Customer Spend Project

Customer spend project is a detailed analysis of a imaginative store's ideal customers. It helps a business to better understand its customer's spending. The owner of a store gets information about it's Customers through membership cards. Data source: kaggle

The project seeks to answer the following questions from the store's data:

1. Which gender visited the store most and actually spent?
2. Which age group spends more money in the shop?
3. Are Store customers more of small or larger families?
4. What class of profession spends more in the store?

In [476…

```
#importing libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# # exporting html
# import plotly.io as pio
# pio.renderers.default ='notebook'

# # exporting PDF
# !pip install pyppeteer
# !pyppeteer-install
```

In [60]:

```
#importing data set
cust = pd.read_csv(r"C:\Users\MR FEM\Desktop\Data Analytics\iPractise\possible projects
cust.head(2)
```

Out[60]:

	CustomerID	Gender	Age	Annual Income ($)	Spending Score (1-100)	Profession	Work Experience	Family Size
0	1	Male	19	15000	39	Healthcare	1	4
1	2	Male	21	35000	81	Engineer	3	3

Exploratory Data Analysis of customer dataframe

In [61]:

```
cust.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2000 entries, 0 to 1999
Data columns (total 8 columns):
 #   Column                  Non-Null Count  Dtype 
---  ------                  --------------  ----- 
 0   CustomerID              2000 non-null   int64 
 1   Gender                  2000 non-null   object
 2   Age                     2000 non-null   int64 
 3   Annual Income ($)       2000 non-null   int64 
 4   Spending Score (1-100)  2000 non-null   int64 
 5   Profession              1965 non-null   object
 6   Work Experience         2000 non-null   int64 
 7   Family Size             2000 non-null   int64 
dtypes: int64(6), object(2)
memory usage: 125.1+ KB
```

In [62]:
```
cust.columns
```

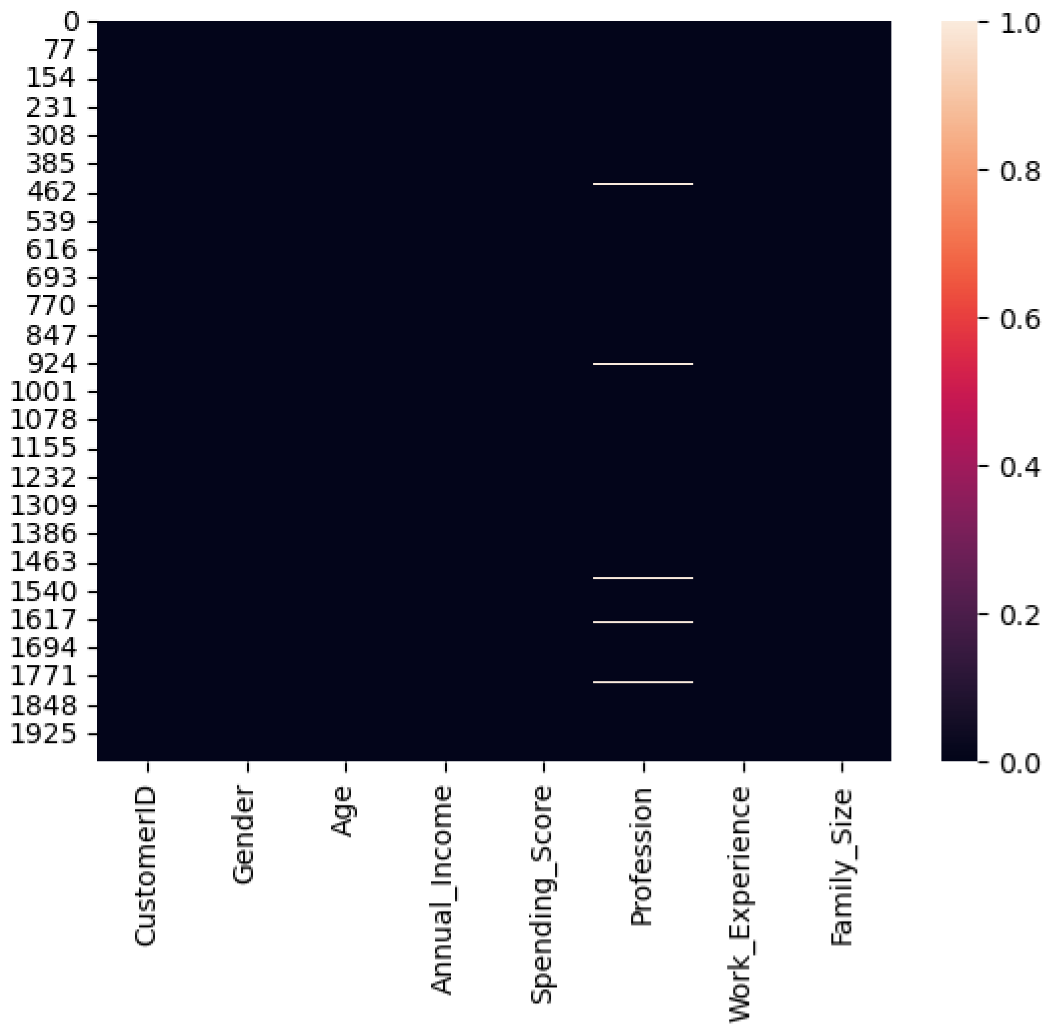
Out[62]:
```
Index(['CustomerID', 'Gender', 'Age', 'Annual Income ($)',
       'Spending Score (1-100)', 'Profession', 'Work Experience',
       'Family Size'],
      dtype='object')
```

