```
import pandas as pd
from bs4 import BeautifulSoup
import requests
from urllib.parse import urljoin
import matplotlib.pyplot as plt
import seaborn as sns
from pymongo import MongoClient
import streamlit as st
import pandas as pd
from pymongo import MongoClient
```

```
BASE_URL = 'https://books.toscrape.com/'
```

```
def get_genre_links():
    response = requests.get(BASE_URL)
    soup = BeautifulSoup(response.text, 'html.parser')
    genre_section = soup.find('ul', class_='nav-list')
    genre_links = genre_section.find_all('a')
    genres = {}
    for link in genre_links[1:]:  # Skip the first link which is 'Books'
        genre_name = link.get_text(strip=True)
        genre_href = link['href']
        full_url = urljoin(BASE_URL, genre_href)
        genres[genre_name] = full_url
    return genres
```

```
def get_books_from_genre(genre_url):
    books = []
    while genre_url:
        response = requests.get(genre_url)
        soup = BeautifulSoup(response.text, 'html.parser')
        book_list = soup.find_all('article', class_='product_pod')
        for book in book_list:
            title = book.h3.a['title']
            price = book.find('p', class_='price_color').get_text()
            availability = book.find('p', class_='instock availability').get_text(strip=True)
            rating = book.p['class'][1]
            product_page = urljoin(genre_url, book.h3.a['href'])
            books.append({
                'Title': title,
                'Price': price,
                'Availability': availability,
                'Rating': rating,
                'Product Page': product_page
            })
        # Check for next page
        next_button = soup.find('li', class_='next')
        if next_button:
            next_href = next_button.a['href']
            genre_url = urljoin(genre_url, next_href)
        else:
            genre_url = None
    return books
```

```
```

```
def scrape_all_books():
    all_books = []
    genres = get_genre_links()
    for genre, url in genres.items():
        print(f"Scraping genre: {genre}")
        books = get_books_from_genre(url)
        for book in books:
            book['Genre'] = genre
        all_books.extend(books)
    return all_books
```

```
books_data = scrape_all_books()
df = pd.DataFrame(books_data)
df.to_csv('books.csv', index=False)
print("Scraping completed. Data saved to books.csv.")
```

```
Scraping genre: Travel
Scraping genre: Mystery
Scraping genre: Historical Fiction
Scraping genre: Sequential Art
Scraping genre: Classics
Scraping genre: Philosophy
Scraping genre: Romance
Scraping genre: Womens Fiction
Scraping genre: Fiction
Scraping genre: Childrens
Scraping genre: Religion
Scraping genre: Nonfiction
Scraping genre: Music
Scraping genre: Default
Scraping genre: Science Fiction
Scraping genre: Sports and Games
Scraping genre: Add a comment
Scraping genre: Fantasy
Scraping genre: New Adult
Scraping genre: Young Adult
Scraping genre: Science
Scraping genre: Poetry
Scraping genre: Paranormal
Scraping genre: Art
Scraping genre: Psychology
Scraping genre: Autobiography
Scraping genre: Parenting
Scraping genre: Adult Fiction
Scraping genre: Humor
Scraping genre: Horror
Scraping genre: History
Scraping genre: Food and Drink
Scraping genre: Christian Fiction
Scraping genre: Business
Scraping genre: Biography
Scraping genre: Thriller
Scraping genre: Contemporary
Scraping genre: Spirituality
Scraping genre: Academic
Scraping genre: Self Help
Scraping genre: Historical
Scraping genre: Christian
Scraping genre: Suspense
Scraping genre: Short Stories
Scraping genre: Novels
```

```
Scraping genre: Health
Scraping genre: Politics
Scraping genre: Cultural
Scraping genre: Erotica
Scraping genre: Crime
Scraping completed. Data saved to books.csv.
