```

Out[3]:

	Year	Product line	Product type	Product	Order method type	Retailer country	Revenue	Planned revenue	Product cost	Quantity	Unit cost	Unit price	Gross profit	Unit
0	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	United States	315044.33	437477.15	158371.76	66385.0	2.552857	6.59	156672.57	5.19
1	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Sales visit	United States	181287.73	222735.41	88348.13	33799.0	2.720000	6.59	92939.60	5.65
2	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Web	United States	340867.26	407123.61	164590.44	61779.0	2.778500	6.59	176276.82	5.83
4	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Mail	United States	48205.04	68628.26	24392.09	10414.0	2.495000	6.59	23812.95	5.04
6	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Fax	United States	46745.73	50011.51	22008.10	7589.0	2.900000	6.59	24737.63	6.17

We will be exploring and analyzing Sales Marketing Dataset from a Sports and Outdoor Company. Below will have some visualizations.

Data Insights

In [4]:
```
df.info()
#get info on data type
#there is around 24743 entries

print("there is around 24743 data entries")
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 24743 entries, 0 to 84667
Data columns (total 15 columns):
Year                  24743 non-null int64
Product line          24743 non-null object
Product type          24743 non-null object
Product               24743 non-null object
Order method type     24743 non-null object
Retailer country      24743 non-null object
Revenue               24743 non-null float64
Planned revenue       24743 non-null float64
Product cost          24743 non-null float64
Quantity              24743 non-null float64
Unit cost             24743 non-null float64
Unit price            24743 non-null float64
Gross profit          24743 non-null float64
Unit sale price       24743 non-null float64
region                24743 non-null object
dtypes: float64(8), int64(1), object(6)
memory usage: 3.0+ MB
there is around 24743 data entries
```

In [5]:
```
for col in df.columns:
    print(f'Number of unique{col} labels is {len(df[col].unique())}')

# this will give us the number of unique labels for each column of the dataset.
# For example, column year has 4 unique labels: 2004-2007
```

```
Number of uniqueYear labels is 4
Number of uniqueProduct line labels is 5
Number of uniqueProduct type labels is 21
Number of uniqueProduct labels is 144
Number of uniqueOrder method type labels is 7
Number of uniqueRetailer country labels is 21
Number of uniqueRevenue labels is 24009
Number of uniquePlanned revenue labels is 22972
Number of uniqueProduct cost labels is 22987
Number of uniqueQuantity labels is 7941
Number of uniqueUnit cost labels is 3824
Number of uniqueUnit price labels is 1639
Number of uniqueGross profit labels is 24233
Number of uniqueUnit sale price labels is 7682
Number of uniqueregion labels is 3
```

In [6]:
```
print("Number of Product labels")
print("There are about 144 products")
df['Product'].value_counts()
#number of product labels
```

```
Number of Product labels
There are about 144 products
```

Out[6]:
```
Polar Sun                       230
Canyon Mule Climber Backpack    221
Star Dome                       220
TrailChef Cook Set              218
Hibernator Lite                 216
                               ...
Zodiak                           70
Sky Pilot                        69
Trail Star                       67
Trail Master                     65
Auto Pilot                       44
Name: Product, Length: 144, dtype: int64
```

In [7]:
```
print("Number of Product Types")
print("There are about 21 different product types")
df['Product type'].value_counts()
#number of product labels
```

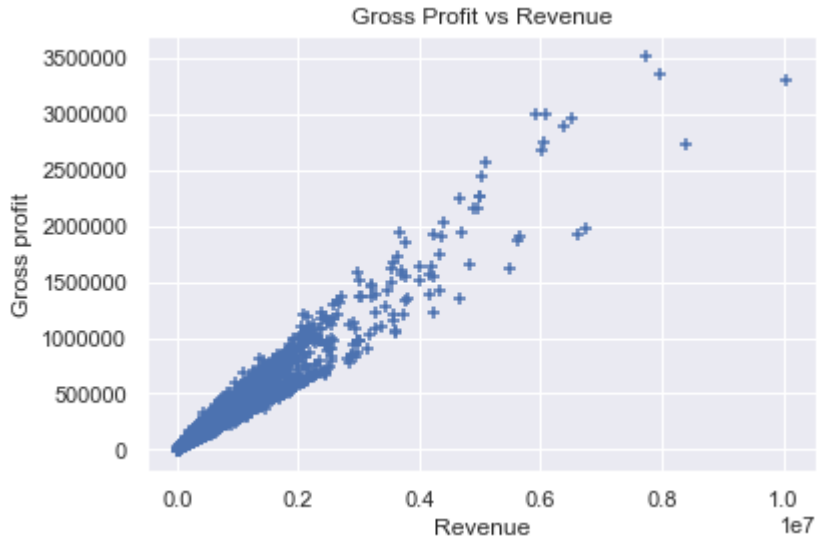
```
Number of Product Types
There are about 21 different product types
```

Out[7]:
```
Lanterns                2397
Eyewear                 2285
Cooking Gear            2059
Watches                 1938
Sleeping Bags           1441
Tents                   1245
Navigation              1240
Knives                  1239
Packs                   1233
Sunscreen               1021
Binoculars              1012
Climbing Accessories     993
First Aid                966
Insect Repellents        957
Tools                    819
Golf Accessories         760
Irons                    729
Woods                    723
Safety                   568
Rope                     567
Putters                  551
Name: Product type, dtype: int64
```

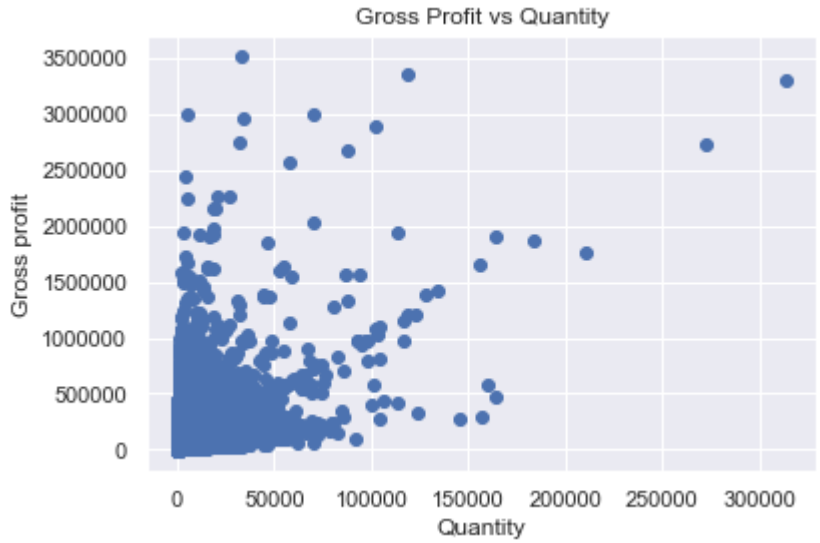
In [8]:
```
group = df.groupby(["Product line"])['Gross profit'].apply(lambda x : x.astype(float).sum())
group.head()

# grouping by product line
```

Out[8]:
```
Product line
Camping Equipment           5.867991e+08
Golf Equipment              3.521936e+08
Mountaineering Equipment    1.632759e+08
Outdoor Protection          4.598328e+07
Personal Accessories        7.765831e+08
Name: Gross profit, dtype: float64
```

In [9]:
```
# trying to see a correlation between gross profit and rev
fig, ax = plt.subplots()
my_scatter_plot = ax.scatter(df["Revenue"], # x values
df["Gross profit"] # y values
,marker = "+")
ax.set_xlabel("Revenue")
ax.set_ylabel("Gross profit")
ax.set_title("Gross Profit vs Revenue")
plt.show()
```



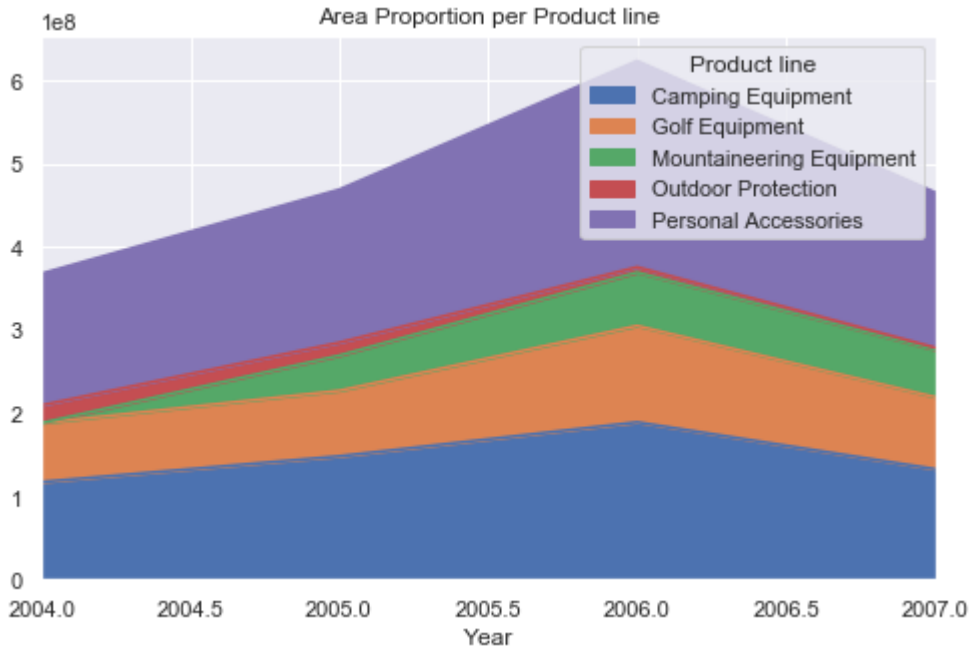
In [10]:
```
# gross profit over quantity correlation