In [63]:
```
#Renaming columns for uniformity
cust.rename(columns = {'Annual Income ($)': 'Annual_Income', 'Spending Score (1-100)': '
                  'Work Experience':'Work_Experience', 'Family Size': 'Family_Size'}, in
cust.head(2)
```

Out[63]:

	CustomerID	Gender	Age	Annual_Income	Spending_Score	Profession	Work_Experience	Family_Size
0	1	Male	19	15000	39	Healthcare	1	4
1	2	Male	21	35000	81	Engineer	3	3

In [64]:
```
#identifying null via heatmap
sns.heatmap(cust.isnull())
plt.show()
```



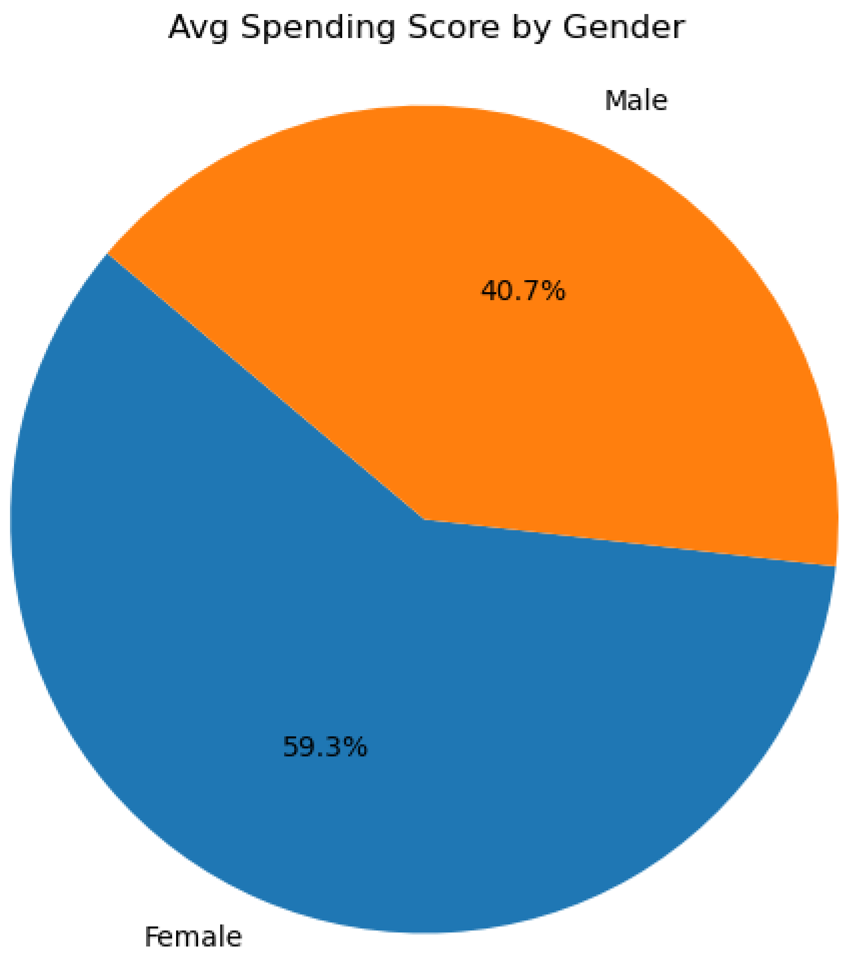
Q1. Which gender visited the store most and actually spent?

