

```
import requests
from bs4 import BeautifulSoup

# Connecting to the site and checking the connection

url = 'http://books.toscrape.com/catalogue/'

print(f"Connecting to {url}...")
response = requests.get(url)

if response.status_code == 200:
    print("Connection Successful!")

    soup = BeautifulSoup(response.text)

    first_book = soup.find('article', |

        title = first_book.find('h3').find('a').get('title')
        price = first_book.find('p', class_='price')

        print("\n--- Extracted Data ---")
        print(f"Book Title: {title}")
        print(f"Price: {price}")

    else:
        print("Error connecting")
```

```
Connecting to http://books.toscrape.com/catalogue/page-1.html...
Connection Successful!

--- Extracted Data ---
Book Title: A Light in the Attic
Price: £51.77
```

```
# Downloading all data and arranging the data
# in a data frame for further analysis

import requests
from bs4 import BeautifulSoup
import pandas as pd
import time
import random

star_map = {'One': 1, 'Two': 2, 'Three': 3, 'Four': 4, 'Five': 5}

def get_single_book_data(book_url):
    try:
        response = requests.get(book_url)
```

```
if response.status_code != 200:
    return None

soup = BeautifulSoup(response.text, 'html.parser')

breadcrumbs = soup.find('ul', class_='breadcrumb')
category = breadcrumbs.find_all('li')[2].text.strip()

title = soup.find('h1').text.strip()

star_tag = soup.find('p', class_='star-rating')
if star_tag:

    rating_text = star_tag['class'][1]
    rating = star_map.get(rating_text, 0)
else:
    rating = 0

book_info = {
    'Category': category,
    'Title': title,
    'Rating': rating,
    'Url': book_url
}

table = soup.find('table', class_='table table-striped')
rows = table.find_all('tr')

for row in rows:
    header = row.find('th').text.strip()
    value = row.find('td').text.strip()
    book_info[header] = value

return book_info

except Exception as e:
    print(f"Error scraping book {book_url}: {e}")
    return None

base_catalogue_url = 'http://books.toscrape.com/catalogue/page-{}.html'
base_domain = 'http://books.toscrape.com/catalogue/'

all_books_data = []
total_books_scraped = 0

print(f"Starting Full Crawl with Ratings (Pages 1-50)...")


for page_num in range(1, 51):
    url = base_catalogue_url.format(page_num)

    try:
        response = requests.get(url)
        soup = BeautifulSoup(response.text, 'html.parser')

        articles = soup.find_all('article', class_='product_pod')
```

```
print(f"--- Processing Page {page_num}/50 ({len(articles)} books) --")

for article in articles:
    relative_url = article.find('h3').find('a')['href']
    clean_rel_url = relative_url.replace('../', '')
    full_book_url = base_domain + clean_rel_url

    if 'catalogue' not in full_book_url:
        full_book_url = 'http://books.toscrape.com/catalogue/' + cl

    data = get_single_book_data(full_book_url)

    if data:
        all_books_data.append(data)
        total_books_scraped += 1

        if total_books_scraped % 50 == 0:
            print(f"    > Progress: collected {total_books_scraped} b

time.sleep(0.1)

except Exception as e:
    print(f"CRITICAL ERROR on page {page_num}: {e}")

df = pd.DataFrame(all_books_data)

print("\n--- Mission Complete! ---")
print(f"Total Books: {len(df)}")
print(df.head())

df.to_csv('books_data.csv', index=False)
print("Saved raw data to 'books_data.csv'")
```

```
> Progress: collected 950 books so far...
--- Processing Page 49/50 (20 books) ---
--- Processing Page 50/50 (20 books) ---
> Progress: collected 1000 books so far...
```

--- Mission Complete! ---

Total Books: 1000

	Category	Title	Rating	\
0	Poetry	A Light in the Attic	3	
1	Historical Fiction	Tipping the Velvet	1	
2	Fiction	Soumission	1	
3	Mystery	Sharp Objects	4	
4	History	Sapiens: A Brief History of Humankind	5	

