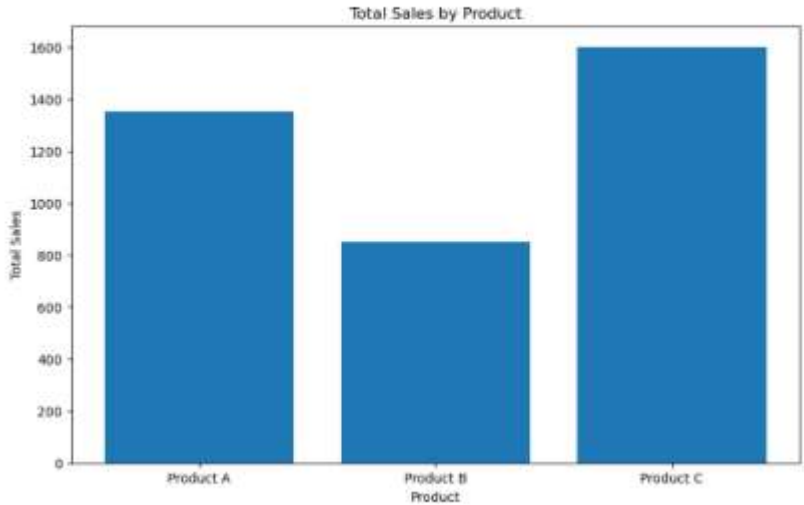
```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
# Load the data into a pandas DataFrame
df = pd.read_csv(r"C:\Users\nivet\OneDrive\Documents\FODS datasets\sales_data_sample.csv")
# Display the first few rows of the DataFrame
print(df.head())
# Check for missing values
print(df.isnull().sum())
# Fill or drop missing values if necessary
df['Sales'].fillna(df['Sales'].mean(), inplace=True)
df.dropna(subset=['Product', 'Quantity', 'Region'], inplace=True)
# Summary statistics
print(df.describe())
# Group by product and calculate the total sales and quantity
product_summary = df.groupby('Product').agg({
'Sales': 'sum',
'Quantity': 'sum'
}).reset_index()
print(product_summary)
# Bar plot of total sales by product
plt.figure(figsize=(10, 6))
plt.bar(product_summary['Product'], product_summary['Sales'])
plt.xlabel('Product')
plt.ylabel('Total Sales')
plt.title('Total Sales by Product')
plt.show()
# Line plot of sales over time
df['Date'] = pd.to_datetime(df['Date'])
sales_over_time = df.groupby('Date').agg({'Sales': 'sum'}).reset_index()
plt.figure(figsize=(10, 6))
plt.plot(sales_over_time['Date'],sales_over_time['Sales'])
plt.xlabel('Date')
plt.ylabel('Total Sales')
plt.title('SalesOver Time')
plt.show()
# Pivot table to analyze sales by region and product
pivot_table = df.pivot_table(values='Sales', index='Region', columns='Product',
aggfunc=np.sum, fill_value=0)
print(pivot_table)
# Correlation matrix
correlation_matrix = df.corr()
print(correlation_matrix)
# Heatmap of the correlation matrix
import seaborn as sns
plt.figure(figsize=(8, 6))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm')
plt.title('Correlation Matrix')
plt.show()
```

```
Date     Product  Sales  Quantity Region
0  2023-01-01  Product A    200         4  North
1  2023-01-02  Product B    150         3  South
2  2023-01-03  Product A    220         5  North
3  2023-01-04  Product C    300         6   East
4  2023-01-05  Product B    180         4   West
Date        0
Product     0
Sales       0
Quantity    0
Region      0
dtype: int64
              Sales   Quantity
count    16.000000  16.000000
mean    237.500000   5.375000
std      64.031242   1.746425
min     150.000000   3.000000
25%     187.500000   4.000000
50%     225.000000   5.500000
75%     302.500000   7.000000
max     340.000000   8.000000
     Product  Sales  Quantity
0  Product A   1350        33
1  Product B    850        17
2  Product C   1600        36
```



Product	Product A	Product B	Product C
Region			
East	0	0	1600
North	1350	0	0
South	0	480	0
West	0	370	0

	Sales	Quantity
Sales	1.000000	0.944922
Quantity	0.944922	1.000000

```
C:\Users\Ayyadurai\AppData\Local\Temp\ipykernel_9648\511106317.py:49: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.
  correlation_matrix = df.corr()
```