```

```
df.head()
df.dtypes
```

```
Title           object
Price           object
Availability    object
Rating          object
Product Page    object
Genre           object
dtype: object
```

```
#clean the price column
import re
def clean_price(price):
    # Extract numeric part (e.g., '45.17' from 'Â£45.17')
    match = re.search(r'\d+\.\d{2}', price)
    return float(match.group()) if match else None

df['Price'] = df['Price'].apply(clean_price)
```

```
df.head()
df.dtypes
```

```
Title            object
Price           float64
Availability     object
Rating           object
Product Page     object
Genre            object
dtype: object
```

```
#clean titles
def clean_title(title):
    # Replace problematic characters (e.g., â with ')
    title = re.sub(r'â', "'", title)
    # Remove extra whitespace
    title = re.sub(r'\s+', ' ', title).strip()
    return title

df['Title'] = df['Title'].apply(clean_title)
```

```
df.head()
```

	Title	Price	Availability	Rating	Product Page	Genre
0	It's Only the Himalayas	45.17	In stock	Two	https://books.toscrape.com/catalogue/its-only-...	Travel
1	Full Moon over Noah's Ark: An Odyssey to Mount...	49.43	In stock	Four	https://books.toscrape.com/catalogue/full-moon...	Travel
2	See America: A Celebration of Our National Par...	48.87	In stock	Three	https://books.toscrape.com/catalogue/see-ameri...	Travel
3	Vagabonding: An Uncommon Guide to the Art of L...	36.94	In stock	Two	https://books.toscrape.com/catalogue/vagabondi...	Travel
4	Under the Tuscan Sun	37.33	In stock	Three	https://books.toscrape.com/catalogue/under-the...	Travel

```
# check for missing values
missing_values = df.isnull().sum()
print(missing_values)
#check for duplicates
duplicates = df.duplicated().sum()
print(duplicates)
```

```
Title           0
Price           0
Availability    0
Rating          0
Product Page    0
Genre           0
dtype: int64
0
```

```
#Analysis

#Genre Distribution: Count the number of books per genre.
genre_counts = df['Genre'].value_counts()
print(genre_counts)
```

```
Genre
Default               152
Nonfiction            110
Sequential Art         75
Add a comment          67
Fiction                65
Young Adult            54
Fantasy                48
Romance                35
Mystery                32
Food and Drink         30
Childrens              29
Historical Fiction     26
Classics               19
Poetry                 19
History                18
Womens Fiction         17
Horror                 17
Science Fiction        16
Science                14
Music                  13
Business               12
Travel                 11
Philosophy             11
Thriller               11
Humor                  10
Autobiography           9
```

```
Art                    8
Religion               7
Psychology             7
Christian Fiction      6
Spirituality           6
New Adult              6
Sports and Games       5
Biography              5
Self Help              5
Health                 4
Politics               3
Contemporary           3
Christian              3
Historical             2
Paranormal             1
Parenting              1
Adult Fiction          1
Academic               1
Short Stories          1
Suspense               1
Novels                 1
Cultural               1
Erotica                1
Crime                  1
Name: count, dtype: int64
```

```
#Average Price by Genre: Compare the average price of books across genres.