fig, ax = plt.subplots()
my_scatter_plot = ax.scatter(df["Quantity"], # x values
                             df["Gross profit"] # y values
                            )
ax.set_xlabel("Quantity")
ax.set_ylabel("Gross profit")
ax.set_title("Gross Profit vs Quantity")
plt.show()
```



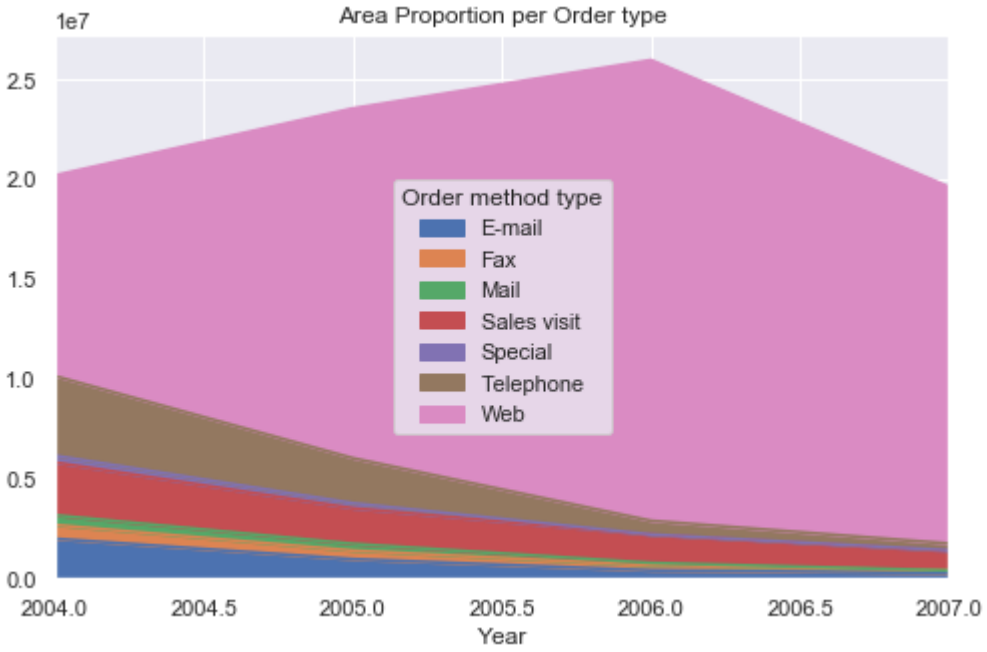
In [11]:
```
# gross profit over quantity correlation

fig, ax = plt.subplots()
my_scatter_plot = ax.scatter(df["Year"], # x values
                             df["Gross profit"] # y values
                            )
ax.set_xlabel("Year")
ax.set_ylabel("Gross profit")
ax.set_title("Distribution of Gross Profit per Year")
plt.show()
```

Area Charts

In [12]:
```
# area chart to show the proportion of each product line

df_unstack = df.groupby(['Year','Product line']).sum().unstack()
plt = df_unstack.plot(kind='area',y='Gross profit', title='Area Proportion per Product line', stacked = True,
figsize=[8,5])
```



In [13]:
```
# area chart to show the proportion of each prder type

df_unstack = df.groupby(['Year','Order method type']).sum().unstack()
plt = df_unstack.plot(kind='area',y='Quantity', title='Area Proportion per Order type', stacked = True, figsi
ze=[8,5])


# web sales contribute a whole lot while other ordering methods rapidly decline over time
# Web sales are dominating while the others are fading, good point to indicate what the company should look i
nto
```



Bar Charts Visuals

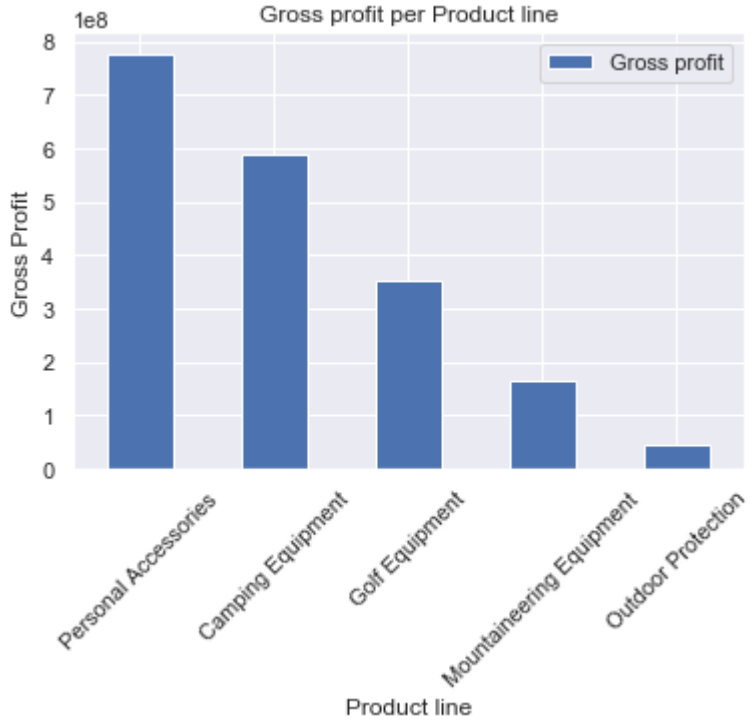
In [14]:
```
data = pd.read_csv(r"C:\Users\phamc\Documents\Data Science Project Working Folder\Retail Sales Marketing Dat
a.csv")
df = pd.DataFrame(data)
df = pd.merge(df,dfreg, on="Retailer country")
df = df.dropna()
df.head(5)
```

Out[14]:

	Year	Product line	Product type	Product	Order method type	Retailer country	Revenue	Planned revenue	Product cost	Quantity	Unit cost	Unit price	Gross profit	Unit
0	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Telephone	United States	315044.33	437477.15	158371.76	66385.0	2.552857	6.59	156672.57	5.19
1	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Sales visit	United States	181287.73	222735.41	88348.13	33799.0	2.720000	6.59	92939.60	5.65
2	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Web	United States	340867.26	407123.61	164590.44	61779.0	2.778500	6.59	176276.82	5.83
4	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Mail	United States	48205.04	68628.26	24392.09	10414.0	2.495000	6.59	23812.95	5.04
6	2004	Camping Equipment	Cooking Gear	TrailChef Water Bag	Fax	United States	46745.73	50011.51	22008.10	7589.0	2.900000	6.59	24737.63	6.17

In [15]:
```
dfgroup = df.groupby('Product line').sum()
dfgroup = dfgroup.sort_values(by='Gross profit', ascending=False)
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per Product line', rot=45)
plt.set_ylabel('Gross Profit')
```

Out[15]: Text(0, 0.5, 'Gross Profit')

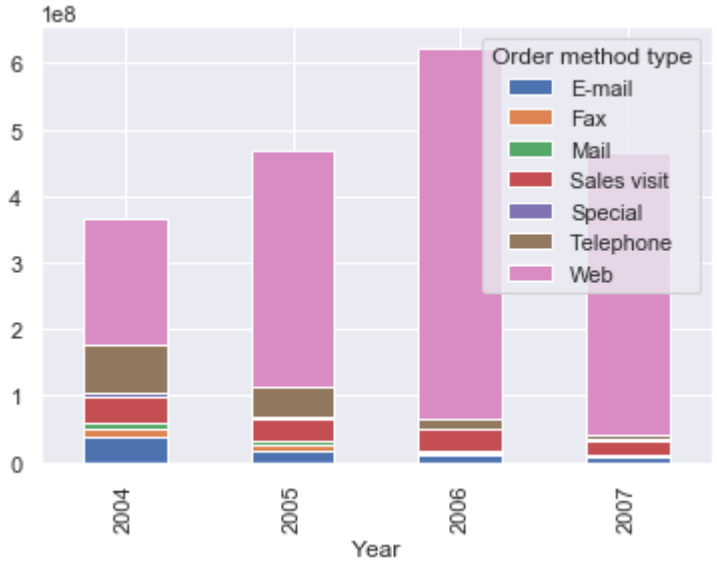


In [16]:
```
dfgroup = df.groupby('Order method type').sum()
dfgroup = dfgroup.sort_values(by='Gross profit', ascending=False)
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per Product line', rot=45)
plt.set_ylabel('Gross Profit')
```

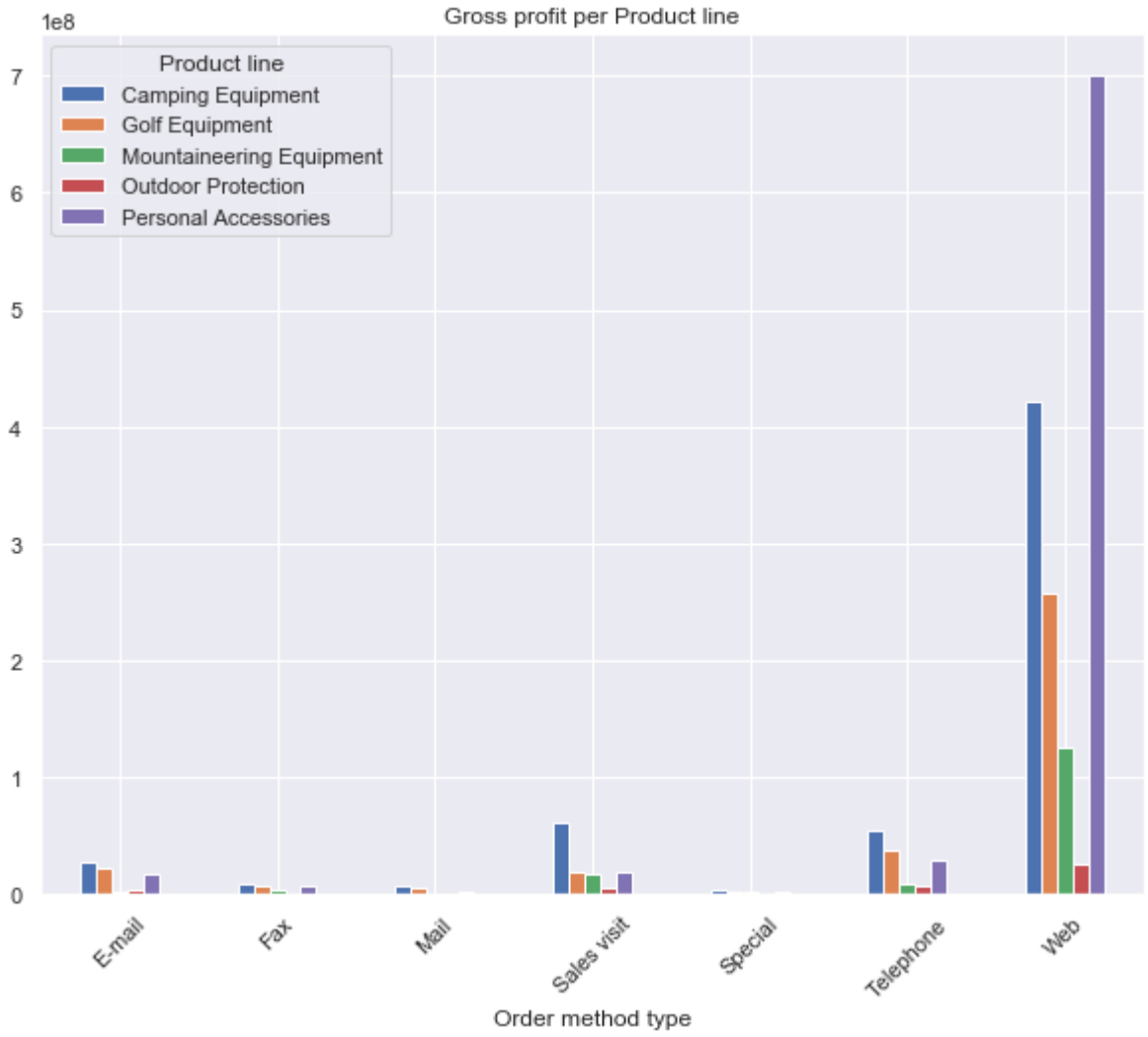
Out[16]:
```
Text(0, 0.5, 'Gross Profit')
```

In [17]:
```
df.groupby(['Year', 'Order method type']).sum().unstack().plot(y='Gross profit', kind='bar', stacked=True)