In [253…
```
# cust.head(2)
custGender = cust.groupby(['Gender'])['Spending_Score'].count()
custGender
```

Out[253]:
```
Gender
Female    1186
```

```
Male        814
Name: Spending_Score, dtype: int64
```

In [200…
```
plt.figure(figsize=(8, 6))
plt.pie(custGender, labels=custGender.index, autopct='%1.1f%%', startangle=140)
plt.title('Avg Spending Score by Gender')
plt.axis('equal')
plt.show()
```



Answer 1: 59.3% of the women spent more money than the male shoppers

Q2. Which age group spends more money in the shop?

In [259…
```
#identifying the maximum and minimum age in the data frame.
# cust.head(2)
min_age = cust['Age'].min()
max_age = cust['Age'].max()
print('minimum age:', min_age)
print('maximum age:', max_age)
```

```
minimum age: 0
maximum age: 99
```

In [92]:
```
#classifying age into 4 categories namely: Young, Adult, Senior and Veteran
def AgeCat(Age):
    if Age <= 25:
        return "Young"
    elif Age <=50:
        return "Adult"
    elif Age <= 75:
        return "Senior"
    else:
        return "Veteran"
```

In [295…

```
#Adding the Age_Category column into the original data frame
# cust.head(2)
cust['Age_Category'] = cust['Age'].apply(AgeCat)
cust
```

Out[295]:

	CustomerID	Gender	Age	Annual_Income	Spending_Score	Profession	Work_Experience	Family_Size	A
0	1	Male	19	15000	39	Healthcare	1	4	
1	2	Male	21	35000	81	Engineer	3	3	
2	3	Female	20	86000	6	Engineer	1	1	
3	4	Female	23	59000	77	Lawyer	0	2	
4	5	Female	31	38000	40	Entertainment	2	6	
...	...	...	...	...	...	...	...	...	
1995	1996	Female	71	184387	40	Artist	8	7	
1996	1997	Female	91	73158	32	Doctor	7	7	
1997	1998	Male	87	90961	14	Healthcare	9	2	
1998	1999	Male	77	182109	4	Executive	7	2	
1999	2000	Male	90	110610	52	Entertainment	5	2	

2000 rows × 9 columns

In [158…

```
#dropping a column AgeCategory
cust.head(1)
# cust.drop(['AgeCategory'], axis = 1, inplace = True).reset
```

Out[158]:

	CustomerID	Gender	Age	Annual_Income	Spending_Score	Profession	Work_Experience	Family_Size	Age_Cat
0	1	Male	19	15000	39	Healthcare	1	4	

In [413…

```
# cust.head(2)
# CustAge = cust.groupby(['Age_Category'])['Age_Category', 'Spending_Score'].sum()
# CustAge

cust.groupby(['Age_Category'])['Age_Category','Spending_Score'].sum()
CustAge=CustAge.sort_values(by = ['Spending_Score'], ascending = True)
CustAge
```

```
C:\Users\MR FEM\AppData\Local\Temp\ipykernel_3448\3001180648.py:5: FutureWarning: Indexi
ng with multiple keys (implicitly converted to a tuple of keys) will be deprecated, use
a list instead.
  cust.groupby(['Age_Category'])['Age_Category','Spending_Score'].sum()
```

Out[413]:

