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Assignment: Week 9 & 10

The Data Wrangling Workshop: Activity 7.01, page 388

This code scrapes the top 100 ebooks from Project Gutenberg and extracts ebook numbers and titles.

In [4]:
```
#import necessary libraries
import urllib.request, urllib.parse, urllib.error
import requests
from bs4 import BeautifulSoup
import ssl
import re
```

In [6]:
```
#This section downloads the HTML page from Project Gutenberg’s Top 100 Ebook
# Read the HTML from the URL and pass on to BeautifulSoup
top100url = 'https://www.gutenberg.org/browse/scores/top'
response = requests.get(top100url)
```

In [8]:
```
#The function status_check() verifies if the request was successful (HTTP 20
def status_check(r):
    if r.status_code==200:
        print("Success!")
        return 1
    else:
        print("Failed!")
        return -1
```

In [10]:
```
#This function helps check whether the webpage is accessible.
status_check(response)
```

```
Success!
```

Out[10]:
```
1
```

In [12]:
```
#Extract the webpage content and decode it properly
contents = response.content.decode(response.encoding)
soup = BeautifulSoup(contents, 'html.parser')
```

In [14]:
```
#The code initializes lst_links, an empty list to store extracted links (hre

# Empty list to hold all the http links in the HTML page
lst_links=[]
# Find all the href tags and store them in the list of links
```

```
for link in soup.find_all('a'):
    #print(link.get('href'))
    lst_links.append(link.get('href'))
#This part collects all hyperlinks found on the webpage
```

In [16]:
```
lst_links[:30]
```

Out[16]:
```
['/',
 '/about/',
 '/about/',
 '/policy/collection_development.html',
 '/about/contact_information.html',
 '/about/background/',
 '/policy/permission.html',
 '/policy/privacy_policy.html',
 '/policy/terms_of_use.html',
 '/ebooks/',
 '/ebooks/',
 '/ebooks/categories',
 '/ebooks/bookshelf/',
 '/browse/scores/top',
 '/ebooks/offline_catalogs.html',
 '/help/',
 '/help/',
 '/help/copyright.html',
 '/help/errata.html',
 '/help/file_formats.html',
 '/help/faq.html',
 '/policy/',
 '/help/public_domain_ebook_submission.html',
 '/help/submitting_your_own_work.html',
 '/help/mobile.html',
 '/attic/',
 '/donate/',
 '/donate/',
 'pretty-pictures',
 '#books-last1']
```

In [18]:
```
booknum=[]
```

In [20]:
```
#The script iterates through lst_links, extracting numeric ebook identifiers
for i in range(19,119):
    link=lst_links[i]
    link=link.strip()
    # Regular expression to find the numeric digits in the link (href) strir
    n=re.findall('[0-9]+',link)
    if len(n)==1:
        # Append the filenumber casted as integer
        booknum.append(int(n[0]))
```

In [22]:
```
print ("\nThe file numbers for the top 100 ebooks on Gutenberg are shown bel
print(booknum)

#It filters out irrelevant links. It extracts ebook identifiers using regex
```

```
The file numbers for the top 100 ebooks on Gutenberg are shown below
----------------------------------------------------------------------
[1, 1, 7, 7, 30, 30, 84, 2701, 8525, 1342, 1513, 11, 1023, 64317, 145, 2542,
37106, 100, 844, 2641, 174, 67979, 16389, 43, 2554, 26184, 394, 6761, 345, 2
160, 6593, 1259, 4085, 98, 5197, 5200, 76097, 1400, 1998, 16328, 76, 1080, 1
260, 1661, 25344, 4300, 28054, 1232, 3207, 2591, 1952, 41445, 4363, 45, 329
6, 1184, 205, 34901, 2000, 7370, 768, 36034, 1497, 74, 2600, 135, 6130, 172
7, 5740, 76087, 35899, 408, 219, 3300, 8800, 2650, 41360, 3201, 46, 2814, 84
92, 829, 16119, 30254, 55, 120, 2852, 1399, 730, 10676]
```

