In [42]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [2]:
```
df = pd.read_excel('/Users/viney/Downloads/Walmart Sales.xlsx')
```

In [55]:
```
df.columns
```

Out[55]:
```
Index(['Invoice ID', 'Branch', 'City', 'Customer type', 'Gender',
       'Product line', 'Unit price', 'Quantity', 'Date', 'Time', '
Payment',
       'Rating', 'Revenue'],
      dtype='object')
```

In [4]:
```
# adding new column of Revenue
df['Revenue'] = df['Unit price'] * df['Quantity']
```

In [6]:
```
df['Branch'].unique()
```

Out[6]:
```
array(['A', 'B', 'C'], dtype=object)
```

In [7]:
```
# I've divided original table into 3 parts having 3 unique Brances
```

In [8]:
```
dfa = df.where(df['Branch'] == 'A')
```

In [9]:
```
dfa.dropna(inplace=True)
```

In [10]:
```
dfb = df[df['Branch']=='B']
```

In [11]:
```
dfc = df[df['Branch'].isin(['C'])]
```

In [32]:
```
#total revenue by branch C
dfc['Revenue'].sum()
```

Out[32]:
```
96257.19
```

In [33]:
```
#total revenue by branch B
dfb['Revenue'].sum()
```

Out[33]:
```
107567.19
```

```
In [34]: #total revenue by branch A
         dfa['Revenue'].sum()

Out[34]: 103763.0
```

```
In [28]: City_grp = df.groupby(['City'])
```

Analysis of sales and revenue at the city and branch level

```
In [81]: #total revnue by branch A in different cities
         dfa.groupby('City')['Revenue'].sum()

Out[81]: City
         Mandalay     637.0
         Naypyitaw    648.0
         Yangon       598.0
         Name: Quantity, dtype: float64
```

```
In [82]: #total sales by branch A in different cities
         dfa.groupby('City')['Quantity'].sum()

Out[82]: City
         Mandalay     637.0
         Naypyitaw    648.0
         Yangon       598.0
         Name: Quantity, dtype: float64
```

```
In [79]: #total revnue by branch B in different cities
         dfb.groupby('City')['Revenue'].sum()

Out[79]: City
         Mandalay     37215.93
         Naypyitaw    35157.75
         Yangon       35193.51
         Name: Revenue, dtype: float64
```

```
In [83]: #total sales by branch B in different cities
         dfa.groupby('City')['Quantity'].sum()

Out[83]: City
         Mandalay     637.0
         Naypyitaw    648.0
         Yangon       598.0
         Name: Quantity, dtype: float64
```

In [39]:

```
#total revnue by branch C in different cities
dfb.groupby('City')['Revenue'].sum()
```

Out[39]:

```
City
Mandalay     29794.62
Naypyitaw    34160.14
Yangon       32302.43
Name: Revenue, dtype: float64
```

In [84]:

```
#total sales by branch C in different cities
dfc.groupby('City')['Quantity'].sum()
```

Out[84]:

```
City
Mandalay     519
Naypyitaw    579
Yangon       630
Name: Quantity, dtype: int64
```

In [41]:

```
#total revnue in different cities
df.groupby('City')['Revenue'].sum()
```

