1. Preprocessing Data

In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [110…
```
file_path = r"C:\Users\Darryl\Documents\File Materi Binus\BOOTCAMP DATA ANALYTIC
df = pd.read_csv(file_path)
```

In [177…
```
df.head()
```

Out[177…

	InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	C
0	536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	12/1/2010 8:26	2.55	17850.0	K
1	536365	71053	WHITE METAL LANTERN	6	12/1/2010 8:26	3.39	17850.0	K
2	536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	12/1/2010 8:26	2.75	17850.0	K
3	536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	12/1/2010 8:26	3.39	17850.0	K
4	536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	12/1/2010 8:26	3.39	17850.0	K

In [175…
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 541909 entries, 0 to 541908
Data columns (total 8 columns):
 #   Column       Non-Null Count   Dtype  
---  ------       --------------   -----  
 0   InvoiceNo    541909 non-null  object 
 1   StockCode    541909 non-null  object 
 2   Description  540455 non-null  object 
 3   Quantity     541909 non-null  int64  
 4   InvoiceDate  541909 non-null  object 
 5   UnitPrice    541909 non-null  float64
 6   CustomerID   406829 non-null  float64
 7   Country      541909 non-null  object 
dtypes: float64(2), int64(1), object(5)
memory usage: 33.1+ MB
```

In [116…
```
df.drop(columns=["index"], inplace=True)
```

In [120…
```
df_cleaned = df.dropna(subset=["CustomerID"])
```

In [122…
```
df_cleaned.loc[:, "InvoiceDate"] = pd.to_datetime(df_cleaned["InvoiceDate"])
df_cleaned = df_cleaned[(df_cleaned["Quantity"] > 0) & (df_cleaned["UnitPrice"]
df_cleaned.loc[:, "TotalPrice"] = df_cleaned["Quantity"] * df_cleaned["UnitPrice
```

In [124…
```
df_cleaned.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 397884 entries, 0 to 541908
Data columns (total 9 columns):
 #   Column       Non-Null Count   Dtype  
---  ------       --------------   -----  
 0   InvoiceNo    397884 non-null  object 
 1   StockCode    397884 non-null  object 
 2   Description  397884 non-null  object 