In [24]:
```
print(soup.text[:2000])
```

To determine the ranking we count the times each file gets downloaded.
Both HTTP and FTP transfers are counted.
Only transfers from ibiblio.org are counted as we have no access to our mirrors log files.
Multiple downloads from the same IP address on the same day count as one download.
IP addresses that download more than 100 files a day are considered
robots and are not considered.
Books made out of multiple files like most audio books are counted
if any file is downloaded.

```
Downloaded Books
2025-05-15897949
last 7 days5813279
last 30 days21959999

Pretty Pictures

Top 100 EBooks yesterday —
  Top 100 Authors yesterday —
  Top 100 EBooks last 7 days —
  Top 100 Authors last 7 days —
  Top 100 EBooks last 30 days —
  Top 100 Authors last 30 days

Top 100 EBooks yesterday

Frankenstein; Or, The Modern Prometheus by Mary Wollstonecraft Shelley (470
4)
Moby Dick; Or, The Whale by Herman Melville (3549)
Eve's Diary, Complete by Mark Twain (2093)
Pride and Prejudice by Jane Austen (2081)
Romeo and Juliet by William Shakespeare (1943)
Alice's Adventures in Wonderland by Lewis Carroll (1865)
Bleak House by Charles Dickens (1852)
The Great Gatsby by F. Scott  Fitzgerald (1651)
Middlemarch by George Eliot (1469)
A Doll's House : a play by Henrik Ibsen (1448)
Little Women; Or, Meg, Jo, Beth, and Amy by Louisa May Alcott (1436)
The Complete Works of William Shakespeare by Wil
```

In [26]:
```python
# Temp empty list of Ebook names
lst_titles_temp=[]
```

In [28]:
```python
#Find index of the "Top 100 EBooks yesterday" section
start_idx=soup.text.splitlines().index('Top 100 EBooks yesterday')
```

In [30]:
```python
# Collecting the 100 ebook titles
for i in range(100):
    lst_titles_temp.append(soup.text.splitlines()[start_idx+2+i])
```

In [32]:
```python
#Clean and Format Ebook Titles
#The script uses regex to extract proper book titles by removing extra chara
lst_titles=[]
for i in range(100):
    id1,id2=re.match('^[a-zA-Z ]*',lst_titles_temp[i]).span()
    lst_titles.append(lst_titles_temp[i][id1:id2])
```

In [34]:
```python
#Finally, the script prints all cleaned ebook titles:

for l in lst_titles:
    print(l)
#Removed unnecessary characters using regex (^[a-zA-Z ]*). Extracts cleaned
```

```
Frankenstein
Moby Dick
Eve
Pride and Prejudice by Jane Austen
Romeo and Juliet by William Shakespeare
Alice
Bleak House by Charles Dickens
The Great Gatsby by F
Middlemarch by George Eliot
A Doll
Little Women
The Complete Works of William Shakespeare by William Shakespeare
The Importance of Being Earnest
A Room with a View by E
The Picture of Dorian Gray by Oscar Wilde
The Blue Castle
The Enchanted April by Elizabeth Von Arnim
The Strange Case of Dr
Crime and Punishment by Fyodor Dostoyevsky
Simple Sabotage Field Manual by United States
Cranford by Elizabeth Cleghorn Gaskell
The Adventures of Ferdinand Count Fathom
Dracula by Bram Stoker
The Expedition of Humphry Clinker by T
History of Tom Jones
Twenty years after by Alexandre Dumas and Auguste Maquet
The Adventures of Roderick Random by T
A Tale of Two Cities by Charles Dickens
My Life
Metamorphosis by Franz Kafka
The art of writing and speaking the English language
Great Expectations by Charles Dickens
Thus Spake Zarathustra
Beowulf
Adventures of Huckleberry Finn by Mark Twain
A Modest Proposal by Jonathan Swift
Jane Eyre
The Adventures of Sherlock Holmes by Arthur Conan Doyle
The Scarlet Letter by Nathaniel Hawthorne
Ulysses by James Joyce
The Brothers Karamazov by Fyodor Dostoyevsky
The Prince by Niccol
Leviathan by Thomas Hobbes
Grimms
The Yellow Wallpaper by Charlotte Perkins Gilman
Frankenstein
Beyond Good and Evil by Friedrich Wilhelm Nietzsche
Anne of Green Gables by L
The Confessions of St
The Count of Monte Cristo by Alexandre Dumas and Auguste Maquet
Walden
On Liberty by John Stuart Mill
Don Quijote by Miguel de Cervantes Saavedra
Second Treatise of Government by John Locke
Wuthering Heights by Emily Bront
White Nights and Other Stories by Fyodor Dostoyevsky
```

```
The Republic by Plato
The Adventures of Tom Sawyer
War and Peace by graf Leo Tolstoy
Les Mis
The Iliad by Homer
The Odyssey by Homer
Tractatus Logico
A day in old Rome
The Philippines a Century Hence by Jos
The Souls of Black Folk by W
Heart of Darkness by Joseph Conrad
An Inquiry into the Nature and Causes of the Wealth of Nations by Adam Smith
The divine comedy by Dante Alighieri
Du c
The Elementary Forms of the Religious Life by
Moby Word Lists by Grady Ward
A Christmas Carol in Prose
Dubliners by James Joyce
The King in Yellow by Robert W
Gulliver
Doctrina Christiana
The Romance of Lust
The Wonderful Wizard of Oz by L
Treasure Island by Robert Louis Stevenson
The Hound of the Baskervilles by Arthur Conan Doyle
Anna Karenina by graf Leo Tolstoy
Oliver Twist by Charles Dickens
The Reign of Greed by Jos
The Works of Edgar Allan Poe
A Study in Scarlet by Arthur Conan Doyle
The Legend of Sleepy Hollow by Washington Irving
Meditations by Emperor of Rome Marcus Aurelius
Winnie
The Social Contract
The Critique of Pure Reason by Immanuel Kant
The Prophet by Kahlil Gibran
Novo dicion
Plutarch
Little Women by Louisa May Alcott
The Kama Sutra of Vatsyayana by Vatsyayana
The lesser Key of Solomon
Riders to the Sea by J
The Problems of Philosophy by Bertrand Russell
The Art of War by active
```