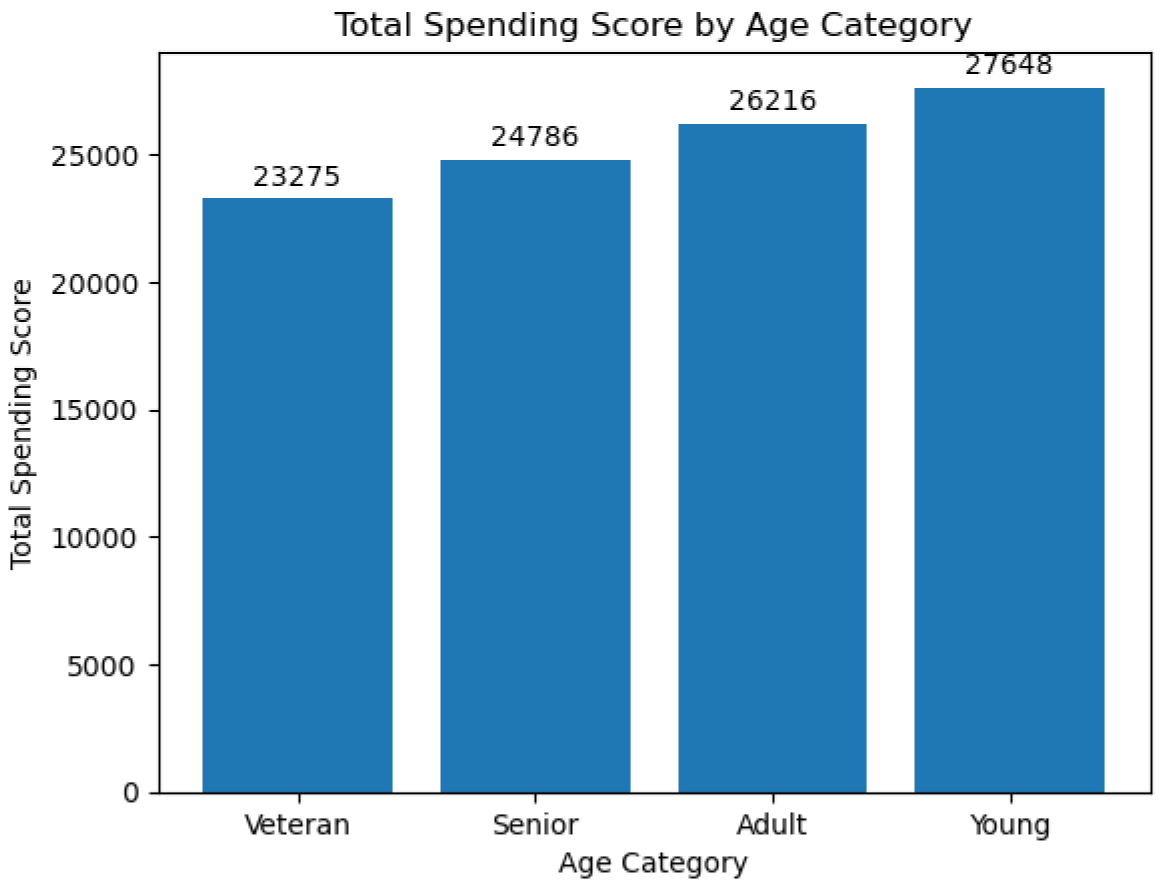
	Spending_Score
Age_Category	
Veteran	23275
Senior	24786
Adult	26216
Young	27648

In [465…

```
# visualizing Total spending score by Age  category

for i, score in enumerate(CustAge['Spending_Score']):
    plt.annotate(f'{score}', (CustAge.index[i], score), textcoords="offset points", xyte

plt.bar(CustAge.index, CustAge['Spending_Score'])
plt.xlabel('Age Category')
plt.ylabel('Total Spending Score')
plt.title('Total Spending Score by Age Category')
plt.xticks(rotation=0)
plt.show()
```



Answer 2: Young people under the age of 25 shopped more at the store

Q3. Are Store customers more of small or larger families?

In [268…

```
#identifying max & min family size
min_fam = cust['Family_Size'].min()
max_fam = cust['Family_Size'].max()
print('minimum fam_size:', min_fam)
print('maximum fam_size:', max_fam)
```

```
minimum fam_size: 1
maximum fam_size: 9
```

In [460…

```
#classifying Family size into 3 categories namely: Small Family, Medium Family and Large
# def FamSizeCat(Family_Size):
#     if Family_Size == 1:
#         return "Individual"
#     elif Family_Size == 2:
#         return "Couple"
#     elif Family_Size <= 5:
#         return "Small Size Family"
#     elif Family_Size <= 7:
```

```
#         return "Medium Size Family"
#     else:
#         return "Large Family"

def FamSizeCat(Family_Size):
    if Family_Size <= 5:
        return "Small Size Family"
    elif Family_Size <= 7:
        return "Medium Size Family"
    else:
        return "Large Family"
```

In [461…

```
#Adding the fam_Category column into the original data frame
# cust.head(2)
cust['Fam_Category'] = cust['Family_Size'].apply(FamSizeCat)
cust.head(2)
```

Out[461]:

	CustomerID	Gender	Age	Annual_Income	Spending_Score	Profession	Work_Experience	Family_Size	Age_Cat
0	1	Male	19	15000	39	Healthcare	1	4	
1	2	Male	21	35000	81	Engineer	3	3	

In [467…

```
CustFam = cust.groupby(['Fam_Category'])['Spending_Score'].mean()
CustFam
# CustFam2=CustFam.sort_values( by = ['Fam_Category']), ascending = True)
```

