



Web Scraping for Beginners

The First Stage of a Data Science Lifecycle



1. What is Web Scraping?

Web scraping is the process of extracting data from websites automatically, instead of copying it manually.



Example use cases:

- Collecting product prices from e-commerce sites
- Gathering job postings from LinkedIn/Indeed
- Extracting news articles, reviews, or sports data
- Building datasets for machine learning



2. Ethical Considerations

- Always check the website's robots.txt file.
- Scrape only public data.
- Respect rate limits — don't overload servers.
- Use data responsibly.



3. Tools & Libraries for Web Scraping

- **Python Requests** → Send HTTP requests, get web pages
- **BeautifulSoup (bs4)** → Parse HTML, extract data
- **lxml** → Fast HTML/XML parser
- **Selenium** → Automate browsers (for dynamic content)
- **Scrapy** → Full web scraping framework



4. Basic Workflow of Web Scraping

1. **Send Request** → Get the webpage HTML
2. **Parse HTML** → Use a parser to read elements
3. **Extract Data** → Target specific tags, attributes

4. **Store Data** → Save in CSV, Excel, or database

5. Getting Started with Requests + BeautifulSoup

Install libraries:

```
# Install required libraries
pip install requests beautifulsoup4
```

Example: Scraping Quotes

```
import requests
from bs4 import BeautifulSoup

# Step 1: Send request
url = "http://quotes.toscrape.com/"
response = requests.get(url)

# Step 2: Parse HTML
soup = BeautifulSoup(response.text, "html.parser")

# Step 3: Extract data
quotes = soup.find_all("span", class_="text")
authors = soup.find_all("small", class_="author")

for q, a in zip(quotes, authors):
    print(f"{q.text} - {a.text}")
```

 **Output:** Extracts all quotes and their authors.

6. Extracting Specific Elements

Find one element:

```
title = soup.find("title").text
```

Find multiple elements:

```
links = soup.find_all("a")
for link in links:
    print(link.get("href"))
```

CSS Selectors:

```
headings = soup.select("h2")
```

7. Scraping Dynamic Content (with Selenium)

Some websites load content using JavaScript. For those cases:

```
pip install selenium

from selenium import webdriver

driver = webdriver.Chrome()
driver.get("https://example.com")

# Extract page source
html = driver.page_source
soup = BeautifulSoup(html, "html.parser")
```

8. Storing Scraped Data

Save to CSV:

```
import csv





with open("quotes.csv", "w", newline="", encoding="utf-8") as f:
    writer = csv.writer(f)
    writer.writerow(["Quote", "Author"])
    for q, a in zip(quotes, authors):
        writer.writerow([q.text, a.text])
```

Save to Pandas DataFrame:

```
import pandas as pd


data = {"Quote": [q.text for q in quotes],
        "Author": [a.text for a in authors]}
df = pd.DataFrame(data)
df.to_csv("quotes.csv", index=False)
```

9. Beginner Project Ideas

-  Book Data → Scrape top books from Goodreads
-  Price Tracking → Collect product prices
-  News Headlines → Extract latest news
-  Job Listings → Create job datasets

10. Next Steps to Advance

- Learn regular expressions for text extraction.
- Use APIs whenever possible (more reliable than scraping).
- Explore Scrapy for large-scale scraping.
- Practice handling pagination & login-protected sites.

 **Web scraping is the foundation step of the Data Science lifecycle. Mastering it helps you collect raw data — the first step toward analysis, visualization, and machine learning.**

Created for Educational Purposes - Complete Beginner's Guide to Data Science

Data Science with Vamsi

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