 3   Quantity     397884 non-null  int64  
 4   InvoiceDate  397884 non-null  object 
 5   UnitPrice    397884 non-null  float64
 6   CustomerID   397884 non-null  float64
 7   Country      397884 non-null  object 
 8   TotalPrice   397884 non-null  float64
dtypes: float64(3), int64(1), object(5)
memory usage: 30.4+ MB
```

2. Analisis Eksploratif dan Statistik Deskriptif

In [126…
```
print(df_cleaned.describe())
```

```
            Quantity      UnitPrice     CustomerID     TotalPrice
count  397884.000000  397884.000000  397884.000000  397884.000000
mean       12.988238       3.116488   15294.423453      22.397000
std       179.331775      22.097877    1713.141560     309.071041
min         1.000000       0.001000   12346.000000       0.001000
25%         2.000000       1.250000   13969.000000       4.680000
50%         6.000000       1.950000   15159.000000      11.800000
75%        12.000000       3.750000   16795.000000      19.800000
max     80995.000000    8142.750000   18287.000000  168469.600000
```

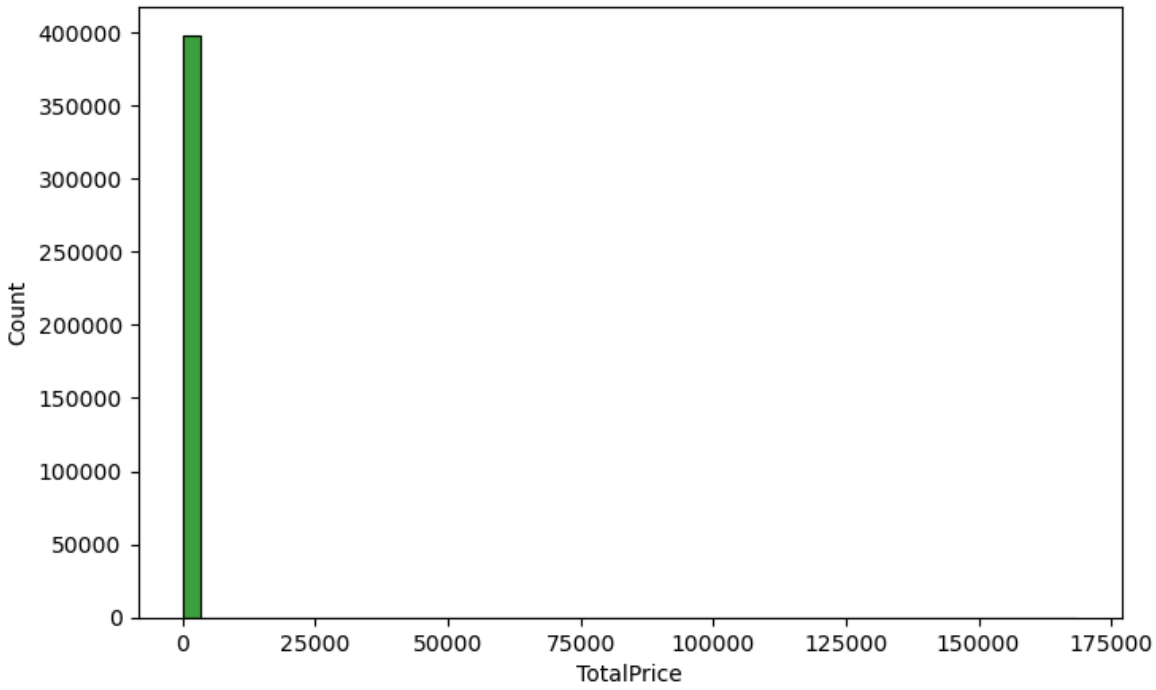