#Order Method Type over time
#Interesting to see that there were more web sales in 2006. The year 2007 sees a steady decline in ordering.
#Need to figure out what to do when it comes towards recession
```

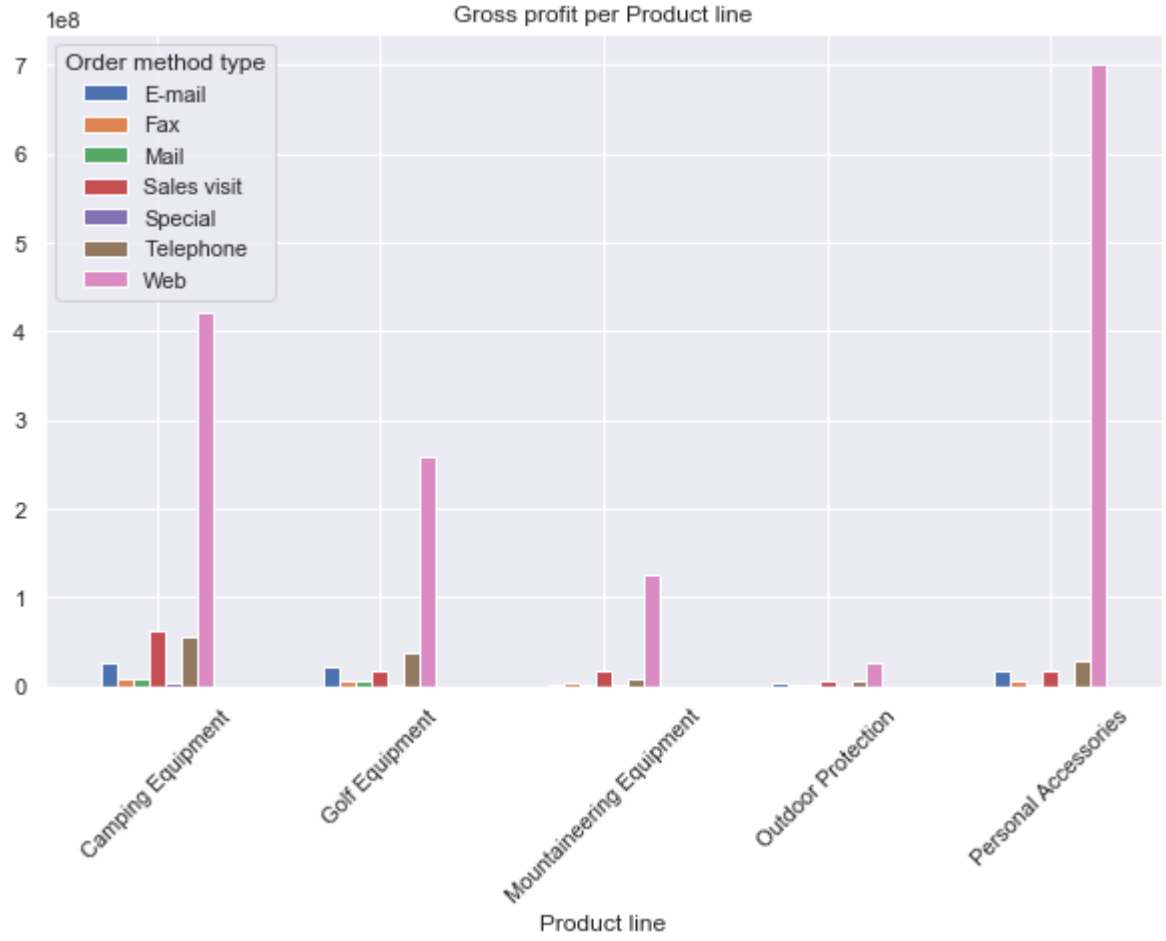
Out[17]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1d499294d48>
```



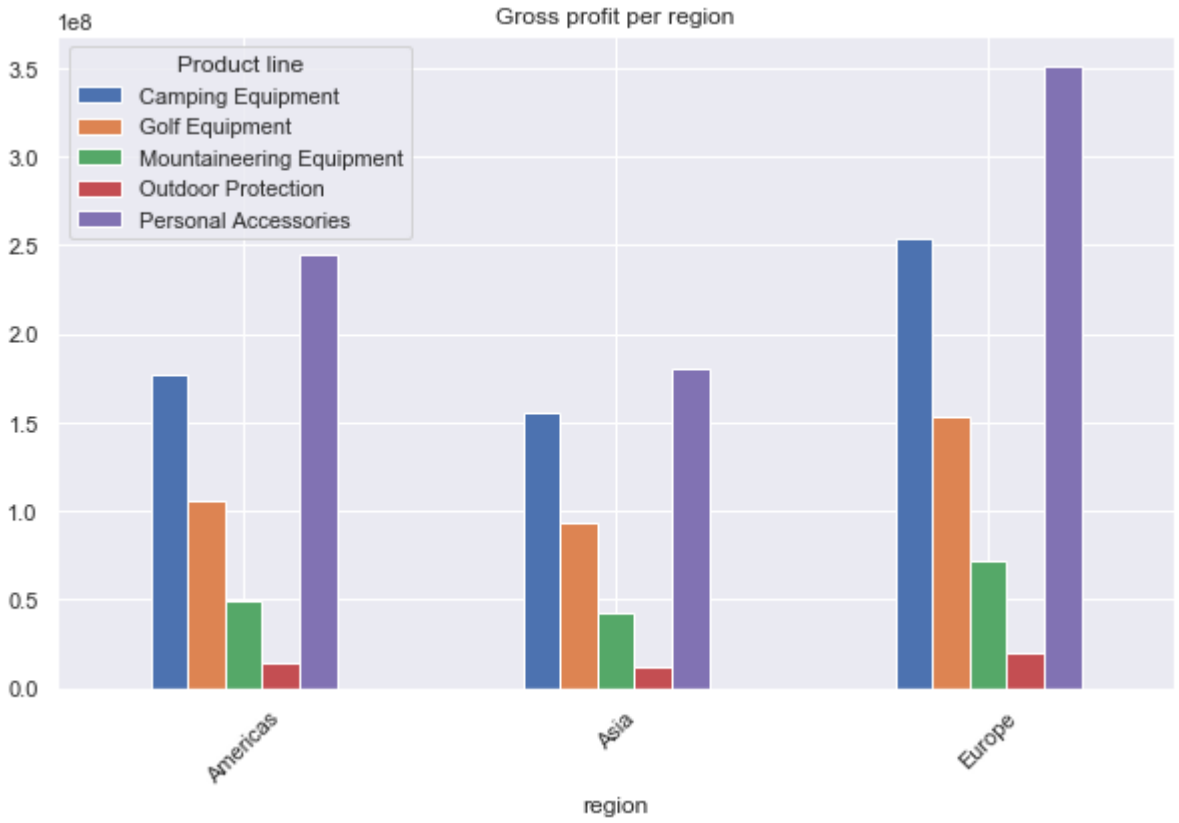
In [18]:
```
dfgroup = df.groupby(['Order method type', 'Product line']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per Product line', stacked=False, figsi
ze=[10,8], rot=45)

# maybe we should increase outdoor, golf, mountaineering sales
```



