13: PYTHON AND WEB SERVICES

There are two common formats that we use when exchanging data across the web. The "eXtensible Markup Language" or XML has been in use for a very long time and is best suited for exchanging document-style data. When programs just want to exchange dictionaries, lists, or other internal information with each other, they use JavaScript Object Notation or JSON (see www.json.org). We will look at both formats.

13.1: EXTENSIBLE MARKUP LANGUAGE - XML

XML looks very similar to HTML, but XML is more structured than HTML.

13.2: LOOPING THROUGH NODES

Often the XML has multiple nodes and we need to write a loop to process all of the nodes. In the following program, we loop through all of the user nodes:

13.3: JAVASCRIPT OBJECT NOTATION - JSON

The JSON format was inspired by the object and array format used in the JavaScript language. But since Python was invented before JavaScript, Python's syntax for dictionaries and lists influenced the syntax of JSON. So the format of JSON is nearly identical to a combination of Python lists and dictionaries.

13.4: PARSING JSON

We construct our JSON by nesting dictionaries (objects) and lists as needed. In this example, we represent a list of users where each user is a set of key-value pairs (i.e., a dictionary). So we have a list of dictionaries.

13.5: APPLICATION PROGRAMMING INTERFACES

The next step is to begin to define and document "contracts" between applications using these techniques. The general name for these application-to-application contracts is Application Program Interfaces or APIs. When we use an API, generally one program makes a set of services available for use by other applications and publishes the APIs (i.e., the "rules") that must be followed to access the services provided by the program.

13.6: GOOGLE GEOCODING WEB SERVICE

Google has an excellent web service that allows us to make use of their large database of geographic information. We can submit a geographical search string like "Ann Arbor, MI" to their geocoding API and have Google return its best guess as to where on a map we might find our search string and tell us about the landmarks nearby.

13.7: SECURITY AND API USAGE

It is quite common that you need some kind of "API key" to make use of a vendor's API. The general idea is that they want to know who is using their services and how much each user is using. Perhaps they have free and pay tiers of their services or have a policy that limits the number of requests that a single individual can make during a particular time period.

13.E: PYTHON AND WEB SERVICES (EXERCISES)

13.G: PYTHON AND WEB SERVICES (GLOSSARY)