In [45]:
```
plt.figure()
```

Out[45]:
```
<Figure size 640x480 with 0 Axes>
```

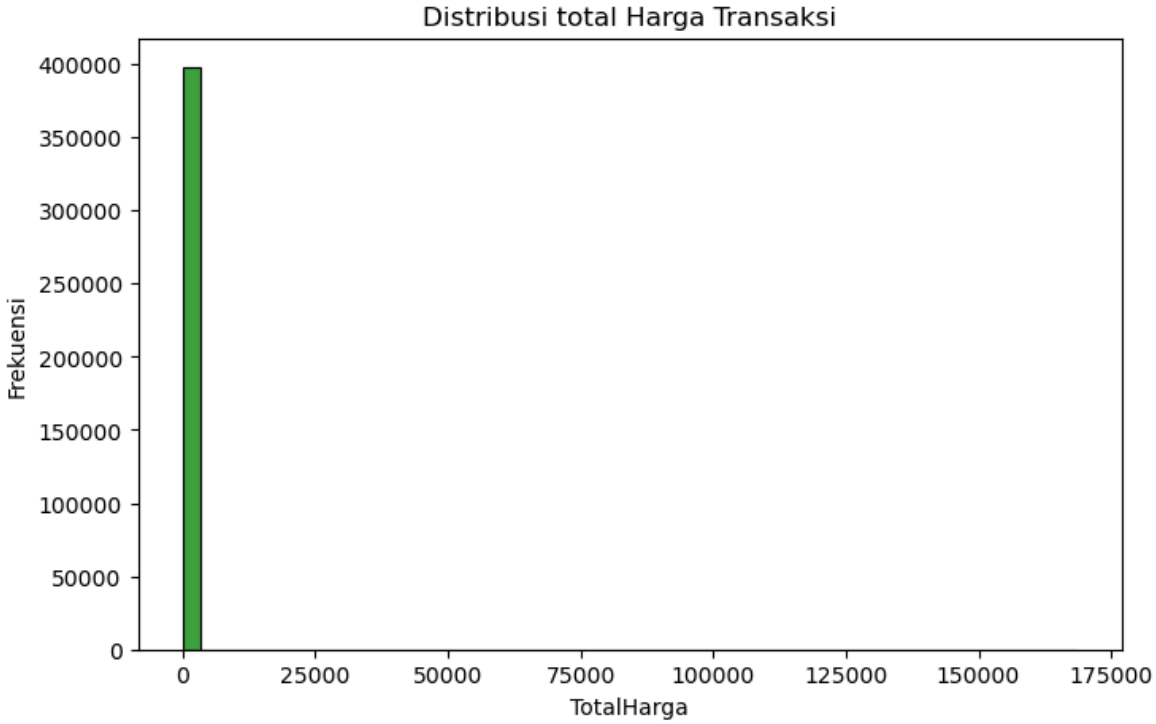
```
<Figure size 640x480 with 0 Axes>
```

In [128…
```
plt.figure(figsize=(8, 5))
sns.histplot(df_cleaned["TotalPrice"], bins=50, color="green")
```

Out[128…
```
<Axes: xlabel='TotalPrice', ylabel='Count'>
```



In [130…
```
plt.figure(figsize=(8, 5))
sns.histplot(df_cleaned["TotalPrice"], bins=50, color="green")
plt.title("Distribusi total Harga Transaksi")
plt.xlabel("TotalHarga")
plt.ylabel("Frekuensi")
plt.show()
```



3. Visualisasi Data

In [132…
```
df.head()
```

Out[132…

	InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	C
0	536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	12/1/2010 8:26	2.55	17850.0	K
1	536365	71053	WHITE METAL LANTERN	6	12/1/2010 8:26	3.39	17850.0	K
2	536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	12/1/2010 8:26	2.75	17850.0	K
3	536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	12/1/2010 8:26	3.39	17850.0	K