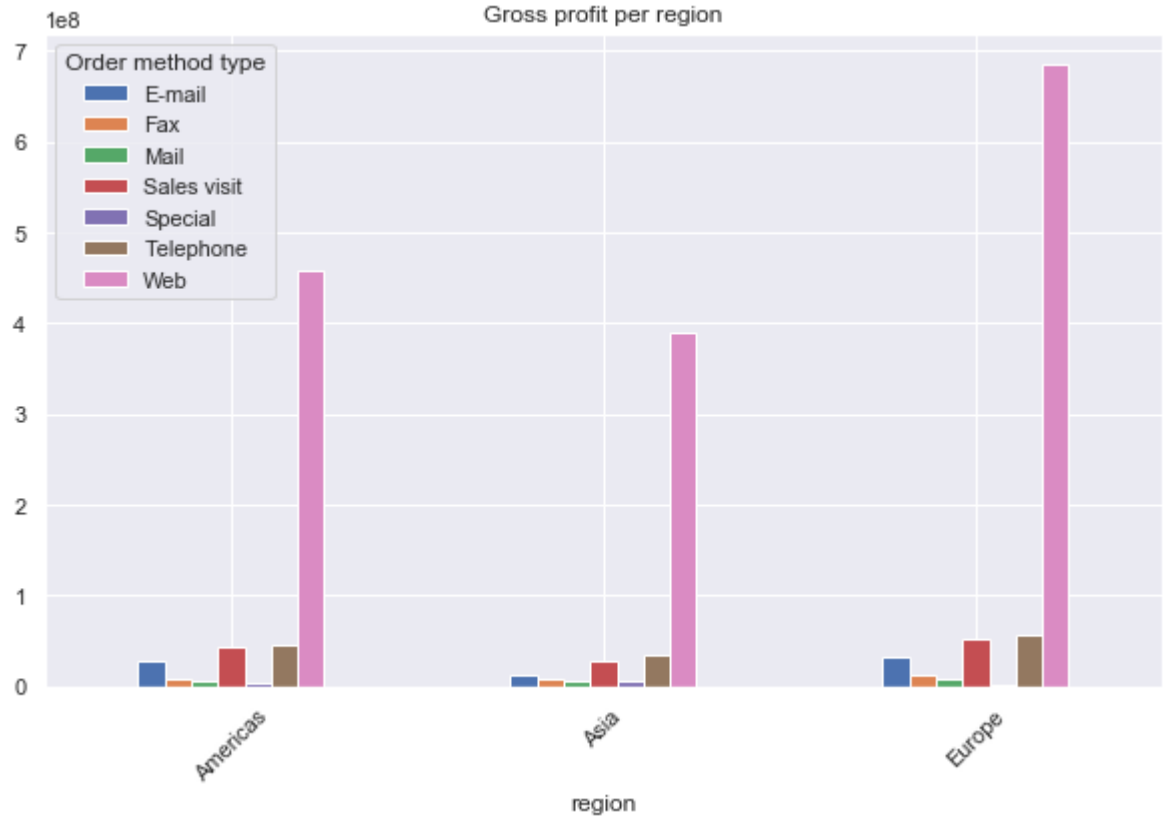
In [19]:
```
dfgroup = df.groupby(['Product line', 'Order method type']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per Product line', stacked=False, figsi
ze=[10,6], rot=45)

# maybe we should increase outdoor, golf, mountaineering sales
```



In [20]:
```
dfgroup = df.groupby(['region', 'Product line']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per region', stacked=False, figsize=[10
,6], rot=45)

#need to increase web marketing exposure in Asia
```

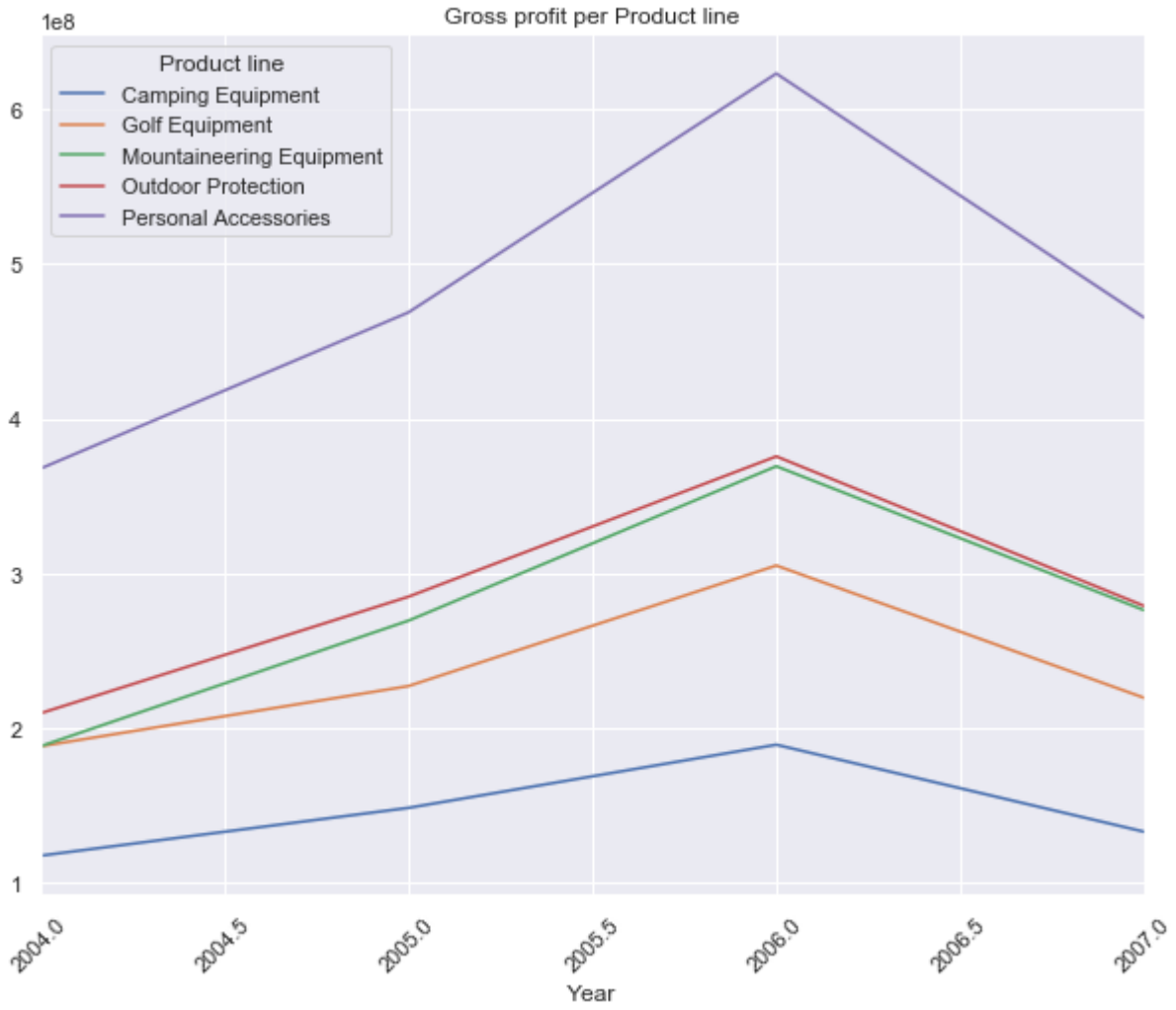


In [21]:
```
dfgroup = df.groupby(['region', 'Order method type']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='bar', title='Gross profit per region', stacked=False, figsize=[10
,6], rot=45)


# maybe we should increase web presence in Asia
```