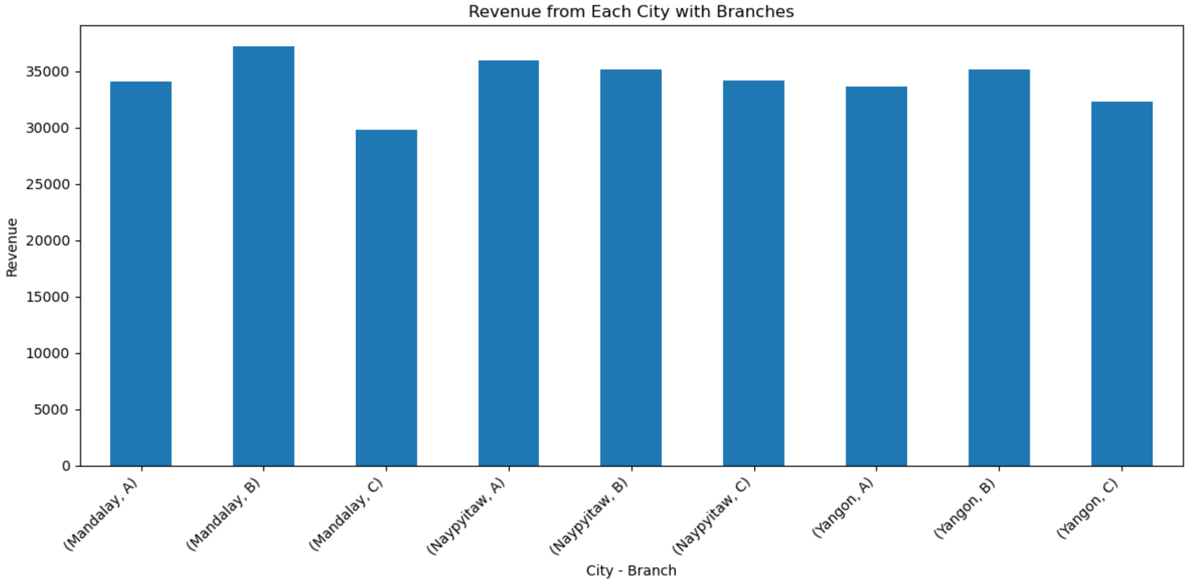
Out[41]:

```
City
Mandalay     101140.64
Naypyitaw    105303.53
Yangon       101143.21
Name: Revenue, dtype: float64
```

In [56]:

```
city_branch_revenue = df.groupby(['City', 'Branch'])['Revenue'].sum
```

```
In [57]: plt.figure(figsize=(12, 6))
         city_branch_revenue.plot(kind='bar', x='Branch', y='Revenue', figsi
         plt.title('Revenue from Each City with Branches')
         plt.xlabel('City - Branch')
         plt.ylabel('Revenue')
         plt.xticks(rotation=45, ha='right')  # Rotate x-axis labels for bet
         plt.tight_layout()
         plt.show()
```



In [106]:
```
df
```

Out[106]:

	Invoice ID	Branch	City	Customer type	Gender	Product line	Unit price	Quantity	Time
0	750-67-8428	A	Yangon	Member	Female	Health and beauty	74.69	7	13:08:00
1	226-31-3081	A	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	10:29:00
2	631-41-3108	A	Yangon	Normal	Male	Home and lifestyle	46.33	7	13:23:00
3	123-19-1176	B	Yangon	Member	Male	Health and beauty	58.22	8	20:33:00
4	373-73-7910	C	Yangon	Normal	Male	Sports and travel	86.31	7	10:37:00
...	...	...	...	...	...	...	...	...	...
995	233-67-5758	A	Naypyitaw	Normal	Male	Health and beauty	40.35	1	13:46:00
996	303-96-2227	A	Mandalay	Normal	Female	Home and lifestyle	97.38	10	17:16:00
997	727-02-1313	A	Yangon	Member	Male	Food and beverages	31.84	1	13:22:00
998	347-56-2442	B	Yangon	Normal	Male	Home and lifestyle	65.82	1	15:33:00
999	849-09-3807	C	Yangon	Member	Female	Fashion accessories	88.34	7	13:28:00

1000 rows × 14 columns

What is the average price of an item sold at each branch of the city

```
In [72]: dfa.groupby('City')['Unit price'].mean()
```

```
Out[72]: City
         Mandalay     53.353866
         Naypyitaw    54.123182
         Yangon       55.639298
         Name: Unit price, dtype: float64
```

```
In [73]: dfb.groupby('City')['Unit price'].mean()
```

```
Out[73]: City
         Mandalay     56.133305
         Naypyitaw    57.785688
         Yangon       56.011062
         Name: Unit price, dtype: float64
```

```
In [74]: dfc.groupby('City')['Unit price'].mean()
```

```
Out[74]: City
         Mandalay     57.958316
         Naypyitaw    57.941009
         Yangon       52.684602
         Name: Unit price, dtype: float64
```