4	536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	12/1/2010 8:26	3.39	17850.0	K

In [142…
```
# a. Tren Penjualan
df_cleaned["InvoiceDate"] = pd.to_datetime(df_cleaned["InvoiceDate"], errors='co
print(df_cleaned["InvoiceDate"].dtype)
df_cleaned["YearMonth"] = df_cleaned["InvoiceDate"].dt.to_period("M")
sales_trend = df_cleaned.groupby("YearMonth")["TotalPrice"].sum()
```

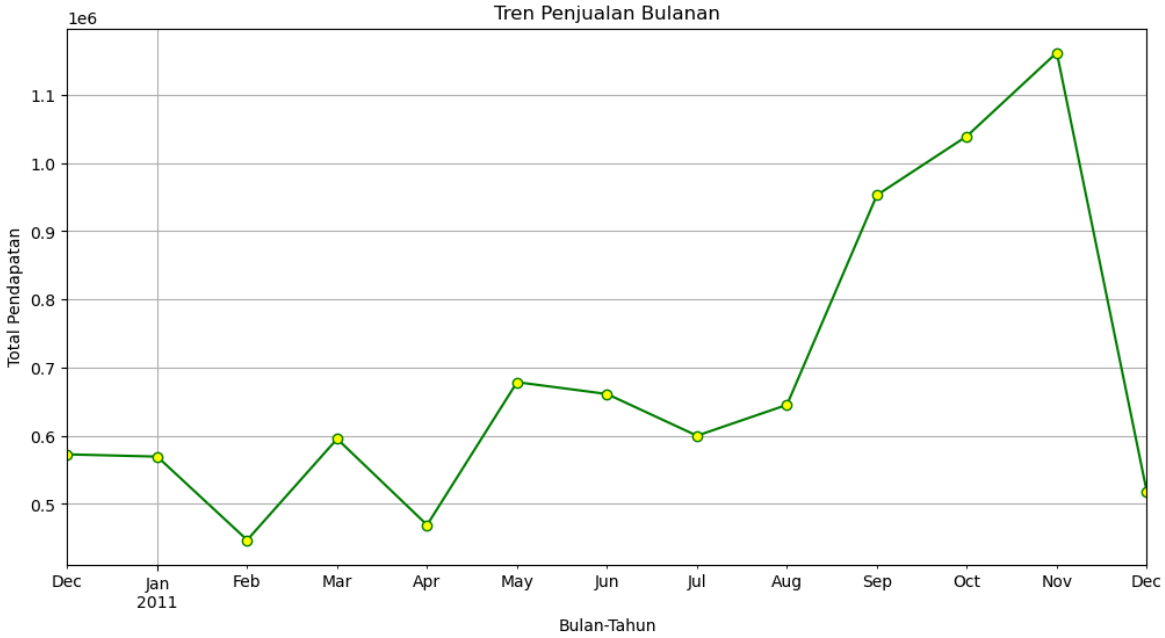
```
datetime64[ns]
```

In [144…
```
plt.figure()
```

Out[144… <Figure size 640x480 with 0 Axes>

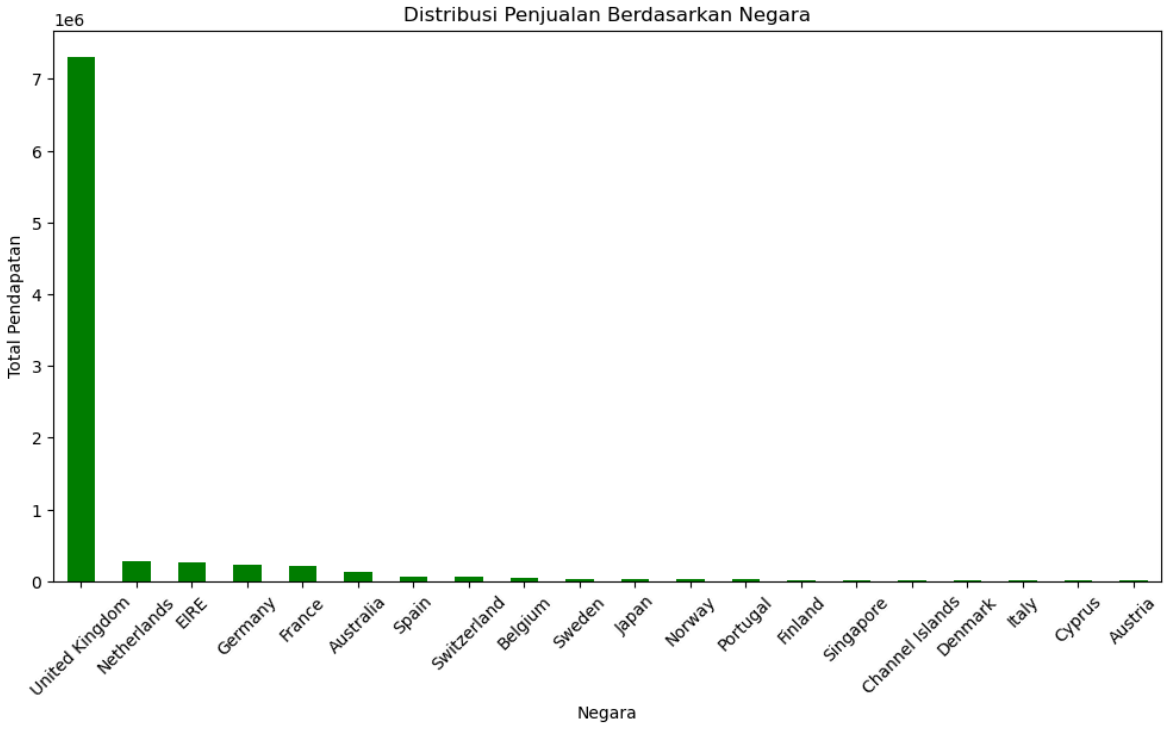
```
<Figure size 640x480 with 0 Axes>
```

In [146…
```
plt.figure(figsize=(12, 6))
sales_trend.plot(kind="line", marker="o", color="green", markerfacecolor="yellow
plt.title("Tren Penjualan Bulanan")
plt.xlabel("Bulan-Tahun")
plt.ylabel("Total Pendapatan")
plt.grid(True)
plt.show()
```



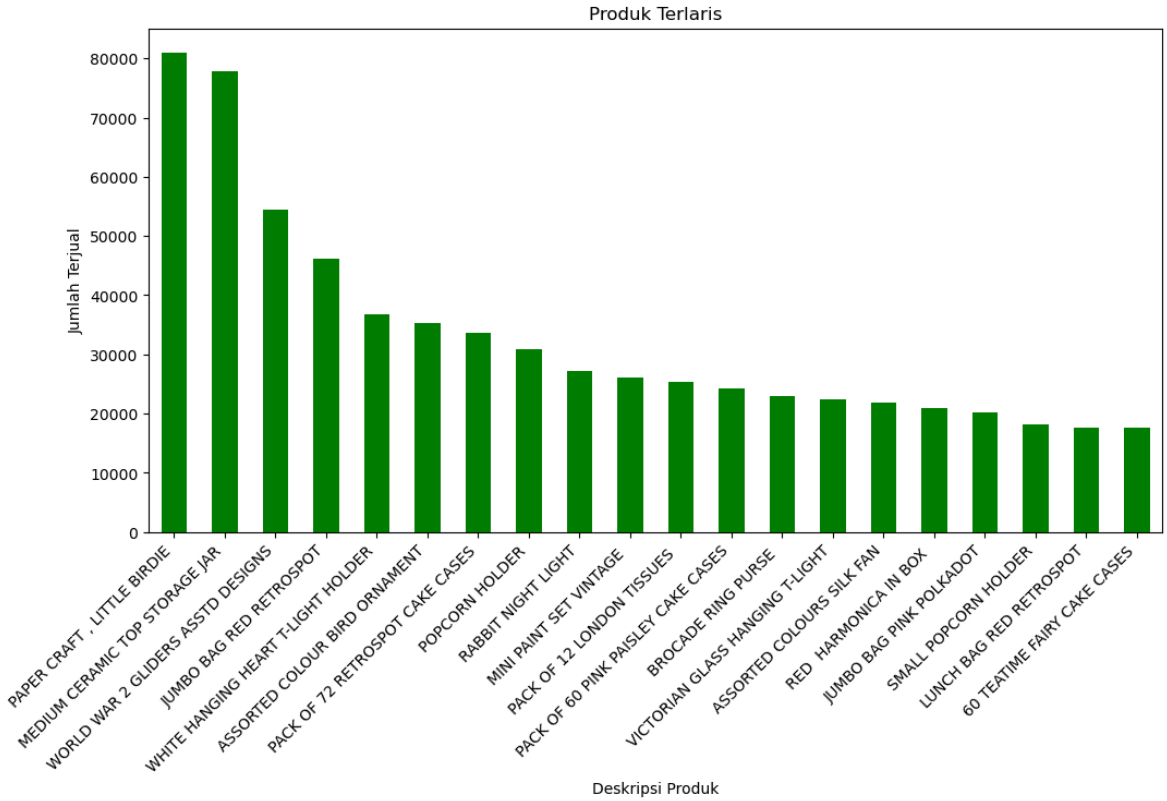
In [150…
```
# b. Distribusi Berdasarkan Negara
sales_by_country = df_cleaned.groupby("Country")["TotalPrice"].sum().sort_values
```

In [152…
```
plt.figure(figsize=(12, 6))