7.2 The Data Wrangling Workshop: Activity 7.02, page 390

In [84]:

```python
import urllib.request, urllib.parse, urllib.error
import json

# Load the secret API key from the JSON file
with open('APIkeys.json') as f:
    keys = json.load(f)
    omdbapi = keys['OMDBapi']
```

In [86]:
```
#serviceurl holds the base API URL. apikey appends the API key for authentic
serviceurl = 'http://www.omdbapi.com/?'
apikey = '&apikey=' + omdbapi
```

In [88]:
```
#The function print_json() extracts specific movie details from the JSON res
#list_keys defines the movie attributes to display.  Iterates through keys i
def print_json(json_data):
    list_keys = ['Title', 'Year', 'Rated', 'Released', 'Runtime', 'Genre', '
                 'Actors', 'Plot', 'Language', 'Country', 'Awards', 'Ratings
                 'Metascore', 'imdbRating', 'imdbVotes', 'imdbID']
    print("-" * 50)
    for k in list_keys:
        if k in list(json_data.keys()):
            print(f"{k}: {json_data[k]}")
    print("-" * 50)
```

In [90]:
```
#The function save_poster() downloads and stores the movie poster.
#Retrieves poster URL from JSON response. Extracts file extension dynamicall
def save_poster(json_data):
    import os
    title = json_data['Title']
    poster_url = json_data['Poster']

    # Extract file extension from poster URL
    poster_file_extension = poster_url.split('.')[-1]

    # Read the image file from the URL
    poster_data = urllib.request.urlopen(poster_url).read()

    savelocation = os.getcwd() + '\\' + 'Posters' + '\\'

    # Create directory if it doesn't exist
    if not os.path.isdir(savelocation):
        os.mkdir(savelocation)

    # Save poster with proper filename
    filename = savelocation + str(title) + '.' + poster_file_extension
    f = open(filename, 'wb')
    f.write(poster_data)
    f.close()
```

In [92]:
```
#The function search_movie() queries OMDB API and retrieves movie data.
"""Builds API query using urllib.parse.urlencode().  Requests movie data fro
Parses JSON response using json.loads(). Handles errors by checking "Respons
If a valid poster is available, downloads it."""
def search_movie(title):
    try:
        # Construct API request URL
        url = serviceurl + urllib.parse.urlencode({'t': str(title)}) + apike
        print(f'Retrieving the data of "{title}" now... ')
        print(url)
        # Fetch movie data
        uh = urllib.request.urlopen(url)
        data = uh.read()
        json_data = json.loads(data)

        # Check if API response is valid
        if json_data['Response'] == 'True':
            print_json(json_data)

            # Ask user if poster should be saved
            if json_data['Poster'] != 'N/A':
                save_poster(json_data)
        else:
            print("Error encountered: ", json_data['Error'])

    except urllib.error.URLError as e:
        print(f"ERROR: {e.reason}")
```

In [96]:
```
#The script searches for "Titanic" and a non-existent "Random_error" movie.
#Calls search_movie("Titanic") - Retrieves data for Titanic. Calls search_mo
search_movie("Titanic")
search_movie("Random_error")
```

```
Retrieving the data of "Titanic" now...
http://www.omdbapi.com/?t=Titanic&apikey=b37a28be
--------------------------------------------------
Title: Titanic
Year: 1997
Rated: PG-13
Released: 19 Dec 1997
Runtime: 194 min
Genre: Drama, Romance
Director: James Cameron
Writer: James Cameron
Actors: Leonardo DiCaprio, Kate Winslet, Billy Zane
Plot: A seventeen-year-old aristocrat falls in love with a kind but poor art
ist aboard the luxurious, ill-fated R.M.S. Titanic.
Language: English, Swedish, Italian, French
Country: United States
Awards: Won 11 Oscars. 126 wins & 83 nominations total
Ratings: [{'Source': 'Internet Movie Database', 'Value': '7.9/10'}, {'Sourc
e': 'Rotten Tomatoes', 'Value': '88%'}, {'Source': 'Metacritic', 'Value': '7
5/100'}]
Metascore: 75
imdbRating: 7.9
imdbVotes: 1,334,872
imdbID: tt0120338
--------------------------------------------------
Retrieving the data of "Random_error" now...
http://www.omdbapi.com/?t=Random_error&apikey=b37a28be
Error encountered:  Movie not found!
```