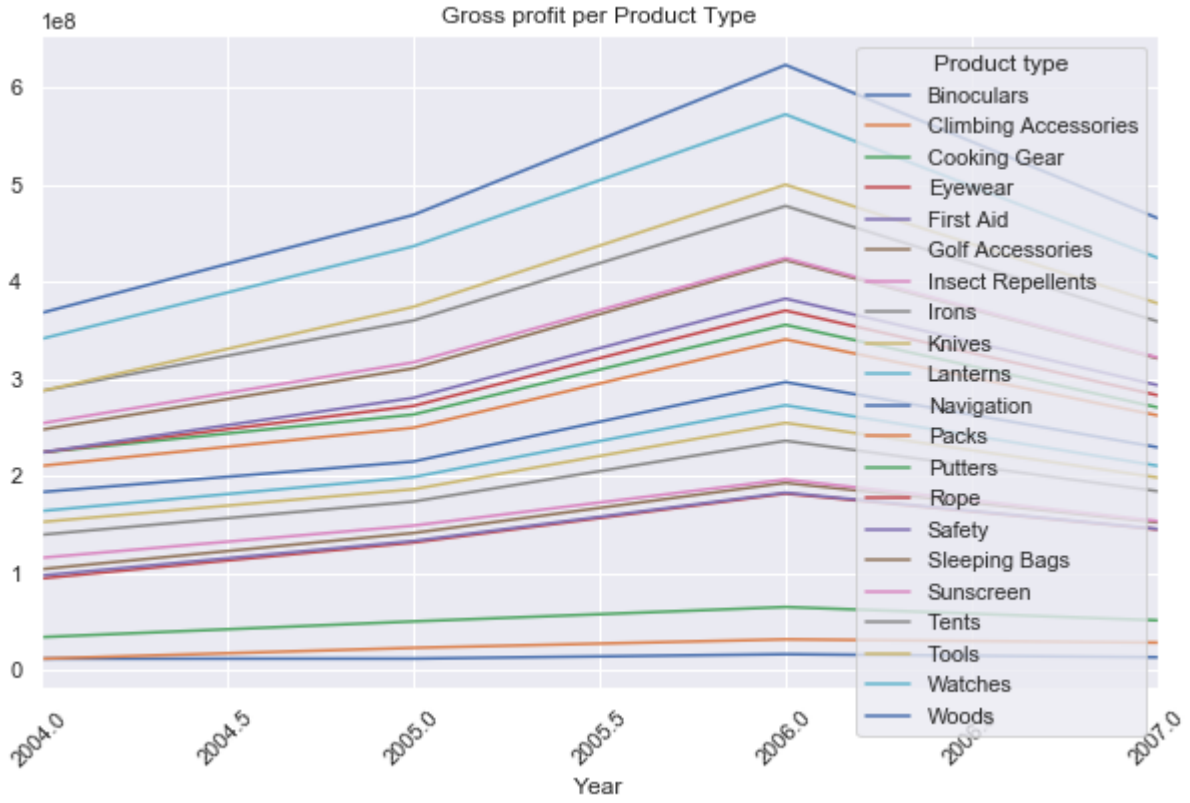


Line Chart

In [22]:
```
dfgroup = df.groupby(['Year', 'Product line']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='line', title='Gross profit per Product line', stacked=True, figsi
ze=[10,8], rot=45)

# we could see some downward trend due to coming towards recession period
```



In [23]:
```
dfgroup = df.groupby(['Year', 'Product type']).sum().unstack()
plt = dfgroup.plot(y ='Gross profit', kind='line', title='Gross profit per Product Type', stacked=True, figsi
ze=[10,6], rot=45)


# line representation of each product type over time
# last three products shwon below are least affected by the recession, need to know WHY
```



In [24]:
```
group = df.groupby(["Product"])['Revenue','Gross profit'].apply(lambda x : x.astype(float).sum())
group['Gross_Profit_Margin'] = group['Gross profit'] / group['Revenue']
group = group.sort_values(by=['Gross_Profit_Margin'], ascending = False)
group.count()
group.head(5)
# profit per item
#showing top 5
```

Out[24]:

Product	Revenue	Gross profit	Gross_Profit_Margin
TrailChef Cup	5702502.70	4157413.39	0.729051
BugShield Lotion Lite	2604170.52	1881286.08	0.722413
Course Pro Golf and Tee Set	9033712.92	6353920.52	0.703356
BugShield Spray	4310369.10	2936536.86	0.681273
BugShield Natural	7071303.54	4791529.44	0.677602

In [25]:
```
#yoy growth on Product Line

dfgroup = df.groupby(['Product line','Year'])['Gross profit'].apply(lambda x : x.astype(float).sum())
dfgroup = dfgroup.unstack('Year')
dfgroup = dfgroup.reset_index()
dfgroup['2007 YOY Growth'] = (dfgroup[2007]-dfgroup[2006])/dfgroup[2006]
dfgroup['2006 YOY Growth'] = (dfgroup[2006]-dfgroup[2005])/dfgroup[2005]
dfgroup['2005 YOY Growth'] = (dfgroup[2005]-dfgroup[2004])/dfgroup[2004]
dfgroup

#Outdoor Production experienced tremendous drop YOY, it was affected the most
```

Out[25]:

Year	Product line	2004	2005	2006	2007	2007 YOY Growth	2006 YOY Growth	2005 YOY Growth
0	Camping Equipment	1.171563e+08	1.480691e+08	1.889428e+08	1.326309e+08	-0.298037	0.276044	0.263859
1	Golf Equipment	7.076639e+07	7.881934e+07	1.159652e+08	8.664269e+07	-0.252856	0.471279	0.113796
2	Mountaineering Equipment	NaN	4.232357e+07	6.423353e+07	5.671881e+07	-0.116991	0.517678	NaN
3	Outdoor Protection	2.134930e+07	1.550153e+07	6.387193e+06	2.745257e+06	-0.570193	-0.587964	-0.273909
4	Personal Accessories	1.583459e+08	1.839701e+08	2.477319e+08	1.865352e+08	-0.247028	0.346587	0.161824

Linear Regression Model

In [26]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as seabornInstance
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
%matplotlib inline
```

In [27]:
```
df = pd.read_csv(r"C:\Users\phamc\Documents\Data Science Project Working Folder\Retail Sales Marketing Data.csv")
df = df.dropna()
```

In [28]:
```
df.shape
```

Out[28]: (24743, 14)

In [29]:
```
df.describe()
```

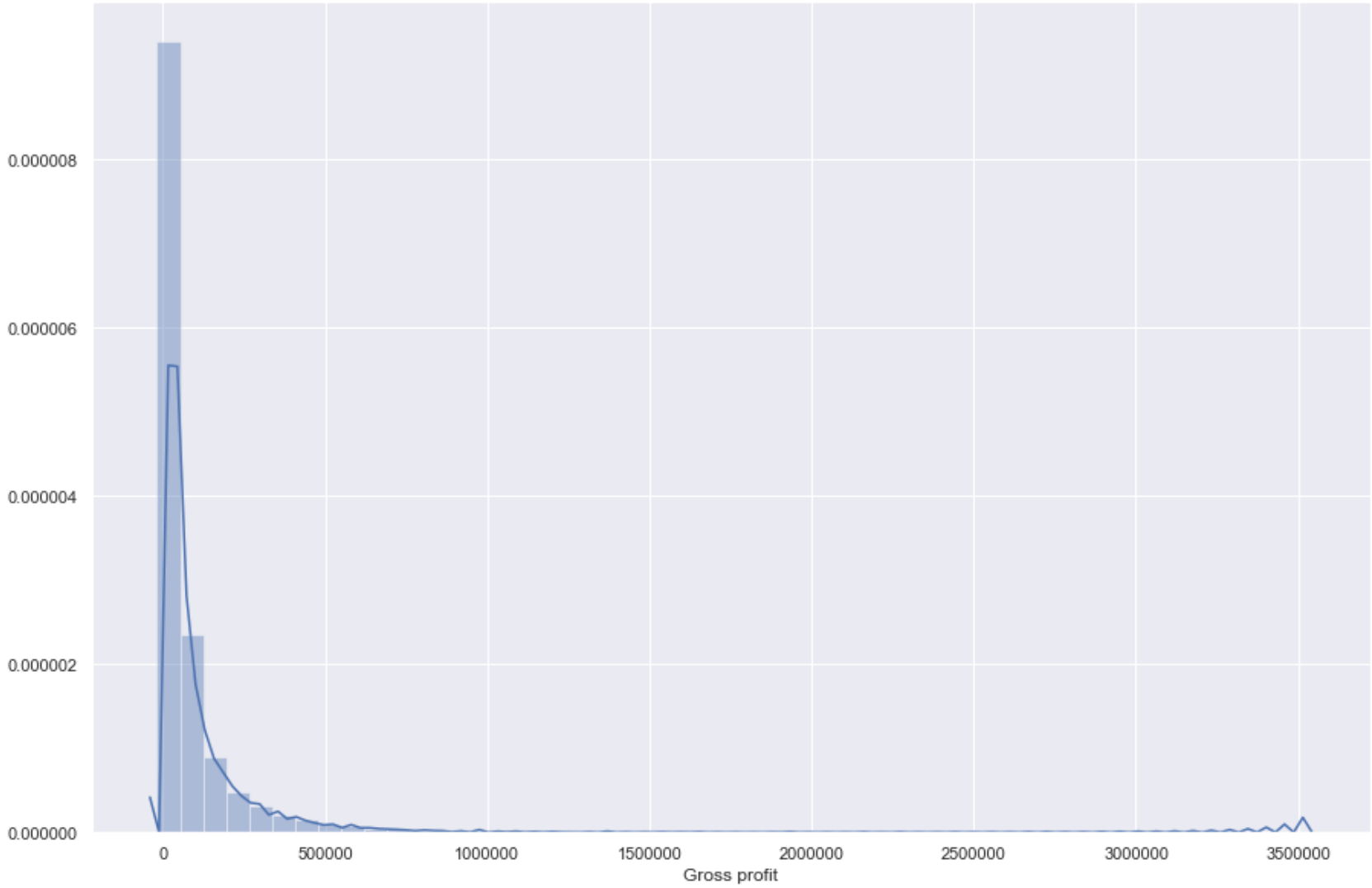
Out[29]:

	Year	Revenue	Planned revenue	Product cost	Quantity	Unit cost	Unit price	Gross profit	Unit sal pric
count	24743.000000	2.474300e+04	2.474300e+04	2.474300e+04	24743.000000	24743.000000	24743.000000	2.474300e+04	24743.00000
mean	2005.345067	1.894183e+05	1.988175e+05	1.116251e+05	3606.559067	84.886432	155.991651	7.779311e+04	147.22991
std	1.073106	3.907509e+05	4.025355e+05	2.384156e+05	8777.721091	131.113339	246.804787	1.581223e+05	232.04881
min	2004.000000	0.000000e+00	1.569000e+01	5.760000e+00	1.000000	0.850000	2.060000	-1.815960e+04	0.00000
25%	2004.000000	1.857921e+04	1.955679e+04	9.431740e+03	328.000000	11.430000	23.000000	8.333060e+03	20.15000
50%	2005.000000	5.986727e+04	6.390684e+04	3.278372e+04	1043.000000	36.828644	66.770000	2.579376e+04	62.65000
75%	2006.000000	1.901930e+05	2.039956e+05	1.113709e+05	3288.000000	80.000000	148.300000	7.825415e+04	140.95666
max	2007.000000	1.005429e+07	1.005429e+07	6.756853e+06	313628.000000	690.000000	1359.720000	3.521098e+06	1307.80272

In [30]:
```
df.plot(x='Revenue', y='Gross profit', style='o')
plt.title('Gross profit vs Revenue')
plt.xlabel('Revenue')
plt.ylabel('Gross profit')
plt.show()
```

In [31]:
```
plt.figure(figsize=(15,10))
plt.tight_layout()
seabornInstance.distplot(df['Gross profit'])
```

Out[31]: <matplotlib.axes._subplots.AxesSubplot at 0x1d49977a508>



In [32]:
```
X = df['Revenue'].values.reshape(-1,1)
y = df['Gross profit'].values.reshape(-1,1)
```

In [33]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0)
```

