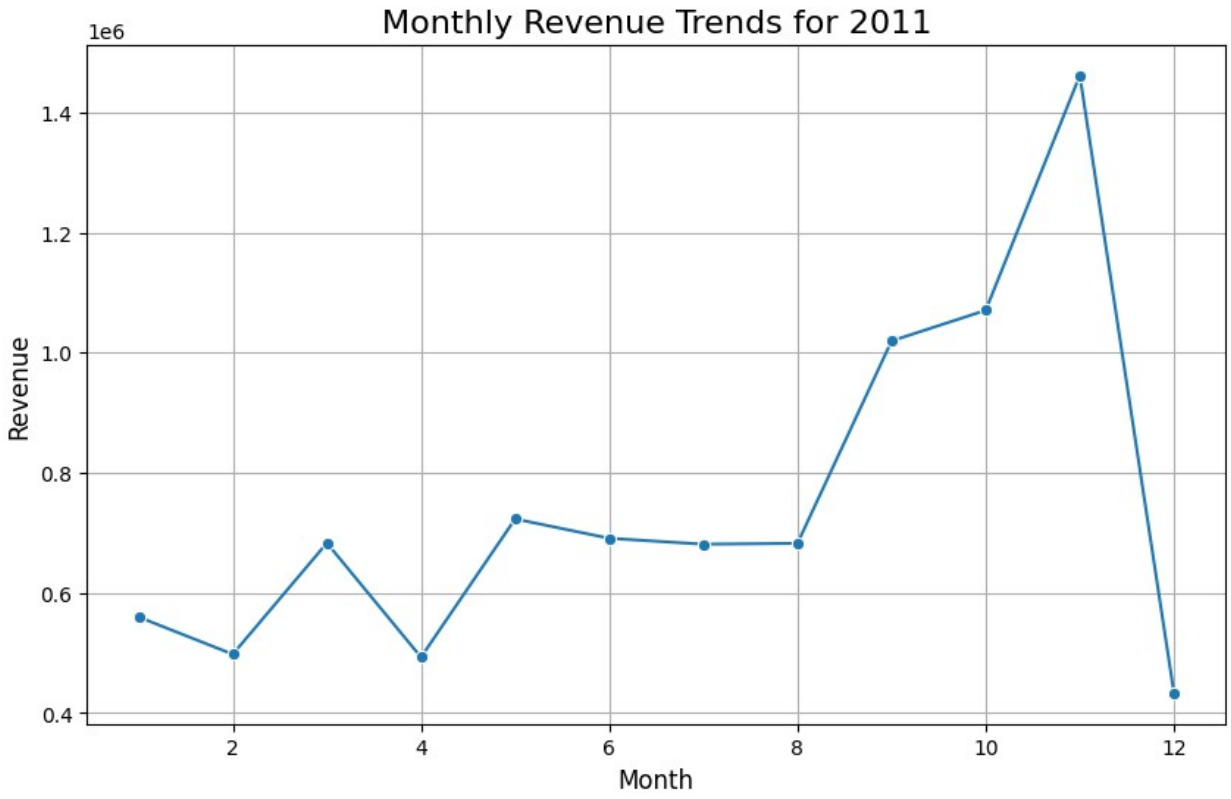
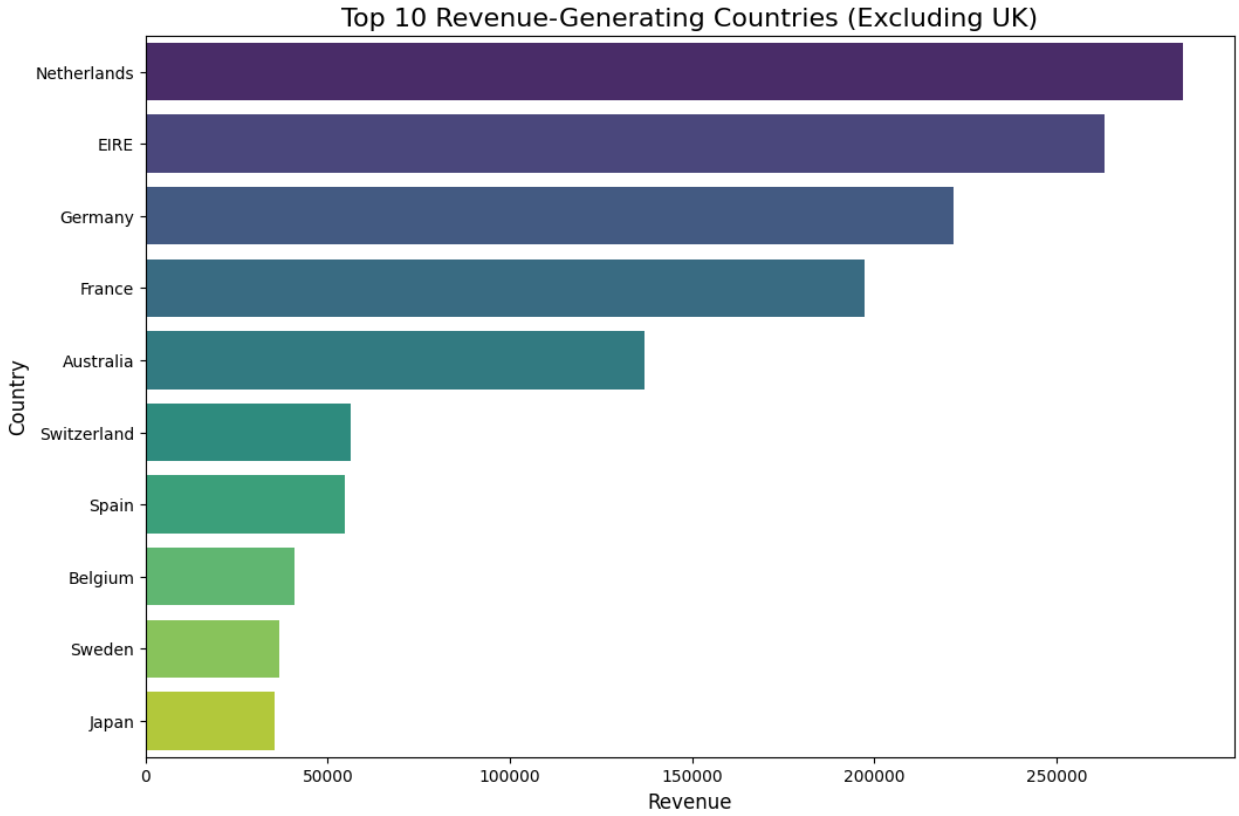
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px