Performance of sales and revenue, Month over Month across the Product Line, Gender, and Payment Method

```
In [103]: df.dtypes
```

```
Out[103]: Invoice ID                object
          Branch                    object
          City                      object
          Customer type             object
          Gender                    object
          Product line              object
          Unit price               float64
          Quantity                   int64
          Time                      object
          Payment                   object
          Rating                   float64
          Revenue                  float64
          Date              datetime64[ns]
          dtype: object
```

```
In [87]: df['date'] = pd.to_datetime(df['Date'])
```

```
In [93]: df.drop(columns=['Date'],inplace=True)
```

In [105]:
```
df['Month'] = df['Date'].dt.month
```

In [101]:
```
df.rename(columns={'date':'Date'},inplace=True)
```

In [164]:
```
grouped_df = df.groupby(['Month', 'Gender', 'Payment']).agg({'Quant
```

In [165]:
```
grouped_df
```

Out[165]:

			Quantity	Revenue
Month	**Gender**	**Payment**		
1	**Female**	**Cash**	395	21477.68
		Credit card	327	18733.30
		Ewallet	297	16111.86
	Male	**Cash**	313	18303.35
		Credit card	295	17692.01
		Ewallet	338	18435.96
2	**Female**	**Cash**	376	21293.52
		Credit card	280	16088.60
		Ewallet	295	16270.79
		Cash	220	12750.61

In [122]:
```
grouped_df_month = df.groupby(['Month','Product line'])
```

In [167]:
```
a = grouped_df_month['Revenue'].sum()
b = grouped_df_month['Quantity'].sum()
result1 = pd.concat([a, b], axis=1)
```

In [168]:
```
result1
```

Out[168]:

		Revenue	Quantity
Month	**Product line**		
1	**Electronic accessories**	17934.56	333
	Fashion accessories	18423.92	336
	Food and beverages	18638.60	325
	Health and beauty	15603.02	254
	Home and lifestyle	19518.80	342
	Sports and travel	20635.26	375
2	**Electronic accessories**	16536.10	313
	Fashion accessories	18104.63	295
	Food and beverages	19047.96	349
	Health and beauty	13906.91	266
	Home and lifestyle	11842.27	205
	Sports and travel	13152.01	226
3	**Electronic accessories**	17279.37	325
	Fashion accessories	15191.35	271
	Food and beverages	15784.72	278
	Health and beauty	17341.25	334
	Home and lifestyle	19935.99	364
	Sports and travel	18710.66	319

In [156]:
```
grouped_df_month_b = df.groupby(['Month','Gender'])
```

In [169]:
```
c = grouped_df_month_b['Revenue'].sum()
d = grouped_df_month_b['Quantity'].sum()
result2 = pd.concat([c, d], axis=1)
```

In [170]:

```
result2
```

Out[170]:

Month	Gender	Revenue	Quantity
1	Female	56322.84	1019
	Male	54431.32	946
2	Female	53652.91	951
	Male	38936.97	703
3	Female	49912.75	899
	Male	54330.59	992

In [161]:

```
grouped_df_month_c = df.groupby(['Month','Payment'])
```

In [172]:

```
e = grouped_df_month_c['Revenue'].sum()
f = grouped_df_month_c['Quantity'].sum()
result3 = pd.concat([e, f], axis=1)
```