In [34]:
```
regressor = LinearRegression()
regressor.fit(X_train, y_train) #training the algorithm
```

Out[34]:
```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

In [35]:
```
#To retrieve the intercept:
print(regressor.intercept_)
#For retrieving the slope:
print(regressor.coef_)

print("The result should be approximately 45844.96869471 and 8.7945224 respectively. This means that for ever
y one unit of change in Quantity, the change in the Gross profit is about 8.79")
```

```
[3479.05395249]
[[0.39128363]]
The result should be approximately 45844.96869471 and 8.7945224 respectively. This means that for every one u
nit of change in Quantity, the change in the Gross profit is about 8.79
```

In [36]:
```
y_pred = regressor.predict(X_test)
```

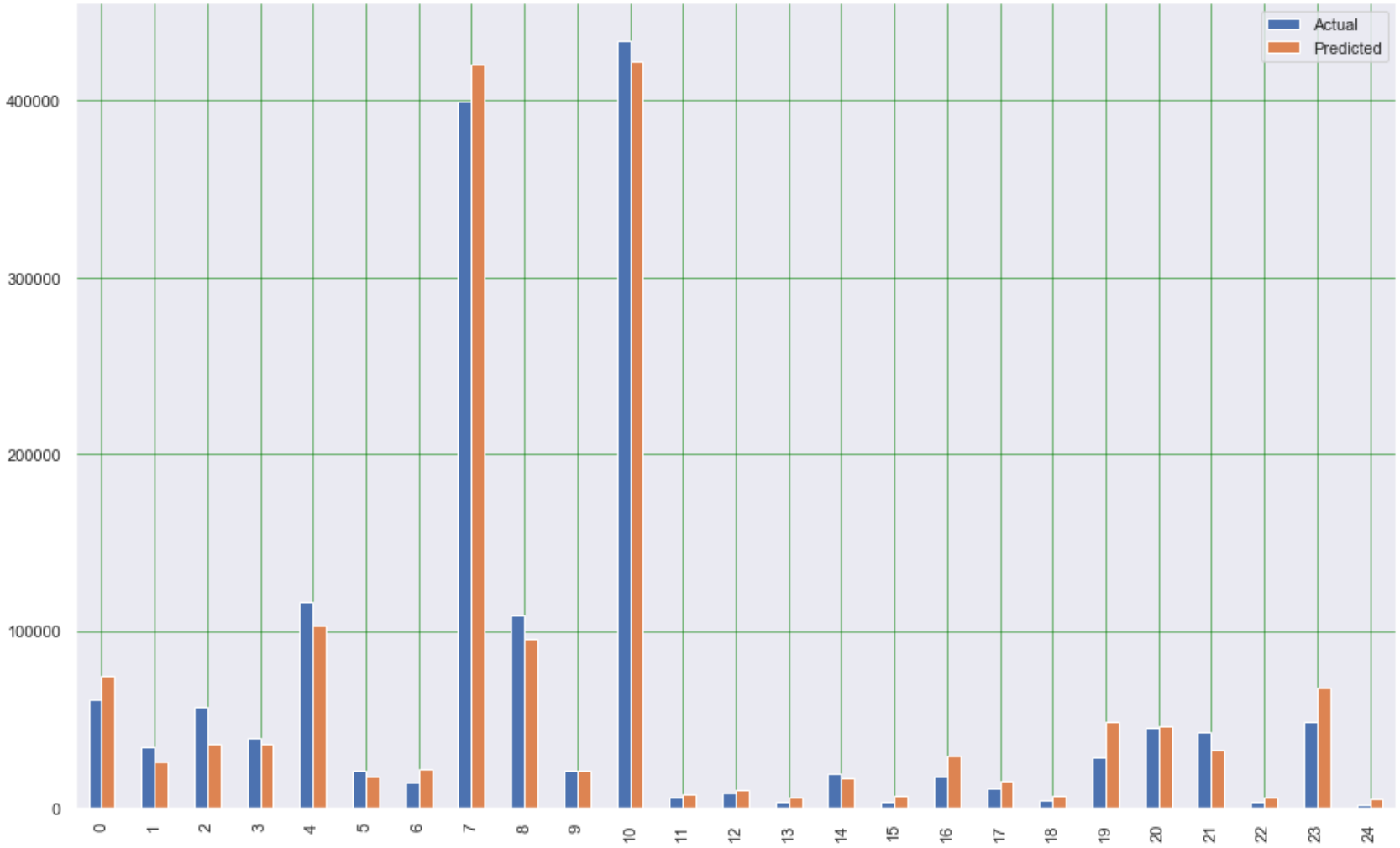
In [37]:
```
df = pd.DataFrame({'Actual': y_test.flatten(), 'Predicted': y_pred.flatten()})
df
```

Out[37]:

	Actual	Predicted
0	60937.87	74183.770540
1	34327.95	26018.986401
2	56554.62	35772.102518
3	39557.05	35614.200010
4	116434.33	103128.949440
...	...	...
4944	7722.12	9849.589634
4945	9754.20	11410.216554
4946	-186.00	3479.053952
4947	156034.59	111946.901602
4948	3307.23	6199.347721

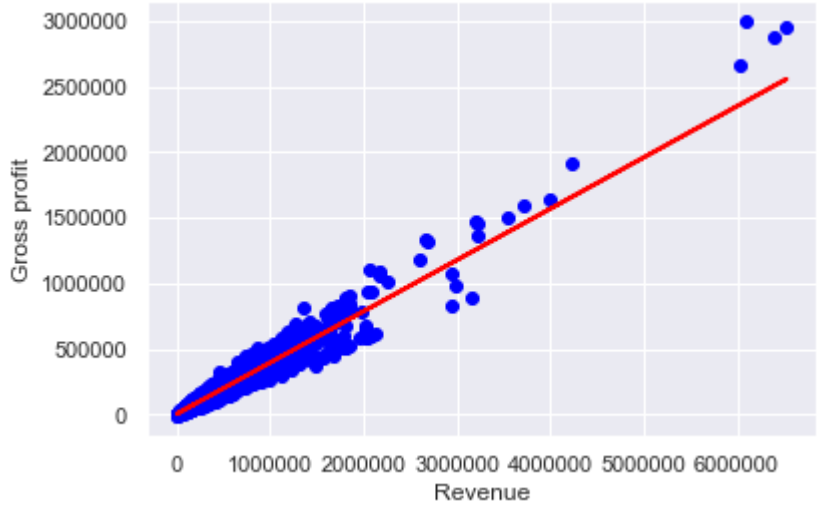
4949 rows × 2 columns

In [38]:
```
df1 = df.head(25)
df1.plot(kind='bar',figsize=(16,10))
plt.grid(which='major', linestyle='-', linewidth='0.5', color='green')
plt.grid(which='minor', linestyle=':', linewidth='0.5', color='black')
plt.show()
```



In [39]:
```
plt.scatter(X_test, y_test,  color='blue')
plt.plot(X_test, y_pred, color='red', linewidth=2)
plt.xlabel('Revenue')
plt.ylabel('Gross profit')
print('Prediction vs Test data')
plt.show()
```