3. Connect to an API of your choice and do a simple data pull - you can use any API -

In [99]:
```python
import requests
import pandas as pd
```

In [101…
```python
# API base URL
base_url = "https://www.alphavantage.co/query"

# API key
api_key = "19IUCK3K3ZLSIV1G"

# Define tickers for retrieval
tickers = ["AAPL", "MSFT", "GOOGL"]  # Example tickers
```

In [105…
```python
# Placeholder for storing data
api_data = []

for ticker in tickers:
    # Define API request parameters
    params = {
        "function": "TIME_SERIES_DAILY",
        "symbol": ticker,
        "apikey": api_key
    }

    # Perform GET request
    response = requests.get(base_url, params=params)
    data = response.json()

    # Extract time series data if available
    if "Time Series (Daily)" in data:
        time_series = data["Time Series (Daily)"]
        for date, values in time_series.items():
            api_data.append({
                "Ticker": ticker,
                "Date": date,
                "Open": float(values.get("1. open", 0)),
                "High": float(values.get("2. high", 0)),
                "Low": float(values.get("3. low", 0)),
                "Close": float(values.get("4. close", 0)),
                "Volume": int(values.get("5. volume", 0))
            })
    else:
        print(f"Error fetching data for {ticker}: {data.get('Note', 'Unknowr
```

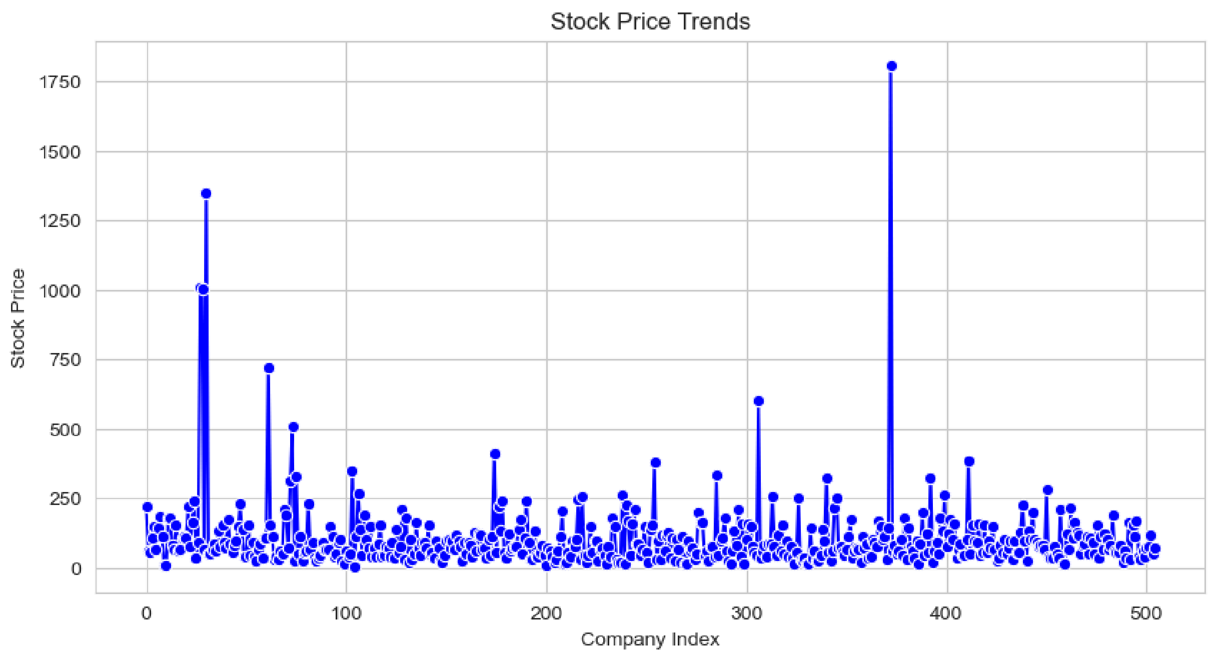
In [107…
```python
# Convert list to DataFrame
api_df = pd.DataFrame(api_data)

# Display subset of cleaned data
print(api_df.head())
```

```
  Ticker        Date    Open      High       Low   Close    Volume
0   AAPL  2025-05-16  212.36  212.5700  209.7700  211.26  53259006
1   AAPL  2025-05-15  210.95  212.9600  209.5400  211.45  45029473
2   AAPL  2025-05-14  212.43  213.9400  210.5801  212.33  49325825
3   AAPL  2025-05-13  210.43  213.4000  209.0000  212.93  51909332
4   AAPL  2025-05-12  210.97  211.2679  206.7500  210.79  63775814
```