avg_price_by_genre = df.groupby('Genre')['Price'].mean().sort_values()
print(avg_price_by_genre)
```

```
Genre
Crime                10.970000
Academic             13.120000
Adult Fiction        15.360000
Paranormal           15.400000
Erotica              19.190000
Historical           22.830000
Food and Drink       31.414667
Thriller             31.433636
Mystery              31.719062
Business             32.460000
Religion             32.567143
Childrens            32.638276
Science              33.088571
Humor                33.501000
Philosophy           33.558182
Historical Fiction   33.644231
Biography            33.662000
Science Fiction      33.802500
Romance              33.933714
Psychology           34.218571
Nonfiction           34.260182
Christian Fiction    34.385000
Default              34.392697
Sequential Art       34.572267
Spirituality         35.098333
Young Adult          35.449074
Music                35.636923
Add a comment        35.796418
Short Stories        35.880000
Horror               35.949412
Poetry               35.974211
Fiction              36.066615
```

```
Contemporary          36.200000
Classics              36.545263
Cultural              36.580000
Womens Fiction        36.791176
Autobiography         37.053333
History               37.295000
Parenting             37.350000
Art                   38.520000
Fantasy               39.593958
Travel                39.794545
Self Help             40.620000
Sports and Games      41.166000
Christian             42.496667
New Adult             46.383333
Health                51.452500
Politics              53.613333
Novels                54.810000
Suspense              58.330000