# Load the dataset
file_path = 'Online Retail Data Set.xlsx'
data = pd.read_excel(file_path)

# Add a revenue column
data['Revenue'] = data['Quantity'] * data['UnitPrice']

# Convert InvoiceDate to datetime format
data['InvoiceDate'] = pd.to_datetime(data['InvoiceDate'])

### Task 1: Time Series Revenue Analysis for 2011 ###
# Filter for 2011 data
data_2011 = data[data['InvoiceDate'].dt.year == 2011]

# Group by month and calculate revenue
monthly_revenue = data_2011.groupby(data_2011['InvoiceDate'].dt.month)
['Revenue'].sum()

# Plot the time series
plt.figure(figsize=(10, 6))
sns.lineplot(x=monthly_revenue.index, y=monthly_revenue.values,
marker="o")
plt.title('Monthly Revenue Trends for 2011', fontsize=16)
plt.xlabel('Month', fontsize=12)
plt.ylabel('Revenue', fontsize=12)
plt.grid(True)
plt.show()
```




```
### Task 2: Top 10 Revenue-Generating Countries (Excluding UK) ###
# Exclude UK and group by country
country_revenue = data[data['Country'] != 'United
Kingdom'].groupby('Country').agg(
    Revenue=('Revenue', 'sum'),
    Quantity=('Quantity', 'sum')
).sort_values(by='Revenue', ascending=False).head(10)

# Plot top 10 countries
plt.figure(figsize=(12, 8))
sns.barplot(x=country_revenue['Revenue'], y=country_revenue.index,
palette='viridis')
plt.title('Top 10 Revenue-Generating Countries (Excluding UK)',
fontsize=16)
plt.xlabel('Revenue', fontsize=12)
plt.ylabel('Country', fontsize=12)
plt.show()
```