	Url	UPC	\
0	http://books.toscrape.com/catalogue/a-light-in... the-attic-1053632.html	a897fe39b1053632	
1	http://books.toscrape.com/catalogue/tipping-th... e-velvet-1140a.html	90fa61229261140a	
2	http://books.toscrape.com/catalogue/soumission... -1760.html	6957f44c3847a760	
3	http://books.toscrape.com/catalogue/sharp-obje... -48.html	e00eb4fd7b871a48	
4	http://books.toscrape.com/catalogue/sapiens-a-... -50f.html	4165285e1663650f	

	Product Type	Price (excl. tax)	Price (incl. tax)	Tax	\
0	Books	£51.77	£51.77	£0.00	
1	Books	£53.74	£53.74	£0.00	
2	Books	£50.10	£50.10	£0.00	
3	Books	£47.82	£47.82	£0.00	
4	Books	£54.23	£54.23	£0.00	

	Availability	Number of reviews
0	In stock (22 available)	0
1	In stock (20 available)	0
2	In stock (20 available)	0
3	In stock (20 available)	0
4	In stock (20 available)	0

Saved raw data to 'books_data.csv'

df

	Category	Title	Rating	Url
0	Poetry	A Light in the Attic	3	http://books.toscrape.com/catalogue/a-light-in... the Attic
1	Historical Fiction	Tipping the Velvet	1	http://books.toscrape.com/catalogue/tipping-th... the Velvet
2	Fiction	Soumission	1	http://books.toscrape.com/catalogue/soumission... Soumission
3	Mystery	Sharp Objects	4	http://books.toscrape.com/catalogue/sharp-obje... Sharp Objects
4	History	Sapiens: A Brief History of Humankind	5	http://books.toscrape.com/catalogue/sapiens-a-... Sapiens: A Brief History of Humankind
...
995	Classics	Alice in Wonderland (Alice's Adventures in Wonderland)	1	http://books.toscrape.com/catalogue/alice-in-w... Wonderland
996	Sequential Art	Ajin: Demi-Human, Volume 1 (Ajin: Demi-Human #1)	4	http://books.toscrape.com/catalogue/ajin-demi-... Ajin: Demi-Human, Volume 1
997	Historical Fiction	A Spy's Devotion (The Regency Spies of London #1)	5	http://books.toscrape.com/catalogue/a-spys-dev... A Spy's Devotion
998	Mystery	1st to Die (Women's Murder Club #1)	1	http://books.toscrape.com/catalogue/1st-to-die... 1st to Die
999	Travel	1,000 Places to See Before You Die	5	http://books.toscrape.com/catalogue/1000-place... 1,000 Places to See Before You Die

1000 rows × 11 columns

Next steps:

[Generate code with df](#)[New interactive sheet](#)

General information

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 11 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Category        1000 non-null    object  
 1   Title            1000 non-null    object  
 2   Rating           1000 non-null    int64  
 3   Url              1000 non-null    object  
 4   UPC              1000 non-null    object  
 5   Product Type     1000 non-null    object  
 6   Price (excl. tax) 1000 non-null    object  
 7   Price (incl. tax) 1000 non-null    object  
 8   Tax               1000 non-null    object  
 9   Availability     1000 non-null    object  
 10  Number of reviews 1000 non-null    object  
dtypes: int64(1), object(10)
memory usage: 86.1+ KB
```

```
df.to_csv('books_data.csv', index=False, encoding='utf-8')
```

```
data = df.copy()
```

```
data
```

	Category	Title	Rating	Url
0	Poetry	A Light in the Attic	3	http://books.toscrape.com/catalogue/a-light-in... the Attic
1	Historical Fiction	Tipping the Velvet	1	http://books.toscrape.com/catalogue/tipping-th... the Velvet
2	Fiction	Soumission	1	http://books.toscrape.com/catalogue/soumission... Soumission
3	Mystery	Sharp Objects	4	http://books.toscrape.com/catalogue/sharp-obje... Sharp Objects
4	History	Sapiens: A Brief History of Humankind	5	http://books.toscrape.com/catalogue/sapiens-a-... Sapiens: A Brief History of Humankind
...
995	Classics	Alice in Wonderland (Alice's Adventures in Wonderland)	1	http://books.toscrape.com/catalogue/alice-in-w... Wonderland
996	Sequential Art	Ajin: Demi-Human, Volume 1 (Ajin: Demi-Human #1)	4	http://books.toscrape.com/catalogue/ajin-demi-... Ajin: Demi-Human, Volume 1
997	Historical Fiction	A Spy's Devotion (The Regency Spies of London #1)	5	http://books.toscrape.com/catalogue/a-spys-dev... A Spy's Devotion
998	Mystery	1st to Die (Women's Murder Club #1)	1	http://books.toscrape.com/catalogue/1st-to-die... 1st to Die
999	Travel	1,000 Places to See Before You Die	5	http://books.toscrape.com/catalogue/1000-place... 1,000 Places to See Before You Die

1000 rows × 11 columns

Next steps:

[Generate code with data](#)[New interactive sheet](#)

Data cleaning