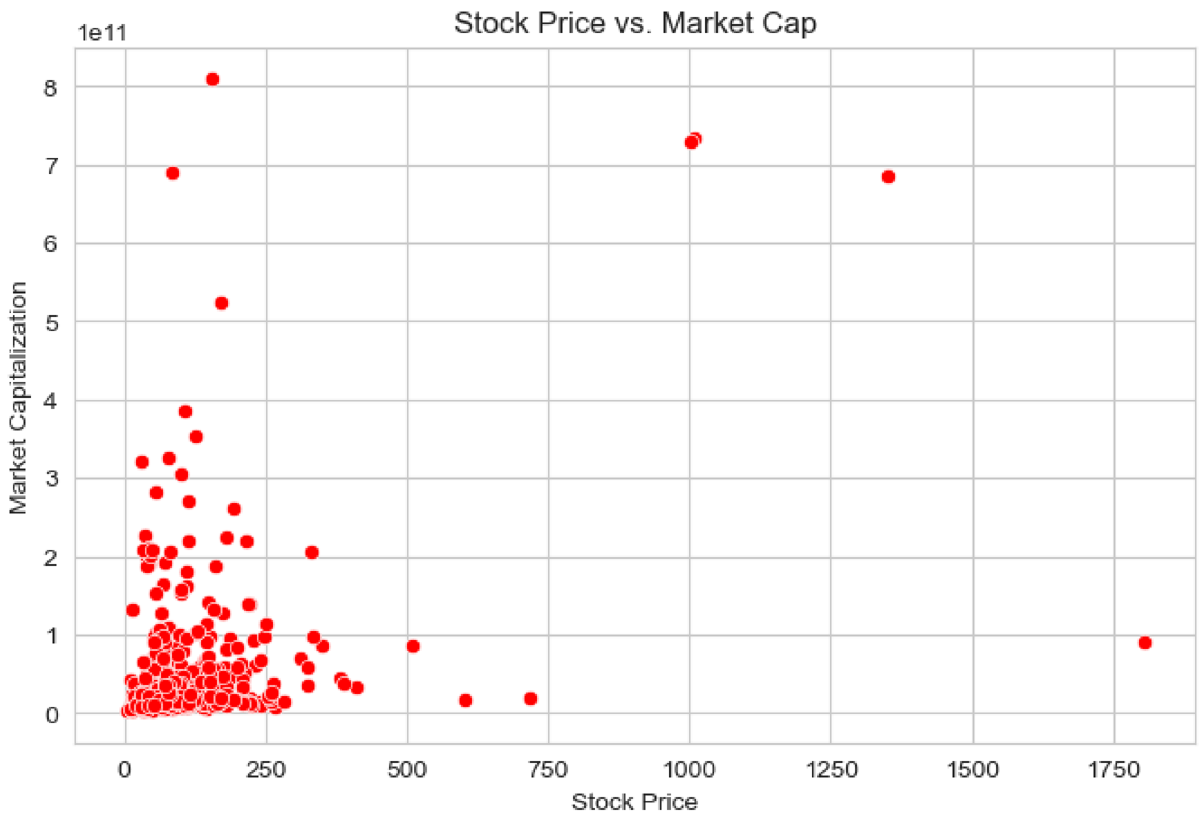
4. Using one of the datasets provided in Weeks 7 & 8, or a dataset of your own, choose 3 of the following visualizations to complete. You must submit via PDF along with your code if you are using Pycharm, otherwise if you submit a notebook file make sure your plots are visible in your notebook or PDF that you submit. You are free to use Matplotlib, Seaborn or another package if you prefer.

In [36]:
```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load Kaggle dataset
kaggle_data = pd.read_csv("/Users/balakrishnamupparaju/Downloads/financials.

# Set style for Seaborn
sns.set_style("whitegrid")
```