In [173]:

```
result3
```

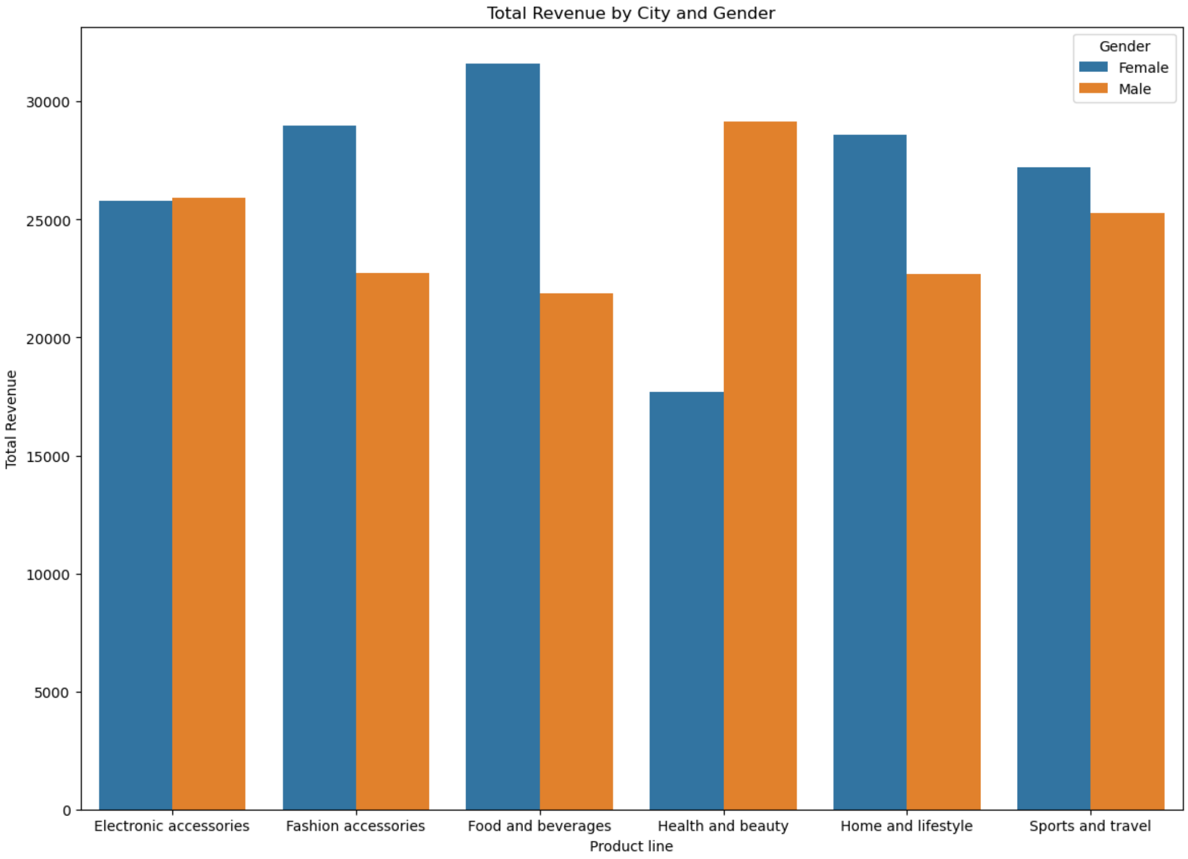
Out[173]:

Month	Payment	Revenue	Quantity
1	Cash	39781.03	708
	Credit card	36425.31	622
	Ewallet	34547.82	635
2	Cash	34044.13	596
	Credit card	29866.69	505
	Ewallet	28679.06	553
3	Cash	33038.24	592
	Credit card	29676.64	595
	Ewallet	41528.46	704