```
data = df.drop(columns=['Url', 'UPC', ...])
```

```
data.head()
```

	Category	Title	Rating	Product Type	Price (incl. tax)	Availability
0	Poetry	A Light in the Attic	3	Books	£51.77	In stock (22 available)
1	Historical Fiction	Tipping the Velvet	1	Books	£53.74	In stock (20 available)
2	Fiction	Soumission	1	Books	£50.10	In stock (20 available)
3	Mystery	Sharp Objects	4	Books	£47.82	In stock (20 available)
4	History	Sapiens: A Brief History of Humankind	5	Books	£54.23	In stock (20 available)

Next steps: [Generate code with data](#)

[New interactive sheet](#)

```
data['Price'] = data['Price (incl. tax)'].str.replace('£', '').str.replace(' ', '')
data['Price'] = pd.to_numeric(data['Price'])
data = data.drop(columns=['Price (incl. tax)'])
```

```
data.head()
```

	Category	Title	Rating	Product Type	Availability	Price
0	Poetry	A Light in the Attic	3	Books	In stock (22 available)	51.77
1	Historical Fiction	Tipping the Velvet	1	Books	In stock (20 available)	53.74
2	Fiction	Soumission	1	Books	In stock (20 available)	50.10
3	Mystery	Sharp Objects	4	Books	In stock (20 available)	47.82
4	History	Sapiens: A Brief History of Humankind	5	Books	In stock (20 available)	54.23

Next steps: [Generate code with data](#) [New interactive sheet](#)

```
temp_step = data['Availability'].str.split('(', expand=True)[1]

data['In stock'] = temp_step.str.split(' ', expand=True)[0]

data['In stock'] = pd.to_numeric(data['In stock']).fillna(0).astype(int)

data = data.drop(columns=['Availability'])
```

	Category	Title	Rating	Product Type	Price	In stock
0	Poetry	A Light in the Attic	3	Books	51.77	22
1	Historical Fiction	Tipping the Velvet	1	Books	53.74	20
2	Fiction	Soumission	1	Books	50.10	20
3	Mystery	Sharp Objects	4	Books	47.82	20
4	History	Sapiens: A Brief History of Humankind	5	Books	54.23	20

Next steps: [Generate code with data](#) [New interactive sheet](#)

```
# General information
```

```
data.head()
```

	Category	Title	Rating	Product Type	Price	In stock	grid icon	chart icon
0	Poetry	A Light in the Attic	3	Books	51.77	22		
1	Historical Fiction	Tipping the Velvet	1	Books	53.74	20		
2	Fiction	Soumission	1	Books	50.10	20		
3	Mystery	Sharp Objects	4	Books	47.82	20		
4	History	Sapiens: A Brief History of Humankind	5	Books	54.23	20		

Next steps: [Generate code with data](#) [New interactive sheet](#)

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 6 columns):
 #   Column           Non-Null Count  Dtype  
 ---  -- 
 0   Category        1000 non-null   object 
 1   Title            1000 non-null   object 
 2   Rating           1000 non-null   int64  
 3   Product Type    1000 non-null   object 
 4   Price            1000 non-null   float64
 5   In stock         1000 non-null   int64  
dtypes: float64(1), int64(2), object(3)
memory usage: 47.0+ KB
```

```
data.describe()
```

	Rating	Price	In stock	
count	1000.000000	1000.000000	1000.000000	
mean	2.923000	35.07035	8.585000	
std	1.434967	14.44669	5.654622	
min	1.000000	10.00000	1.000000	
25%	2.000000	22.10750	3.000000	
50%	3.000000	35.98000	7.000000	
75%	4.000000	47.45750	14.000000	
max	5.000000	59.99000	22.000000	

```
# Macro analysis
```

```
data['Revenue'] = data['Price'] * data['In stock']
```

```
data.head()
```