Name: Price, dtype: float64
```

```
# convert rating to numeric
rating_map = {'One': 1, 'Two': 2, 'Three': 3, 'Four': 4, 'Five': 5}
df['Rating_Numeric'] = df['Rating'].map(rating_map)
```

```
#Rating Distribution by Genre: Analyze the average rating or rating distribution per genre
avg_rating_by_genre = df.groupby('Genre')['Rating_Numeric'].mean().sort_values()
print(avg_rating_by_genre)
```

```
Genre
Crime                 1.000000
Cultural              1.000000
Paranormal            1.000000
Short Stories         1.000000
Psychology            1.714286
Academic              2.000000
Parenting             2.000000
Biography             2.200000
Science Fiction       2.250000
Politics              2.333333
Contemporary          2.333333
Philosophy            2.363636
Classics              2.473684
Self Help             2.600000
Childrens             2.620690
Romance               2.628571
Christian             2.666667
Horror                2.705882
Thriller              2.727273
Travel                2.727273
Add a comment         2.761194
Default               2.835526
Nonfiction            2.881818
Food and Drink        2.900000
Business              2.916667
Science               2.928571
Mystery               2.937500
History               2.944444
Sequential Art        2.973333
Suspense              3.000000
Autobiography         3.000000
Historical            3.000000
Sports and Games      3.000000
```

```
Fantasy               3.083333
Womens Fiction        3.117647
Religion              3.142857
Music                 3.153846
New Adult             3.166667
Fiction               3.184615
Historical Fiction    3.230769
Young Adult           3.296296