```
C:\Users\ayana\AppData\Local\Temp\ipykernel_1412\2659393511.py:10:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `y` variable to `hue` and set
`legend=False` for the same effect.
```

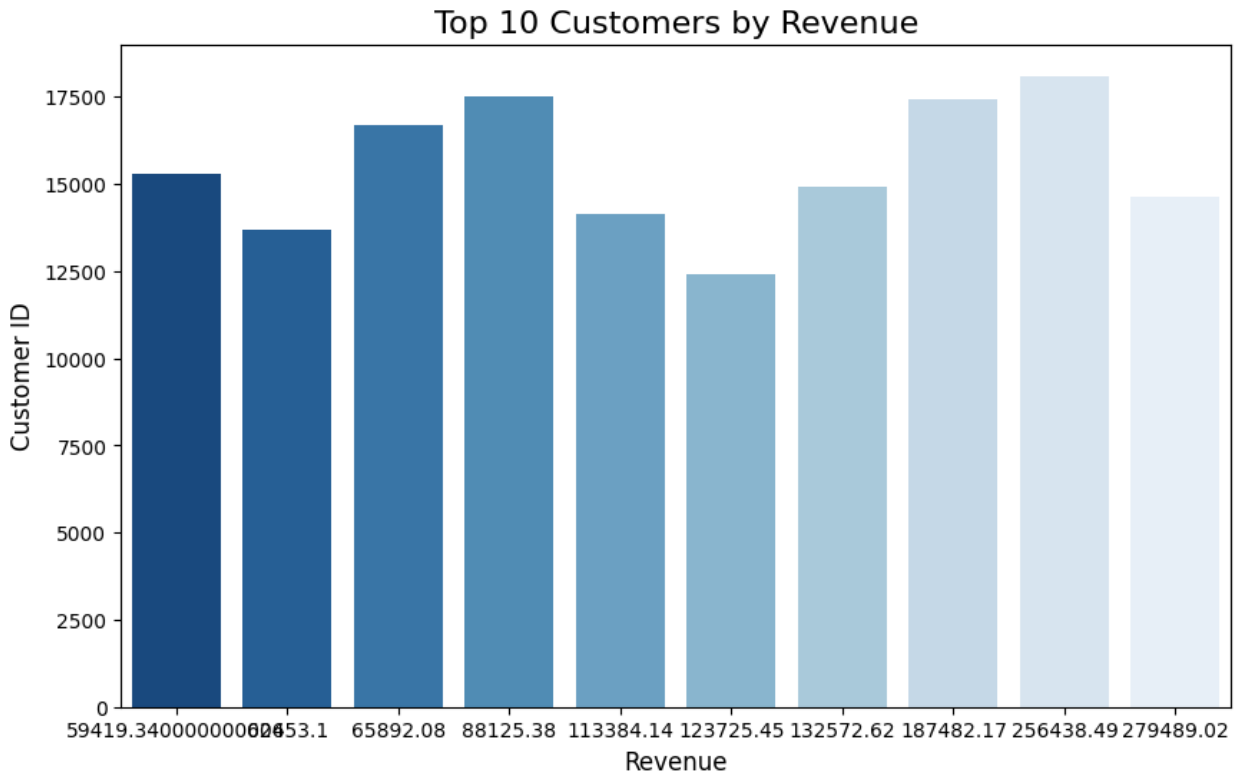
```
  sns.barplot(x=country_revenue['Revenue'], y=country_revenue.index,
palette='viridis')
```




```
### Task 3: Top 10 Customers by Revenue ###
# Group by CustomerID and calculate total revenue
top_customers = data.groupby('CustomerID')
['Revenue'].sum().sort_values(ascending=False).head(10)

# Plot top 10 customers
plt.figure(figsize=(10, 6))
sns.barplot(x=top_customers.values, y=top_customers.index,
palette='Blues_r')
plt.title('Top 10 Customers by Revenue', fontsize=16)
plt.xlabel('Revenue', fontsize=12)
plt.ylabel('Customer ID', fontsize=12)
plt.show()
```

```
C:\Users\ayana\AppData\Local\Temp\ipykernel_1412\2310643461.py:7:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.
```

```
  sns.barplot(x=top_customers.values, y=top_customers.index,
palette='Blues_r')
```




```
### Task 4: Country-Wise Product Demand (Excluding UK) ###
# Exclude UK and group by country
country_demand = data[data['Country'] != 'United
Kingdom'].groupby('Country')
['Quantity'].sum().sort_values(ascending=False)

# Plot demand by country
plt.figure(figsize=(12, 8))
sns.barplot(x=country_demand.values, y=country_demand.index,
palette='magma')
plt.title('Product Demand by Country (Excluding UK)', fontsize=16)
plt.xlabel('Quantity Sold', fontsize=12)
plt.ylabel('Country', fontsize=12)
plt.show()

C:\Users\ayana\AppData\Local\Temp\ipykernel_1412\438090553.py:7:
FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `y` variable to `hue` and set
`legend=False` for the same effect.
```

```
  sns.barplot(x=country_demand.values, y=country_demand.index,
palette='magma')
```