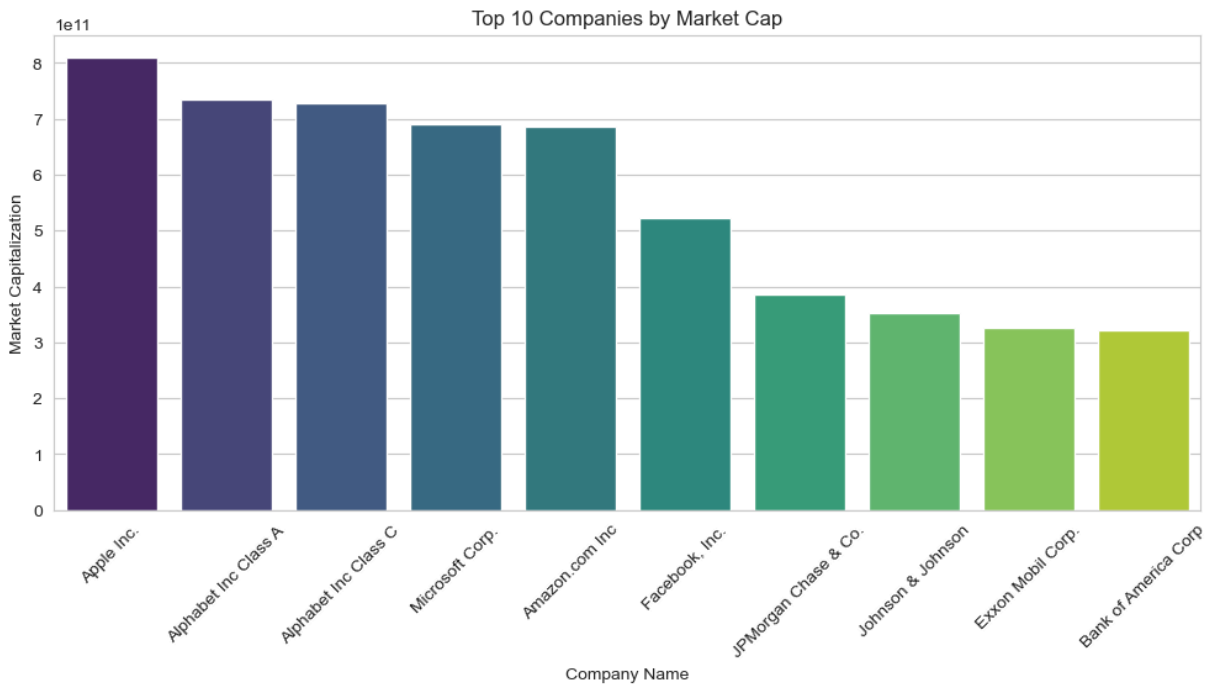
In [37]:
```python
# a. Line Plot (Stock Price Trends
plt.figure(figsize=(10, 5))
sns.lineplot(x=kaggle_data.index, y=kaggle_data["Price"], marker="o", color=

plt.xlabel("Company Index")
plt.ylabel("Stock Price")
plt.title("Stock Price Trends")
plt.show()
```



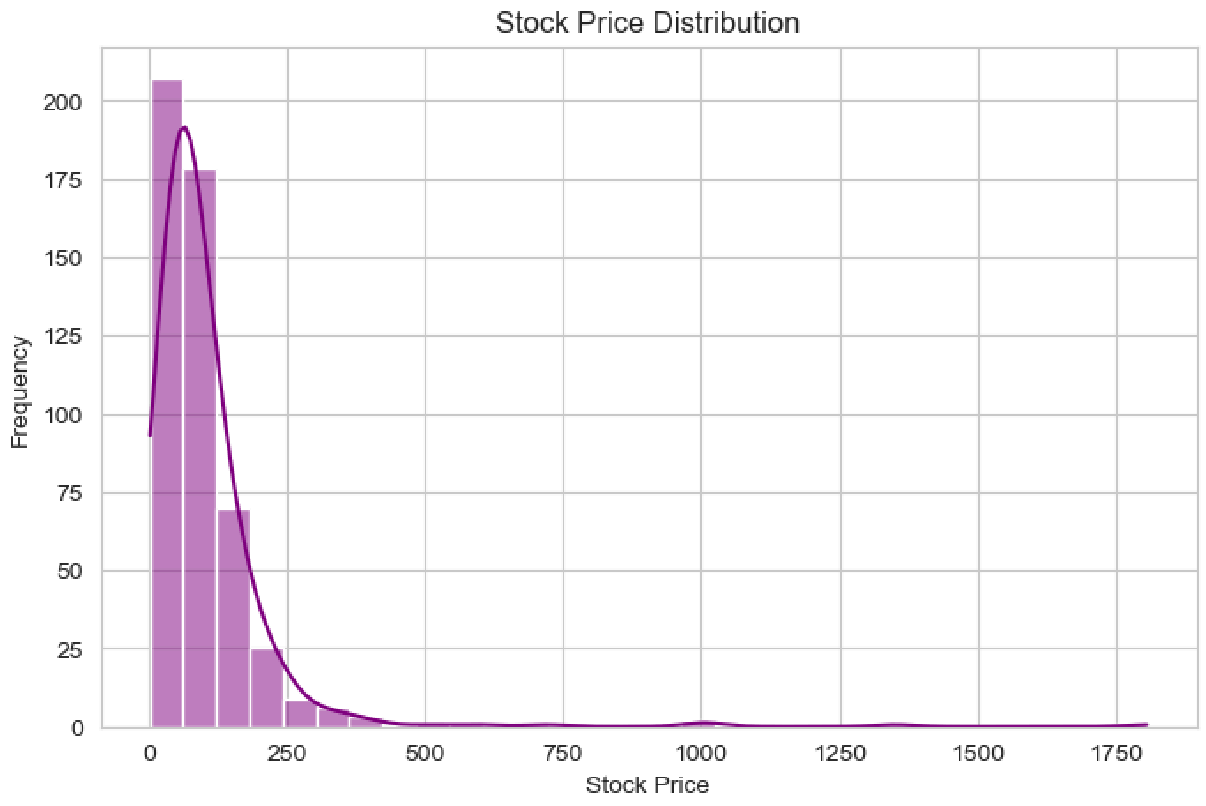
In [40]:
```
#b. Scatter Plot (Price vs. Market Cap)

plt.figure(figsize=(8, 5))
sns.scatterplot(x=kaggle_data["Price"], y=kaggle_data["Market Cap"], color="

plt.xlabel("Stock Price")
plt.ylabel("Market Capitalization")
plt.title("Stock Price vs. Market Cap")
plt.show()
```