	Category	Title	Rating	Product Type	Price	In stock	Revenue	
								
0	Poetry	A Light in the Attic	3	Books	51.77	22	1138.94	
1	Historical Fiction	Tipping the Velvet	1	Books	53.74	20	1074.80	
2	Fiction	Soumission	1	Books	50.10	20	1002.00	
3	Mystery	Sharp Objects	4	Books	47.82	20	956.40	
4	History	Sapiens: A Brief History of Humankind	5	Books	54.23	20	1084.60	

Next steps: [Generate code with data](#) [New interactive sheet](#)

```
# Total Inventory Value
```

```
Total_Inventory_Value = data['Revenue'].sum()
```

```
print(f"Total Inventory Value: {Total_Inventory_Value:.2f}")
```

```
Total Inventory Value: £300188.27
```

```
# Category Dominance
```

```
Category_Dominance = data.groupby('Category').count()['Title'].sort_values(ascending=False).head(10)
```

Category	Title
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

```
dtype: int64
```

```
category_inventory = data.groupby('Category').sum().reset_index()
print("--- Top 10 Categories by Total Inventory ---")
category_inventory.head(10)
```

```
--- Top 10 Categories by Total Inventory ---
```

In stock

Category

Default	1345
----------------	------

```
# Price Distribution
```

Sequential Art 888

```
mean_price = data['Price'].mean()
median_price = data['Price'].median()
min_price = data['Price'].min()
max_price = data['Price'].max()
```

```
print("Price Statistics:")
print(f"Mean Price: {mean_price:.2f}")
print(f"Median Price: {median_price:.2f}")
print(f"Price Range: {min_price} - {max_price}")
```

Romance 269
Price Statistics:
 Mean Price: £35.07
dtype: int64
 Median Price: £35.98
 Price Range: £10.0 - £59.99

```
bins = [0, 20, 40, 100]
labels = ['Budget (<£20)', 'Standard (£20-£40)', 'Premium (>£40)']
data['Price_Tier'] = pd.cut(data['Price'], bins=bins, labels=labels)
```

```
print("\nInventory by Price Tier:")
data['Price_Tier'].value_counts(normalize=True) * 100
```

Inventory by Price Tier:

proportion

Price_Tier

Premium (>£40)	40.3
Standard (£20-£40)	40.1
Budget (<£20)	19.6

dtype: float64

```
from numpy import exp
import matplotlib.pyplot as plt
import seaborn as sns
```

```
counts = data['Price_Tier'].value_counts()
labels = counts.index
sizes = counts.values
```

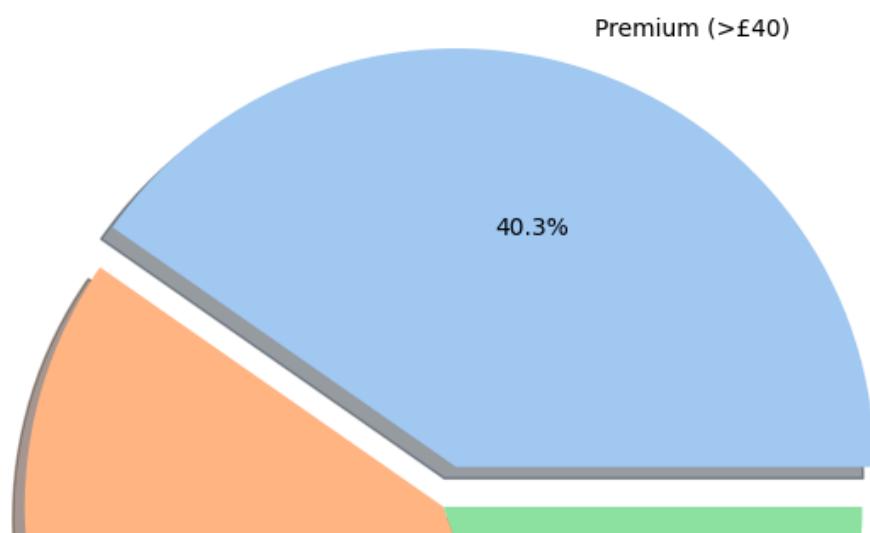
```
plt.figure(figsize=(8, 8))

colors = sns.color_palette('pastel')[0:len(labels)]

plt.pie(sizes,
        labels = labels,
        colors = colors,
        autopct = '%1.1f%%',
        explode = (0.1, 0, 0),
        shadow=True)

plt.title('Inventory by Price Tier', fontsize=16)
plt.show()
```