```
Prediction vs Test data
```

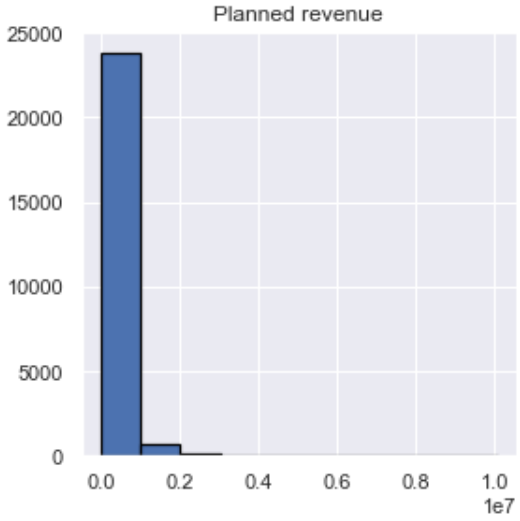


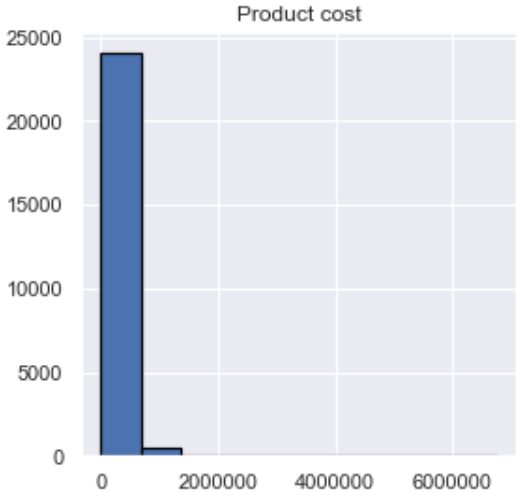
Histogram

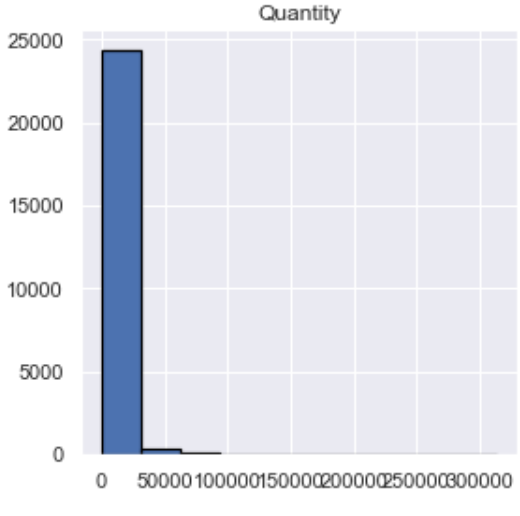
In [40]:
```
df = pd.read_csv(r"C:\Users\phamc\Documents\Data Science Project Working Folder\Retail Sales Marketing Data.csv")

#creating a histogram for every variable
df.hist(edgecolor='black', linewidth=1.2, figsize=[15,15])
```

Out[40]:
```
array([[<matplotlib.axes._subplots.AxesSubplot object at 0x000001D4985B2108>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D4997F2348>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D4993F1B88>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x000001D4995EB5C8>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D49948EF88>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D4993BBA48>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x000001D4994FFB48>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D49939FC88>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x000001D499386888>]],
      dtype=object)
```

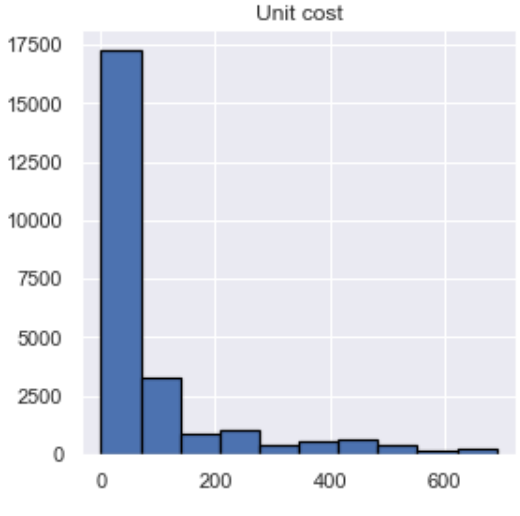

Gross profit
20000
15000
10000
5000
0
0
1000000
2000000
3000000


Planned revenue
25000
20000
15000
10000
5000
0
0.0
0.2
0.4
0.6
0.8
1.0
1e7


Product cost
25000
20000
15000
10000
5000
0
0
2000000
4000000
6000000

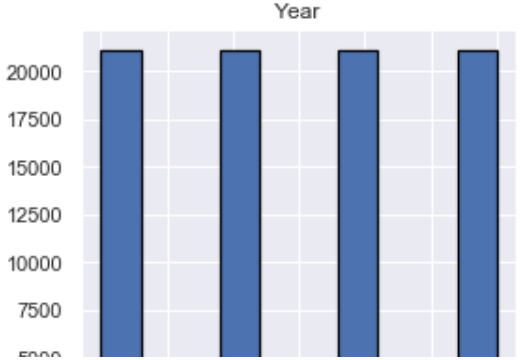

Quantity
25000
20000
15000
10000
5000
0
0
50000
100000
150000
200000
250000
300000

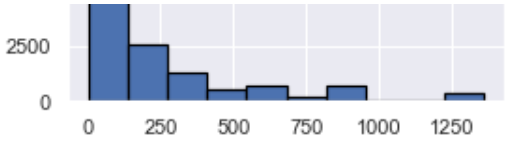

Revenue
25000
20000
15000
10000
5000
0
0.0
0.2
0.4
0.6
0.8
1.0
1e7

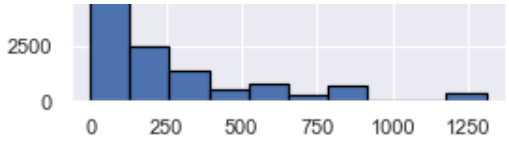

Unit cost
17500
15000
12500
10000
7500
5000
2500
0
0
200
400
600

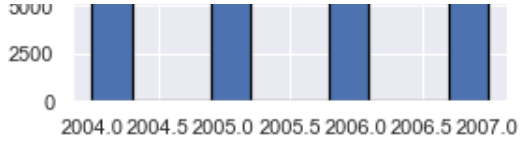

Unit price
17500
15000
12500
10000
7500
5000


Unit sale price
17500
15000
12500
10000
7500
5000


Year
20000
17500
15000
12500
10000
7500


2500
0
0
250
500
750
1000
1250

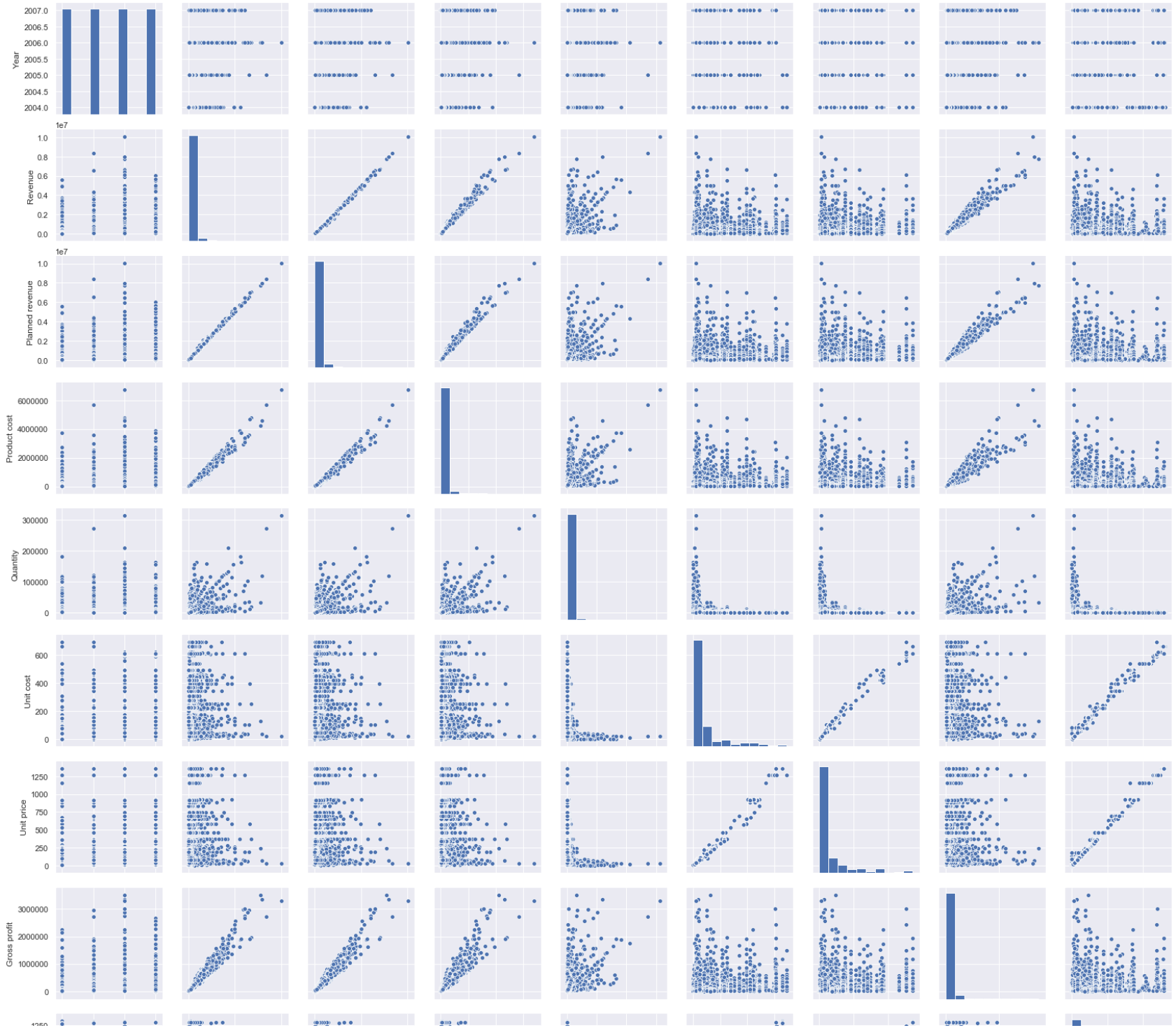

2500
0
0
250
500
750
1000
1250

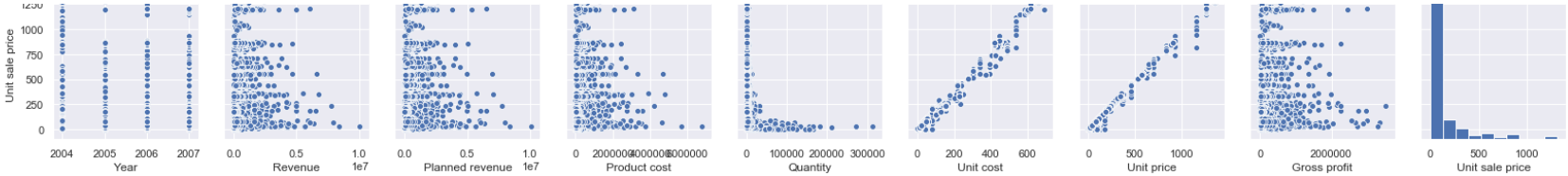

2500
0
2004.0
2004.5
2005.0
2005.5
2006.0
2006.5
2007.0

Seaborn

In [42]:
```
sb.pairplot(df)
```

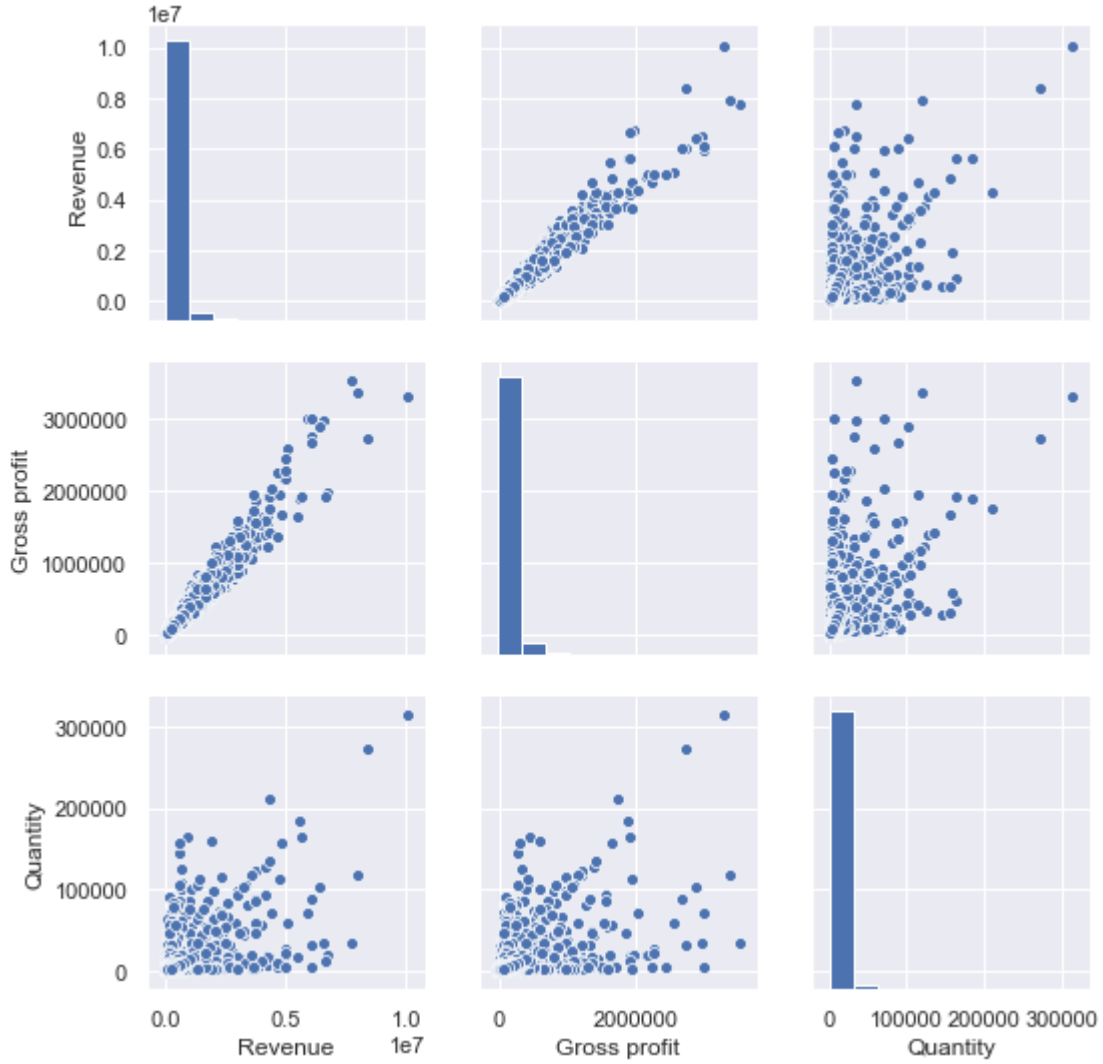
Out[42]: <seaborn.axisgrid.PairGrid at 0x1d4994fed48>


Year
Revenue
Planned revenue
Product cost
Quantity
Unit cost
Unit price
Gross profit
1e7


Unit sale price
Year
Revenue
1e7
Planned revenue
1e7
Product cost
Quantity
Unit cost
Unit price
Gross profit
Unit sale price

In [50]:
```
X = df[['Revenue', 'Gross profit', 'Quantity']]
sb.pairplot(X)