Spirituality          3.333333
Humor                 3.400000
Poetry                3.526316
Art                   3.625000
Health                3.750000
Christian Fiction     4.166667
Adult Fiction         5.000000
Novels                5.000000
Erotica               5.000000
Name: Rating_Numeric, dtype: float64
```

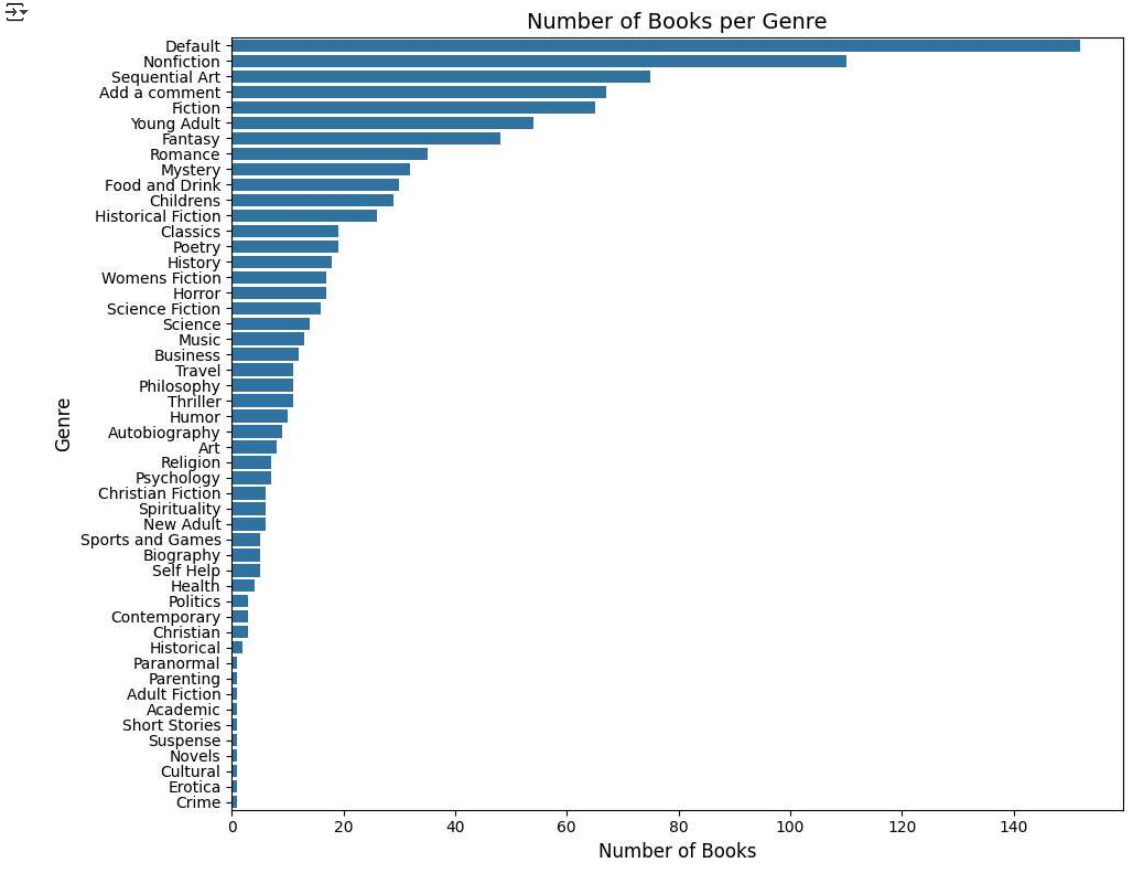
```
#Most Expensive/Cheapest Books: Find the top 5 most expensive and cheapest books.
print("Most Expensive Books:")
print(df[['Title', 'Price', 'Genre']].nlargest(5, 'Price'))
print("\nCheapest Books:")
print(df[['Title', 'Price', 'Genre']].nsmallest(5, 'Price'))
```

```
Most Expensive Books:
                                 Title  Price           Genre
191  The Perfect Play (Play by Play #1)  59.99         Romance
271   Last One Home (New Beginnings #1)  59.98         Fiction
845    Civilization and Its Discontents  59.95      Psychology
925      The Barefoot Contessa Cookbook  59.92  Food and Drink
368           The Diary of a Young Girl  59.90      Nonfiction

Cheapest Books:
                                            Title  Price           Genre
781                        An Abundance of Katherines  10.00     Young Adult
804                             The Origin of Species  10.01         Science
666  The Tipping Point: How Little Things Can Make ...  10.02   Add a comment
77                                       Patience  10.16  Sequential Art
497                           Greek Mythic History  10.23         Default
```

```
#Highest-Rated Books
top_rated = df[df['Rating_Numeric'] == 5][['Title', 'Genre', 'Price']]
print(top_rated)
```

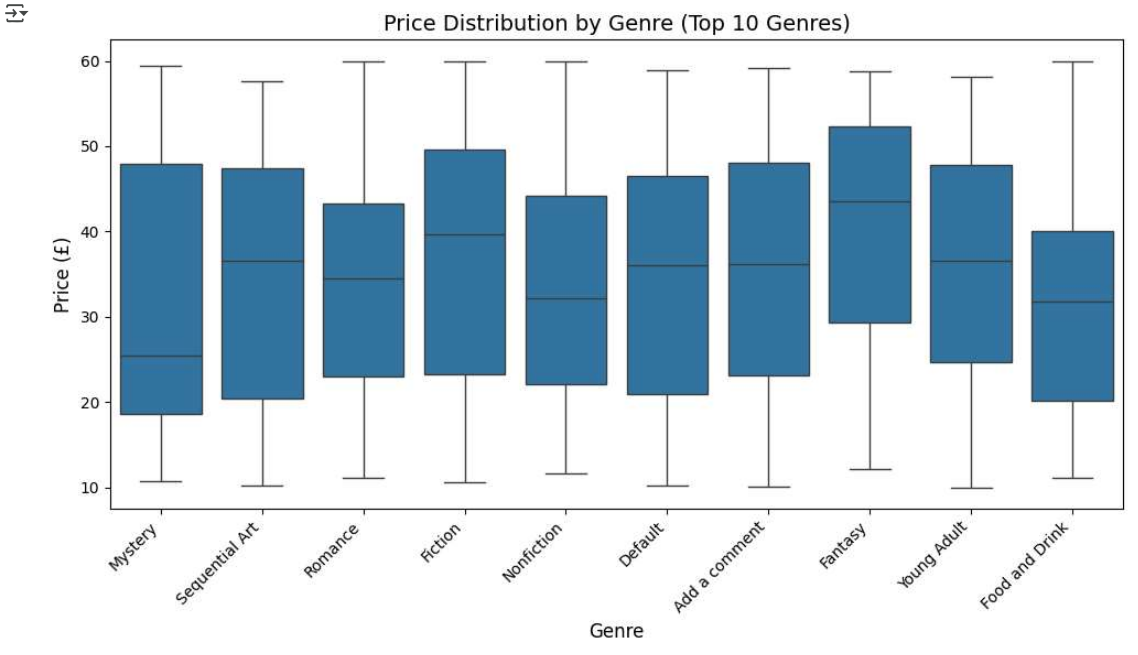
```