In [42]:
```
#c. Bar Plot (Top 10 Companies by Market Cap)

import warnings
warnings.filterwarnings("ignore")
top_10 = kaggle_data.nlargest(10, "Market Cap")

plt.figure(figsize=(12, 5))
sns.barplot(x=top_10["Name"], y=top_10["Market Cap"], palette="viridis")

plt.xticks(rotation=45)
plt.xlabel("Company Name")
plt.ylabel("Market Capitalization")
plt.title("Top 10 Companies by Market Cap")
plt.show()
```

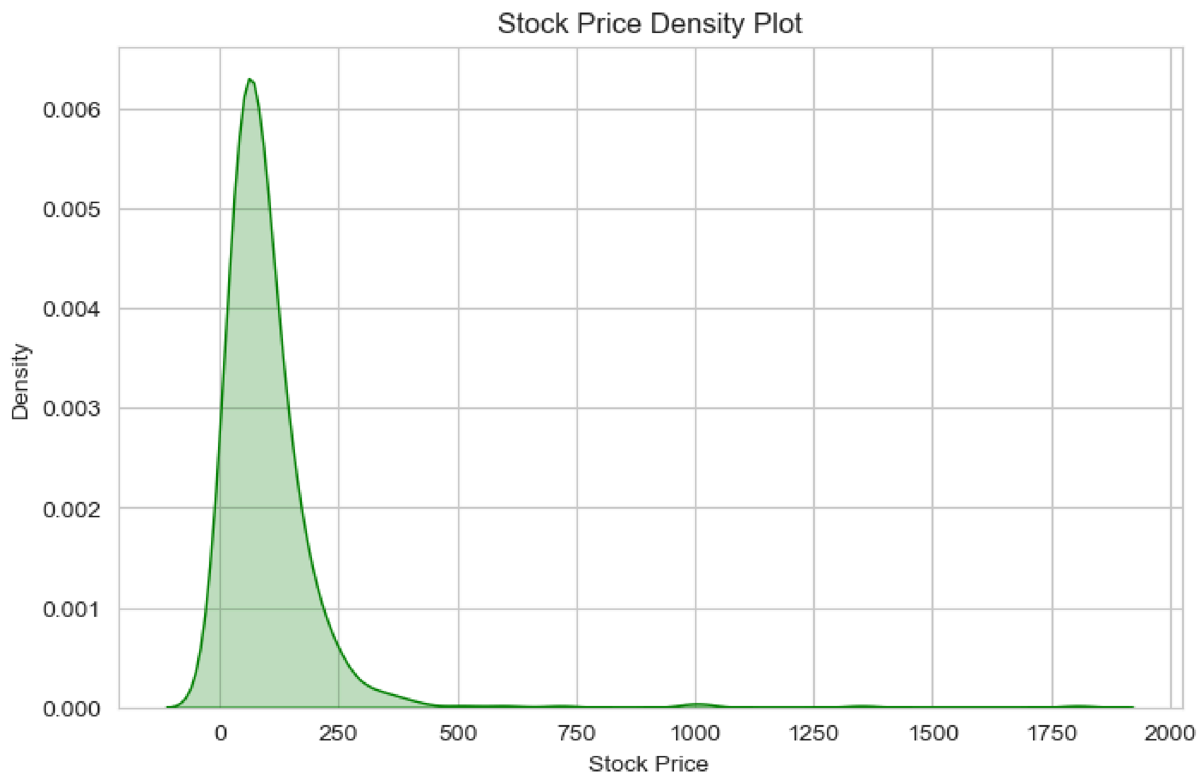


In [44]:
```
#d. Histogram (Stock Price Distribution)
plt.figure(figsize=(8, 5))
sns.histplot(kaggle_data["Price"], bins=30, color="purple", kde=True)

plt.xlabel("Stock Price")
plt.ylabel("Frequency")
plt.title("Stock Price Distribution")
plt.show()
```