In [187]:
```
df.groupby(['Product line'])['Revenue'].sum()
```

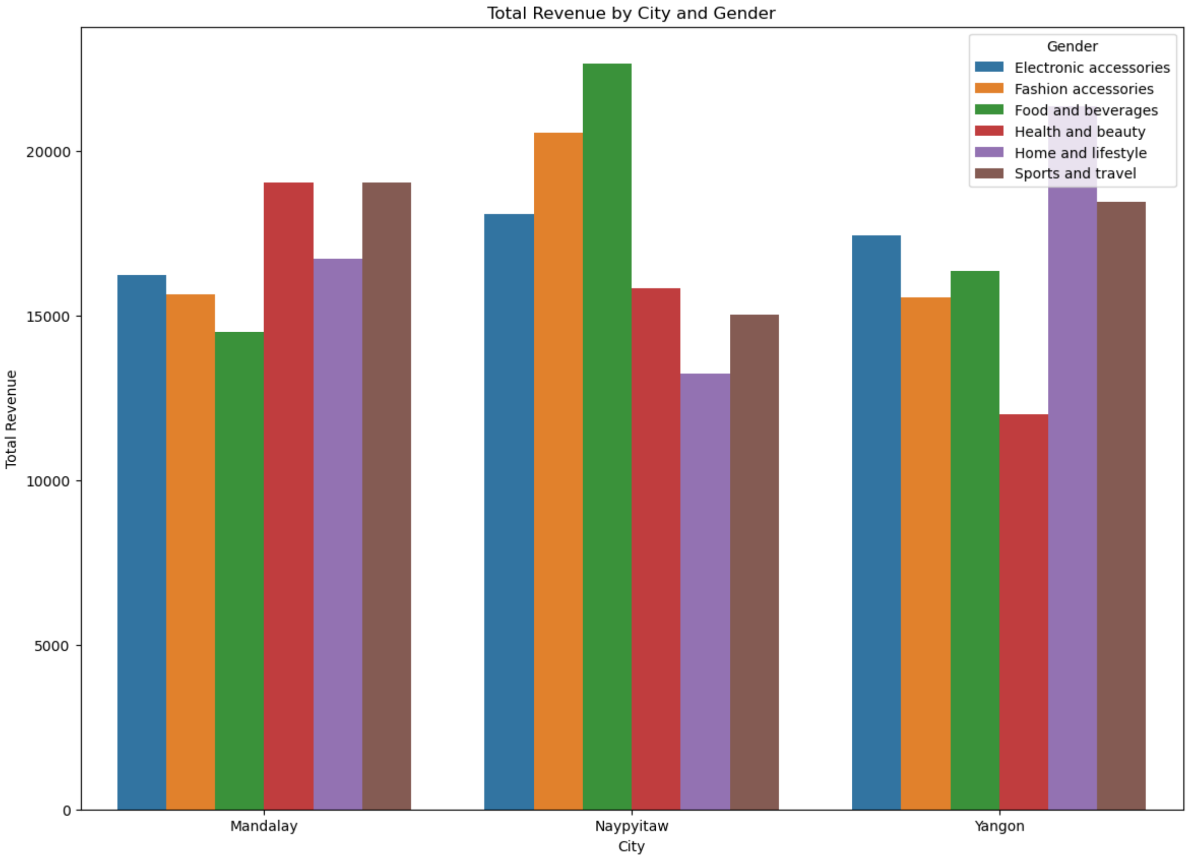
Out[187]:
```
Product line
Electronic accessories    51750.03
Fashion accessories       51719.90
Food and beverages        53471.28
Health and beauty         46851.18
Home and lifestyle        51297.06
Sports and travel         52497.93
Name: Revenue, dtype: float64
```

In [212]:
```
city_gender_grouped = df.groupby(['Product line', 'Gender']).agg({
    'Revenue': 'sum',
    'Quantity': 'sum',
    'Rating': 'mean'
}).reset_index()

# Create a bar plot with total revenue on the y-axis
plt.figure(figsize=(14, 10))
sns.barplot(x='Product line', y='Revenue', hue='Gender', data=city_
plt.title('Total Revenue by City and Gender')
plt.xlabel('Product line')
plt.ylabel('Total Revenue')
plt.legend(title='Gender')
plt.show()
```



In [210]:

```
city_gender_grouped = df.groupby(['City', 'Product line']).agg({
    'Revenue': 'sum',
    'Quantity': 'sum',
    'Rating': 'mean'
}).reset_index()

# Create a bar plot with total revenue on the y-axis
plt.figure(figsize=(14, 10))
sns.barplot(x='City', y='Revenue', hue='Product line', data=city_ge
plt.title('Total Revenue by City and Gender')
plt.xlabel('City')
plt.ylabel('Total Revenue')
plt.legend(title='Gender')
plt.show()
```



Health and beauty sales is low in Yangon city, improvement in advertisement of product of health and beauty can be improved