sales_by_country.plot(kind="bar", color="green")
plt.title("Distribusi Penjualan Berdasarkan Negara")
plt.xlabel("Negara")
plt.ylabel("Total Pendapatan")
plt.xticks(rotation=45)
plt.show()
```



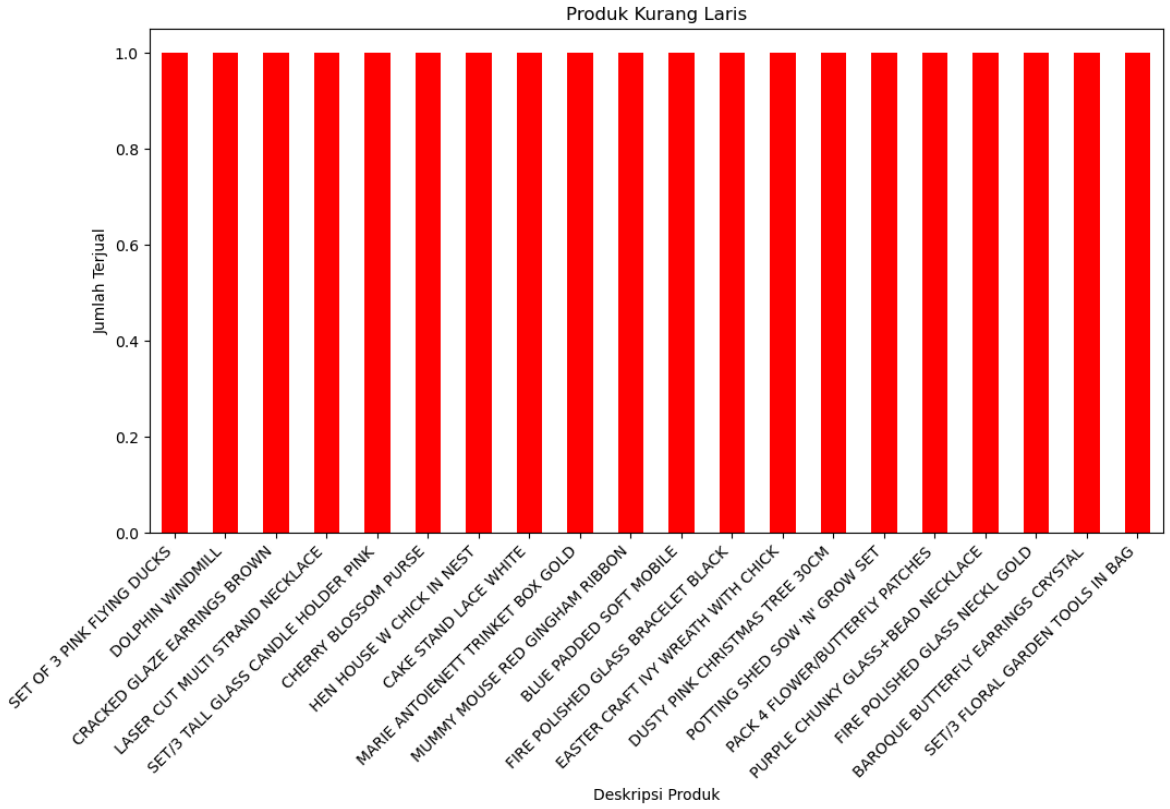
In [154…
```
# c. Analisis Produk

# Produk Terlaris di Pasaran
top_products = df_cleaned.groupby("Description")["Quantity"].sum().sort_values(a
```

In [156…
```
plt.figure(figsize=(12, 6))
top_products.plot(kind="bar", color="green")
plt.title("Produk Terlaris")
plt.xlabel("Deskripsi Produk")
plt.ylabel("Jumlah Terjual")
plt.xticks(rotation=45, ha="right")
plt.show()
```



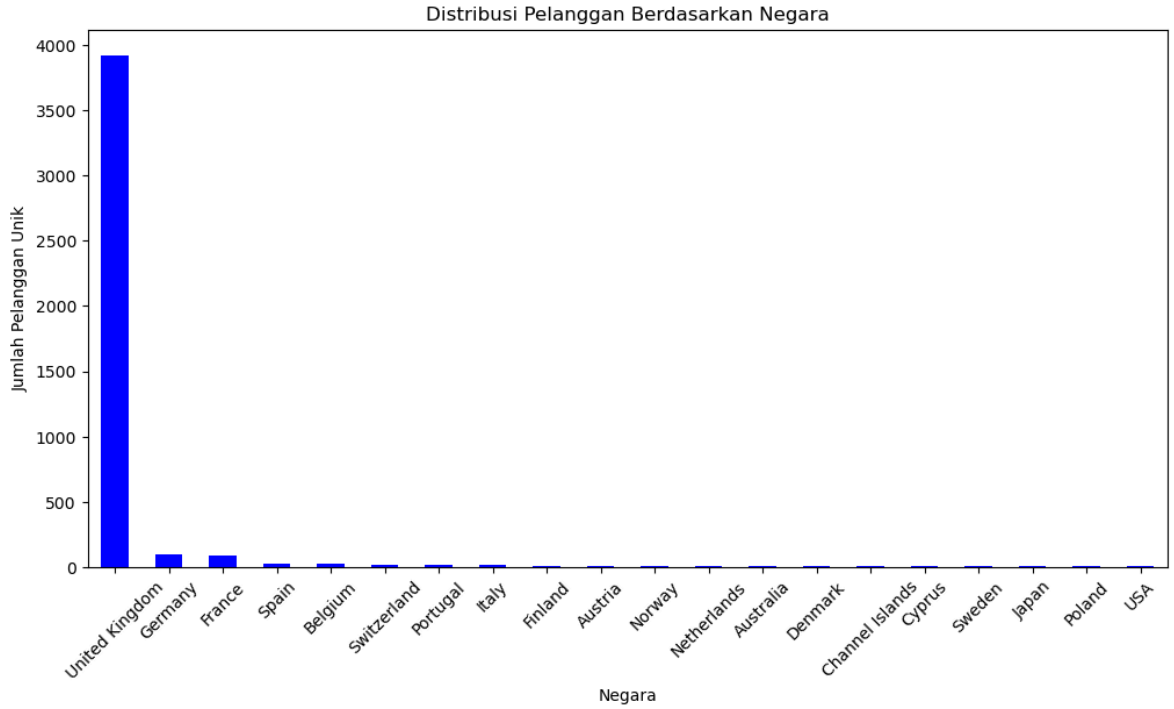
In [158…
```
# Produk Kurang Laris di Pasaran
least_products = df_cleaned.groupby("Description")["Quantity"].sum().sort_values
```

In [160…
```
plt.figure(figsize=(12, 6))
least_products.plot(kind="bar", color="red")
plt.title("Produk Kurang Laris")
plt.xlabel("Deskripsi Produk")
plt.ylabel("Jumlah Terjual")
plt.xticks(rotation=45, ha="right")
plt.show()
```



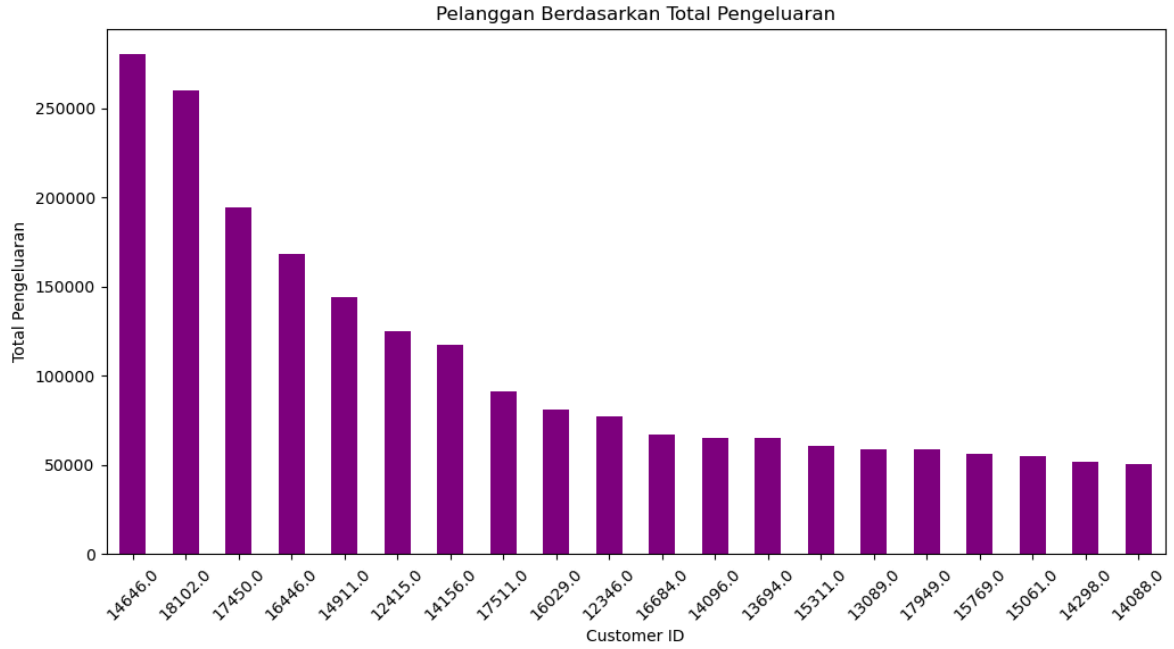