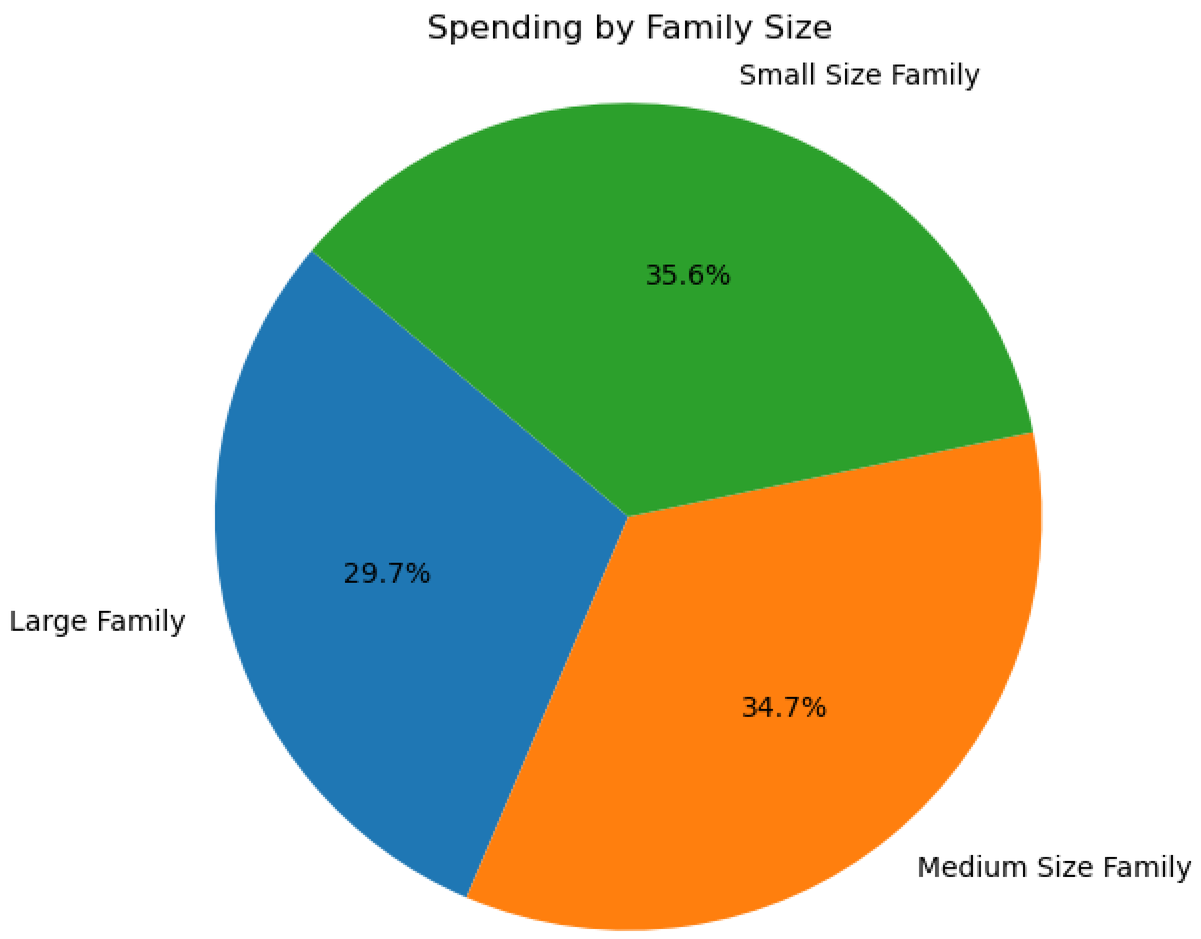
Out[467]:

```
Fam_Category
Large Family          42.800000
Medium Size Family    49.966457
Small Size Family     51.302372
Name: Spending_Score, dtype: float64
```

In [463…

```
# CustFam.head(2)
# visualizing Total spending score by family size

plt.figure(figsize = (8, 6))
plt.pie(CustFam, labels = CustFam.index, autopct='%1.1f%%', startangle=140)
plt.title('Spending by Family Size')
plt.axis('equal')
plt.show()
```