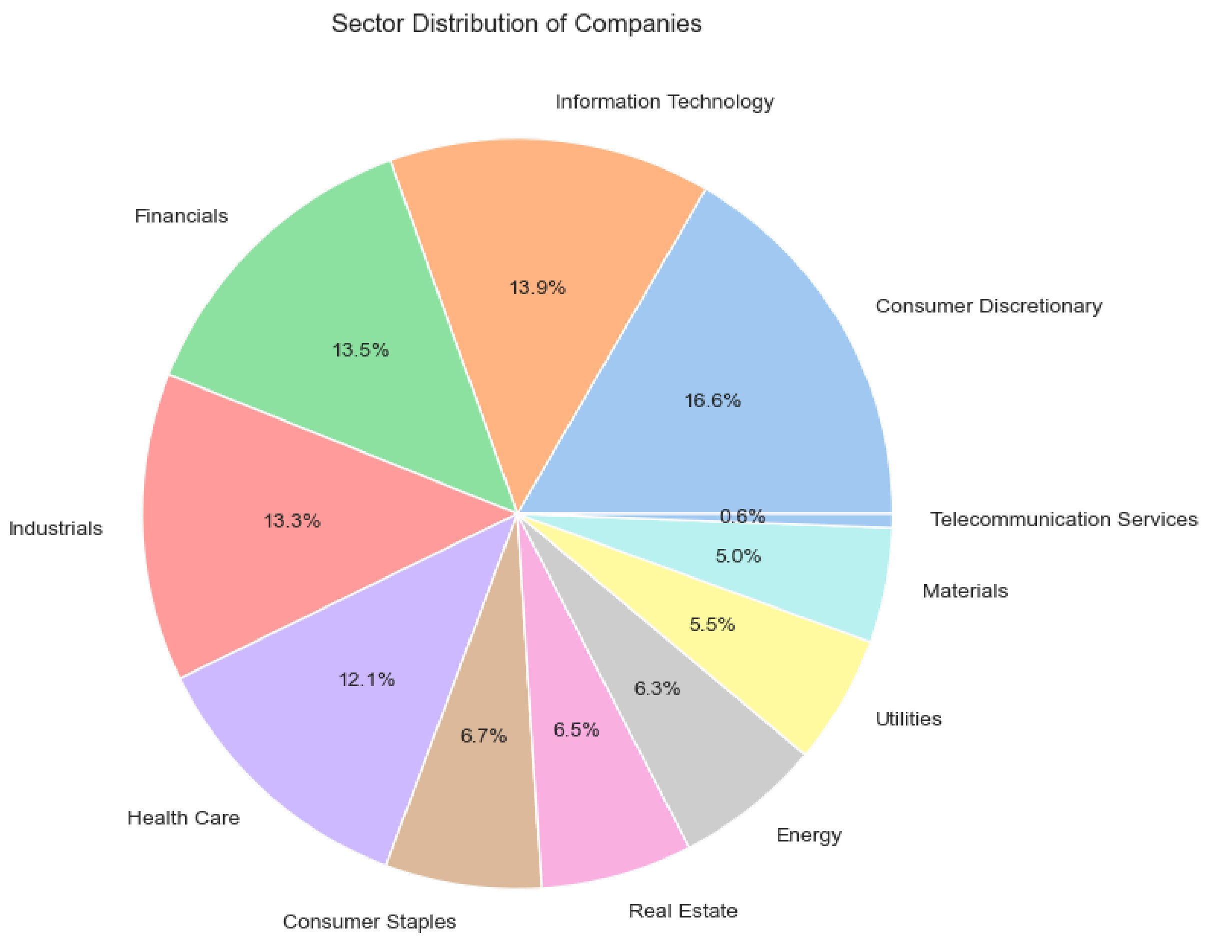


```
In [ ]:
```

```
In [47]: #e. Density Plot (Stock Price Density)
         plt.figure(figsize=(8, 5))
         sns.kdeplot(kaggle_data["Price"], fill=True, color="green")

         plt.xlabel("Stock Price")
         plt.ylabel("Density")
         plt.title("Stock Price Density Plot")
         plt.show()
```



In [49]:
```
#f. Pie Chart (Sector Distribution)
sector_counts = kaggle_data["Sector"].value_counts()

plt.figure(figsize=(8, 8))
plt.pie(sector_counts, labels=sector_counts.index, autopct="%1.1f%%", colors

plt.title("Sector Distribution of Companies")
plt.show()
```


Sector Distribution of Companies
Information Technology
13.9%
Financials
13.5%
Consumer Discretionary
16.6%
Industrials
13.3%
0.6%
Telecommunication Services
5.0%
Materials
5.5%
12.1%
6.3%
Utilities
6.7%
6.5%
Health Care
Energy
Consumer Staples
Real Estate

```
In [ ]:
```