INFO-UB 23: Introduction to Programming and Data Science

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Project advice

General advice:

1. Build projects with scope that can easily scale up or down
2. Expect to spend a lot of your time on data cleaning and merging
3. Start with description, then move to prediction
4. Write up your project as you work

Getting data

Data sources

Some good places to look for data:

1. Aggregate lists of datasets (GitHub page, class website)
2. ProgrammeableWeb API directory
3. Kaggle competition datasets
4. Also: Github repositories, data science blog posts

Obtaining data

Typical means of obtaining data include:

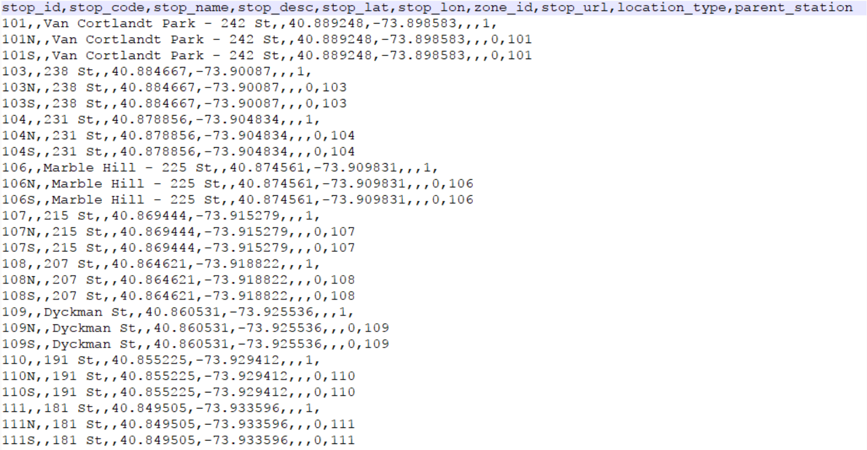
1. Downloads in tabular format
2. Queries posted to APIs
3. Web scraping

Obtaining data: tabular formats

1. Datasets are often available for download in tabular format: (typically, using delimiters)

   - Excel workbooks
   - .csv = comma-separated values
   - .tsv = tab-separated values

.csv example



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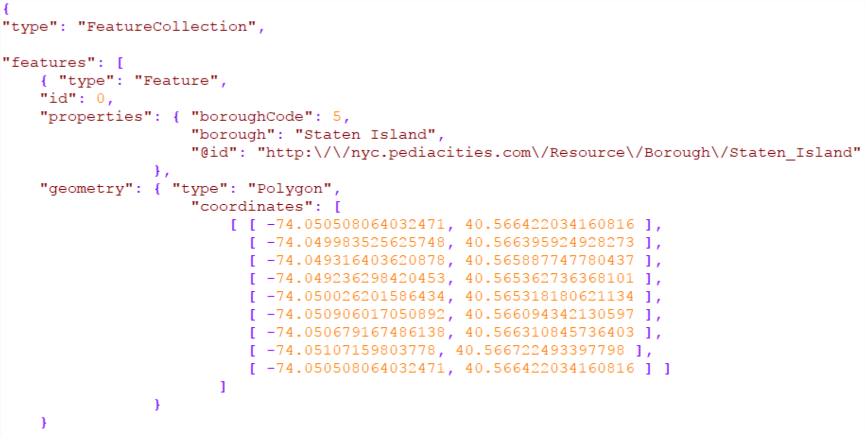
Obtaining data: APIs

2. A popular (programmer-friendly) alternative is APIs, (i.e. Application Programming Interfaces)

- Websites volunteer their data in a structured way
- Rate limits (and costs) often apply
- Typically, results are returned using:
  - .json = JavaScript Object Notation; flexible, dictionary-like
  - .xml = Extensible Markup Language; flexible, HTML-like
  - .txt = plain text
  - Sometimes, custom Python packages

.json example



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                       ]
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    }
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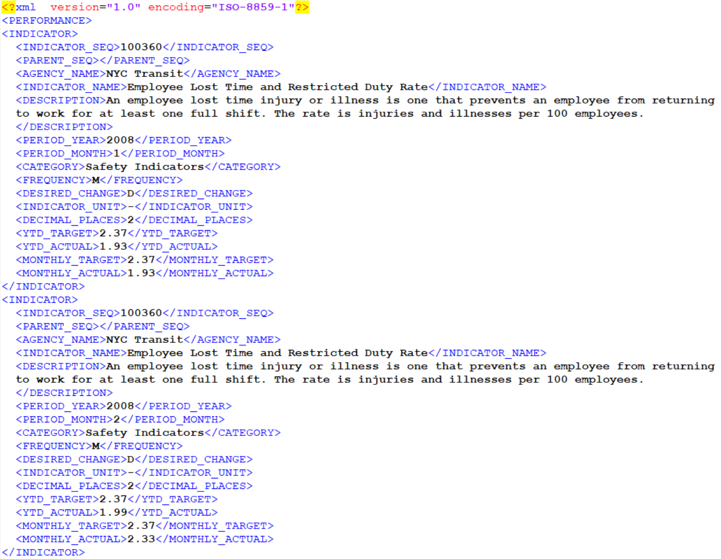
.xml example



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  <PARENT_SEQ></PARENT_SEQ>
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  <DESCRIPTION>An employee lost time injury or illness is one that prevents an employee from returning
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  </DESCRIPTION>
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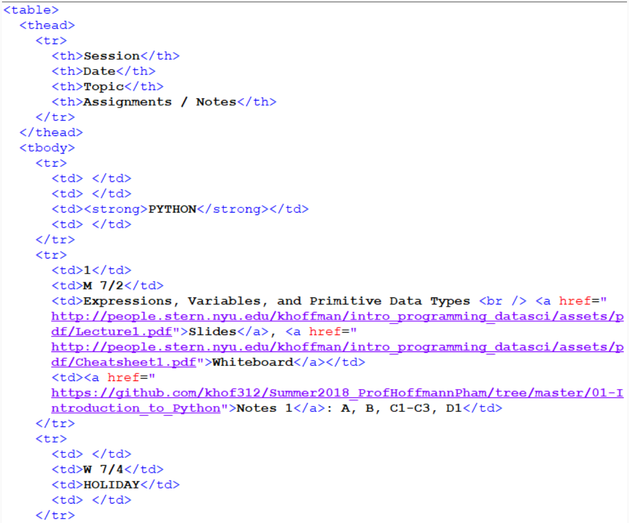
Obtaining data: Web scraping

3. A more involved alternative is to use web scraping

   - Basic idea: try to extract elements of the page
   - Collect and parse the page source, typically:
     - .html: Hypertext markup language
     - e.g. with Python's BeautifulSoup library
   - Easily scraped pages:
     - Are well-organized
     - Have a simple structure
     - Include few dynamic elements

.html example



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      http://people.stern.nyu.edu/khoffman/intro_programming_datasci/assets/p
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