                                            Title      Genre  Price
10                  1,000 Places to See Before You Die     Travel  26.08
19              A Time of Torment (Charlie Parker #14)    Mystery  48.35
28   What Happened on Beale Street (Secrets of the ...    Mystery  25.37
29   The Bachelor Girl's Guide to Murder (Herringfo...    Mystery  52.30
33                    The Silkworm (Cormoran Strike #2)    Mystery  23.05
..                                                 ...        ...    ...
984  (Un)Qualified: How God Uses Broken People to D...  Christian  54.00
989  Suzie Snowflake: One beautiful flake (a self-e...     Novels  54.81
992  10-Day Green Smoothie Cleanse: Lose Up to 15 P...     Health  49.71
993     The Art and Science of Low Carbohydrate Living     Health  52.98
998                                      Dark Notes    Erotica  19.19

[196 rows x 3 columns]
```

```
# Visualization 1: Bar Plot - Number of Books per Genre
plt.figure(figsize=(10, 8))
genre_counts = df['Genre'].value_counts()
sns.barplot(x=genre_counts.values, y=genre_counts.index)
plt.title('Number of Books per Genre', fontsize=14)
plt.xlabel('Number of Books', fontsize=12)
plt.ylabel('Genre', fontsize=12)
plt.tight_layout()
plt.savefig('genre_bar_plot.png', dpi=300, bbox_inches='tight')
plt.show()
```



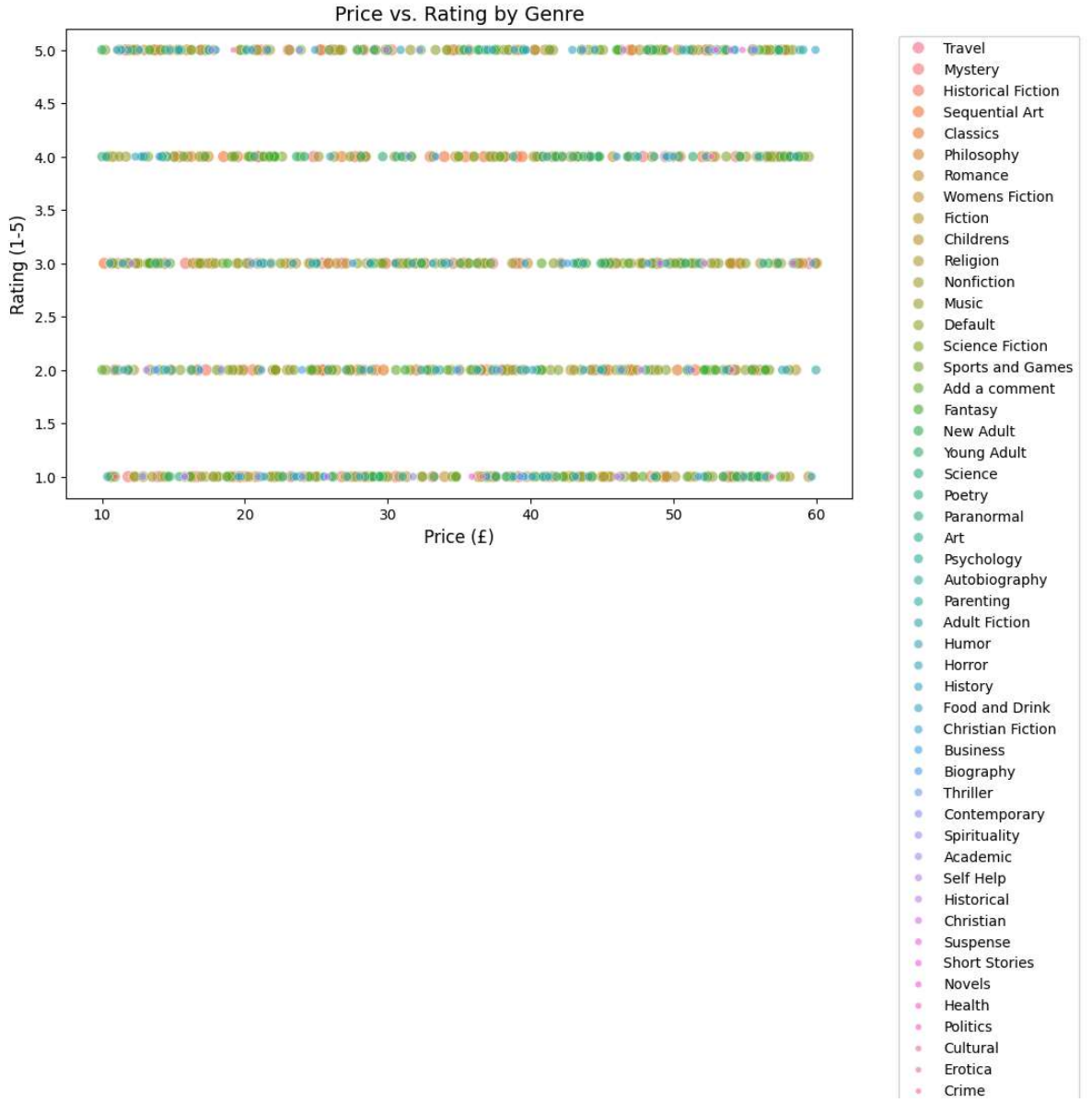

```
# Visualization 2: Box Plot - Price Distribution by Genre (Top 10 Genres)
plt.figure(figsize=(10, 6))
# Filter top 10 genres by book count to make the plot readable
top_genres = genre_counts.head(10).index
df_top_genres = df[df['Genre'].isin(top_genres)]
```

```
sns.boxplot(x='Genre', y='Price', data=df_top_genres)
plt.title('Price Distribution by Genre (Top 10 Genres)', fontsize=14)