In [162…
```
# d. Analisis Pelanggan
customer_by_country = df_cleaned.groupby("Country")["CustomerID"].nunique().sort
```

In [164…
```
plt.figure(figsize=(12, 6))
customer_by_country.plot(kind="bar", color="blue")
plt.title("Distribusi Pelanggan Berdasarkan Negara")
plt.xlabel("Negara")
plt.ylabel("Jumlah Pelanggan Unik")
plt.xticks(rotation=45)
plt.show()
```



In [166…
```
# Pelanggan Berdasarkan Pengeluaran
customer_analysis = df_cleaned.groupby("CustomerID")["TotalPrice"].sum().sort_va
```

In [168…
```
plt.figure(figsize=(12, 6))
customer_analysis.plot(kind="bar", color="purple")
plt.title("Pelanggan Berdasarkan Total Pengeluaran")
plt.xlabel("Customer ID")
plt.ylabel("Total Pengeluaran")
plt.xticks(rotation=45)
plt.show()
```



In [172…
```
# e. Korelasi dan Hubungan
plt.figure(figsize=(8, 5))
sns.scatterplot(data=df_cleaned, x="UnitPrice", y="Quantity", alpha=1)
plt.title("Korelasi Harga dan Kuantitas")
plt.xlabel("Harga per Unit")
plt.ylabel("Kuantitas Terjual")
```

```
plt.grid(True)
plt.show()
```