# we could see that revenue and gross profit are correlly lineated
```

Out[50]: <seaborn.axisgrid.PairGrid at 0x1d4acf31d08>



Heatmap Correlation

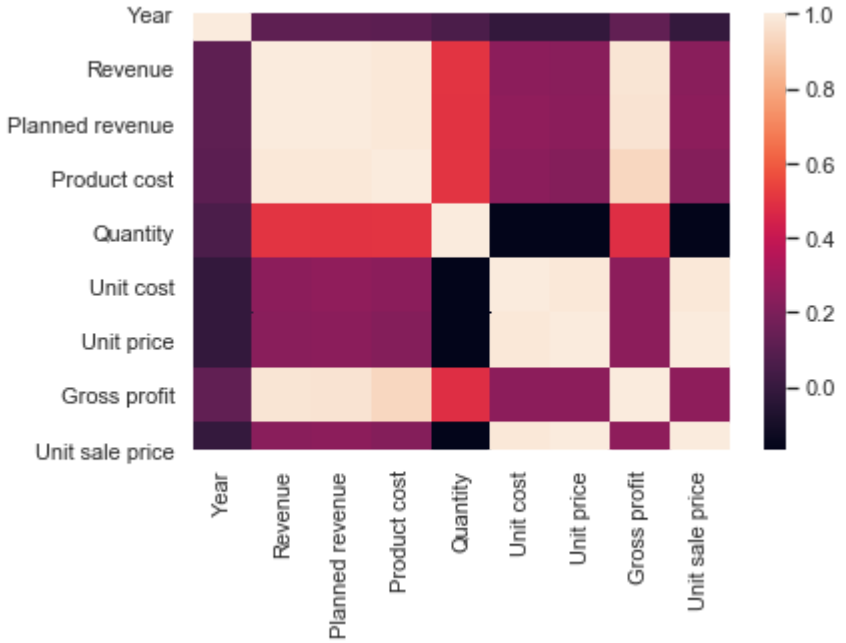
In [68]:
```
corr = df.corr()
corr
```

Out[68]:

	Year	Revenue	Planned revenue	Product cost	Quantity	Unit cost	Unit price	Gross profit	Unit sale price
Year	1.000000	0.115565	0.115897	0.106944	0.060784	-0.013209	-0.009350	0.124335	-0.005736
Revenue	0.115565	1.000000	0.999059	0.990357	0.505598	0.246344	0.233281	0.977941	0.236045
Planned revenue	0.115897	0.999059	1.000000	0.989579	0.499477	0.255005	0.242103	0.976788	0.244408
Product cost	0.106944	0.990357	0.989579	1.000000	0.506130	0.241509	0.219441	0.939573	0.222011
Quantity	0.060784	0.505598	0.499477	0.506130	1.000000	-0.168750	-0.167766	0.486292	-0.167453
Unit cost	-0.013209	0.246344	0.255005	0.241509	-0.168750	1.000000	0.988687	0.244619	0.988926
Unit price	-0.009350	0.233281	0.242103	0.219441	-0.167766	0.988687	1.000000	0.245611	0.999275
Gross profit	0.124335	0.977941	0.976788	0.939573	0.486292	0.244619	0.245611	1.000000	0.248567
Unit sale price	-0.005736	0.236045	0.244408	0.222011	-0.167453	0.988926	0.999275	0.248567	1.000000

In [69]:
```
sb.heatmap(corr,xticklabels=corr.columns.values, yticklabels=corr.columns.values)
```

Out[69]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1d4aee437c8>
```



In [ ]:
```

```