plt.xlabel('Genre', fontsize=12)
plt.ylabel('Price (£)', fontsize=12)
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.savefig('price_box_plot.png', dpi=300, bbox_inches='tight')
plt.show()
```

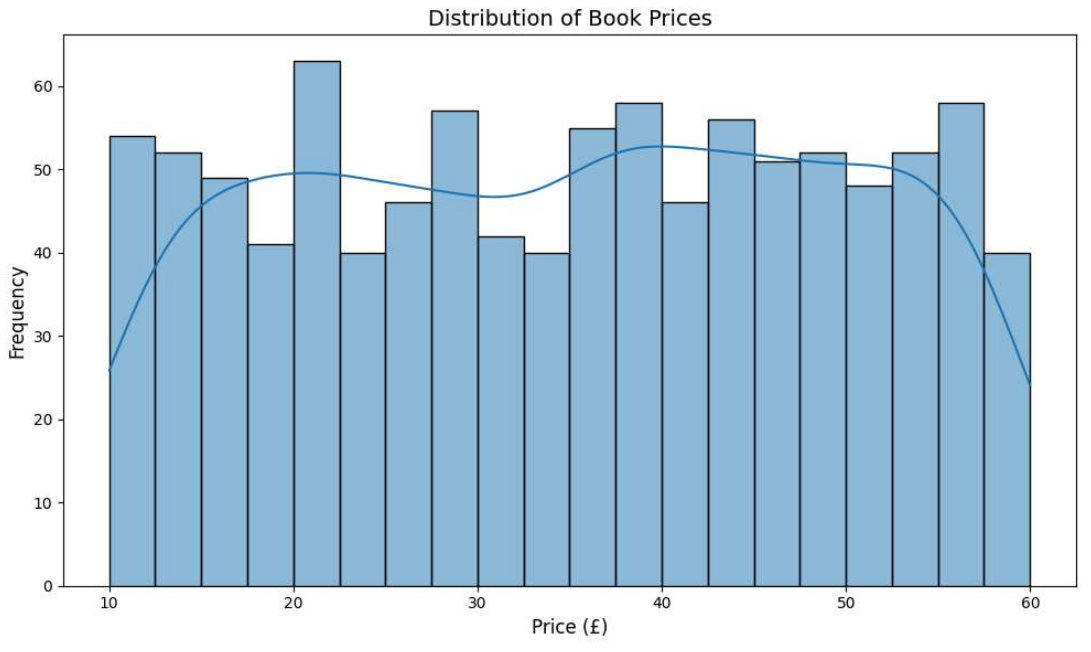



```
# Visualization 3: Scatter Plot - Price vs. Rating
plt.figure(figsize=(10, 6))
sns.scatterplot(x='Price', y='Rating_Numeric', hue='Genre', size='Genre', data=df, alpha=0.6)
plt.title('Price vs. Rating by Genre', fontsize=14)
plt.xlabel('Price (£)', fontsize=12)
plt.ylabel('Rating (1-5)', fontsize=12)
plt.legend(bbox_to_anchor=(1.05, 1), loc='upper left', fontsize=10)
plt.tight_layout()
plt.show()
```

```
C:\Users\Ahmedhelmy\AppData\Local\Temp\ipykernel_10116\3234671763.py:8: UserWarning: Tight layout not applied. The bottom and top margins cannot be made large enough to accommodate all Axes decorations.
  plt.tight_layout()
```



```
# Visualization 4: Histogram - Distribution of Book Prices
plt.figure(figsize=(10, 6))
sns.histplot(df['Price'], bins=20, kde=True)
plt.title('Distribution of Book Prices', fontsize=14)
plt.xlabel('Price (£)', fontsize=12)
plt.ylabel('Frequency', fontsize=12)
plt.tight_layout()
plt.savefig('price_histogram.png', dpi=300, bbox_inches='tight')
plt.show()
```




```
# Connect to the database
client = MongoClient('mongodb://localhost:27017/')
db = client['Library']
collection = db['books']
# Clear existing data
collection.delete_many({})
# Convert DataFrame to list of dictionaries
records = df.to_dict(orient='records')

# Insert the data into MongoDB
collection.insert_many(records)
print("Data successfully stored in MongoDB.")
```

Data successfully stored in MongoDB.