Inventory by Price Tier



Rating Analysis

```
avg_rating = data['Rating'].mean()
print(f"Average Rating: {avg_rating:.2f} / 5.0")
```

Average Rating: 2.92 / 5.0

```
rating_dist = data['Rating'].value_counts(normalize=True).sort_index() * 100
print("\nDetailed Distribution (%):")
rating_dist
```

Detailed Distribution (%):

proportion

Rating

1	22.6
2	19.6
3	20.3
4	17.9
5	19.6

dtype: float64

```
plt.figure(figsize=(8, 5))
sns.countplot(x='Rating', data=data, palette='coolwarm')

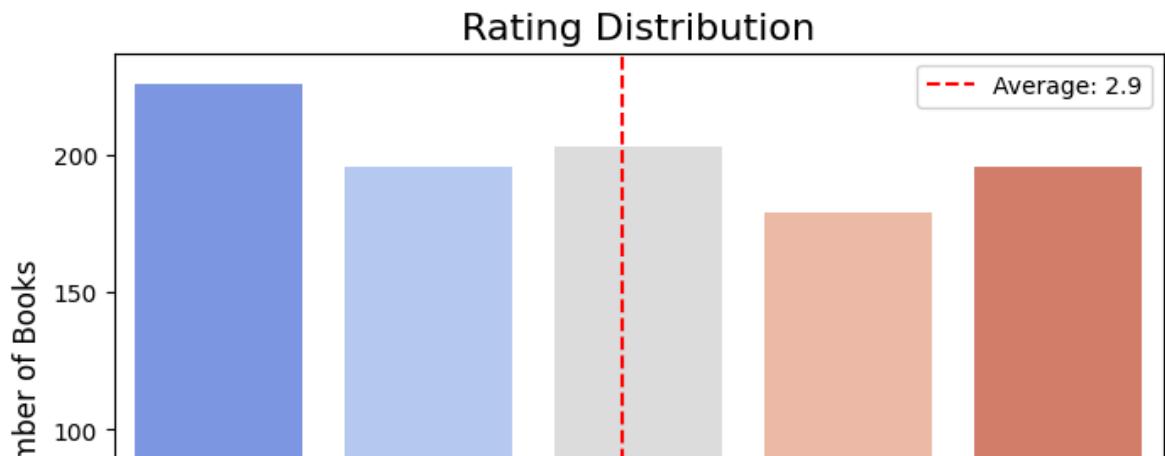
plt.title('Rating Distribution', fontsize=16)
plt.xlabel('Star Rating', fontsize=12)
plt.ylabel('Number of Books', fontsize=12)

plt.axvline(avg_rating - 1, color='red', linestyle='--', label=f'Average: {avg_rating:.1f}')
plt.legend()
plt.show()
```

/tmp/ipython-input-3585619309.py:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in a future version.

```
sns.countplot(x='Rating', data=data, palette='coolwarm')
```



Macro analysis

Price vs. Rating analysis -
Do Higher Ratings Cost More?

```
rating_mean_price = data.groupby('Rating')  
print("\nPrice vs. Rating:")  
rating_mean_price
```

Price vs. Rating:

Rating	Price
1	34.561195
2	34.810918
3	34.692020
4	36.093296
5	35.374490

dtype: float64

```
correlation = data['Rating'].corr(data['Price'])  
correlation  
  
np.float64(0.028166239485873015)
```

```
# The averages are pretty much the same  
# across all rating levels and the correlation test also produced a number t  
  
# The conclusion is:  
# There is NO relationship between rating and price
```