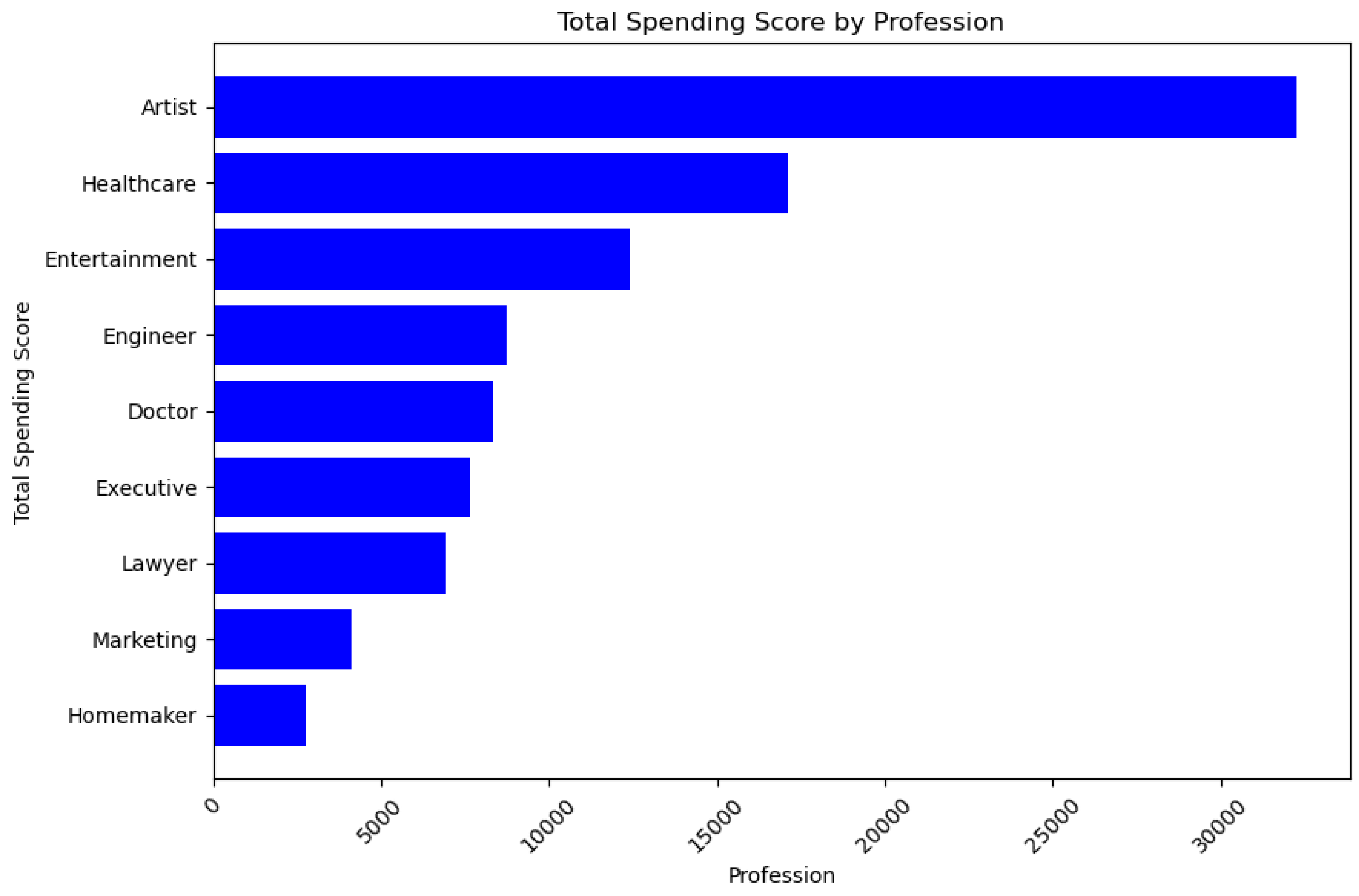
Answer 3: Families less than 5 purchased more at the store

Q4. What class of profession spends more in the store?

```
In [447…
# cust.head(2)
cust.groupby(['Profession']).agg({'Annual_Income':'mean', 'Spending_Score':'sum'}).round
CustProf = cust_prof.sort_values(by = ['Spending_Score'], ascending = True)
CustProf
```

```
In [475…
# visualizing Total spending score by profession
# for i, score in enumerate(CustProf['Spending_Score']):
#     plt.annotate(f'{score}', (CustProf.index[i], score), textcoords="offset points", x

plt.figure(figsize=(9, 6))
plt.barh(CustProf.index, CustProf['Spending_Score'], color='blue')
plt.xlabel('Profession')
plt.ylabel('Total Spending Score')
plt.title('Total Spending Score by Profession')
plt.xticks(rotation=45)
plt.tight_layout()
```



Answer: Artist spent more in the store. Possible increased investment in Art releated stocks.

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