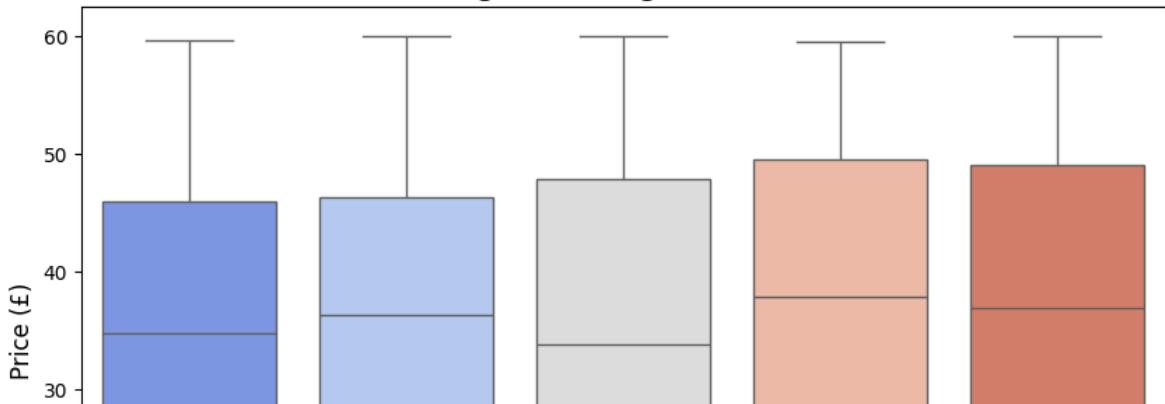
```
import seaborn as sns  
import matplotlib.pyplot as plt  
  
plt.figure(figsize=(10, 6))  
  
sns.boxplot(x='Rating', y='Price', data=data, palette='coolwarm')  
  
plt.title('Do Higher Ratings Cost More?', fontsize=16)  
plt.xlabel('Star Rating (1-5)', fontsize=12)  
plt.ylabel('Price (£)', fontsize=12)  
  
plt.show()
```

```
/tmp/ipython-input-4022629371.py:6: FutureWarning:
```

Passing `palette` without assigning `hue` is deprecated and will be removed in a future version.

```
sns.boxplot(x='Rating', y='Price', data=data, palette='coolwarm')
```

Do Higher Ratings Cost More?



```
# Category vs. Price
```

```
category_mean_price = data.groupby('Category')['Price'].mean().sort_values(ascending=False)

print("\nCategory vs. Price:")
category_mean_price.head()
```

Category vs. Price:

Category	Price
Suspense	58.330000
Novels	54.810000
Politics	53.613333
Health	51.452500
New Adult	46.383333

dtype: float64

```
# Inventory Levels vs. Price Analysis
```

```
stock_correlation = data['Price'].corr(data['In stock'])

print(f"Stock Management Correlation: {stock_correlation}")
```

Stock Management Correlation: -0.010914066796795583

```
import seaborn as sns
import matplotlib.pyplot as plt
```

```
plt.figure(figsize=(10, 6))

sns.regplot(x='Price', y='In stock', c : 
    scatter_kws={'alpha':0.5,
    line_kws={'color':'red'})

plt.title('Stock Strategy: Inventory L : 
plt.xlabel('Price (£)', fontsize=12)
plt.ylabel('Units in Stock', fontsize=12)

plt.show()
```



```
# Identified inefficiency: The store holds equal inventory for £10 books and
# Need to improve inventory management
```

```
# Find diamonds and mines products
```

```
diamonds = data[(data['Rating'] == 5) & (data['Price'] < 20)]
mines = data[(data['Rating'] == 1) & (data['Price'] > 50)]

print(f"Found {len(diamonds)} Hidden Gems (High Rating, Low Price).")
print(f"Found {len(mines)} Potential Risks (Low Rating, High Price).")
```

```
Found 42 Hidden Gems (High Rating, Low Price).
Found 40 Potential Risks (Low Rating, High Price).
```

```
diamonds[['Title', 'Price', 'Rating', 'In stock']].sort_values(by='Price', a
```

		Title	Price	Rating	In stock	
913		The Zombie Room	19.69	5	1	
662		Outlander (Outlander #1)	19.67	5	4	
200		Dark Notes	19.19	5	15	
537	Counted With the Stars (Out from Egypt #1)		17.97	5	7	
553	The Hobbit (Middle-Earth Universe)		17.80	5	6	

```
mines[['Title', 'Price', 'Rating', 'In stock']].sort_values(by='Price', ascending=True)
```

		Title	Price	Rating	In stock	
133	Thomas Jefferson and the Tripoli Pirates: The ...		59.64	1	15	
393		The Improbability of Love	59.45		11	