

Information Management (EPPS 6354) Assignment 5

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Question 1

1. Look up websites containing the following data representations:

- a) Using JSON
- b) Using XML

Analyze the websites in terms of structure and composition. Name the technology/methods use for creating the web database.

a) Websites using JSON:

- 1. OpenWeatherMap (<https://openweathermap.org/api>)

OpenWeatherMap uses a simple structure for its JSON data, with each piece of data represented as a key-value pair. The website provides a range of APIs that allow developers to access weather data for various locations, as well as historical weather data. The website is built using JavaScript and Node.js.

- 2. Twitter (<https://developer.twitter.com/en/docs/twitter-api/v1/data-dictionary/overview/tweet-object>)

Twitter's JSON data is more complex than that of OpenWeatherMap, with nested objects and arrays used to represent the relationships between tweets, users, and other data. The website provides APIs that allow developers to access various types of Twitter data, including tweets, users, and trends. The website is built using a variety of technologies, including JavaScript, Ruby, and Python.

Question 1

3. GitHub API (<https://docs.github.com/en/rest/reference>) GitHub provides an API that allows developers to access data related to GitHub repositories, issues, pull requests, and more. The API uses JSON to represent the data, with each piece of data represented as a key-value pair. The website is built using a variety of technologies, including Ruby on Rails and JavaScript.
4. The New York Times API (<https://developer.nytimes.com/docs>) The New York Times provides an API that allows developers to access data related to news articles, including headlines, abstracts, and full article content. The API uses JSON to represent the data, with nested objects used to represent relationships between articles and other data. The website is built using a variety of technologies, including JavaScript and Ruby on Rails.

Question 1

b) Websites using XML:

1. IMDb (<https://www.imdb.com/xml/>) IMDb's XML data is structured in a hierarchical manner, with elements nested within other elements. The website provides an XML data feed that includes information about movies, TV shows, and more. Developers can use this data feed to access IMDb data and integrate it into their own applications. The website is built using a variety of technologies, including Java, Python, and Ruby.
2. Amazon (<https://www.amazon.com/gp/help/customer/display.html?nodeId=GDFU3JS5AL6SYHRD>) Amazon's XML data is also structured hierarchically, with elements nested within other elements. The website provides an XML data feed that includes information about products, prices, and more. Developers can use this data feed to access Amazon data and integrate it into their own applications. The website is built using a variety of technologies, including Java, Python, and Ruby.

Question 1

b) Websites using XML:

3. National Weather Service (<https://www.weather.gov/documentation/services-web-api>) The National Weather Service provides an API that allows developers to access weather data for various locations across the United States. The API uses XML to represent the data, with elements nested within other elements to represent relationships between data. The website is built using a variety of technologies, including Java and JavaScript.
4. PubMed (<https://www.ncbi.nlm.nih.gov/home/develop/api/>) PubMed is a database of biomedical literature, maintained by the National Library of Medicine. The website provides an API that allows developers to access PubMed data, including journal articles and citations. The API uses XML to represent the data, with elements nested within other elements to represent relationships between data. The website is built using a variety of technologies, including Java and Python.

Question 1b

JSON is used to represent data in a simple key-value format, while XML is used to represent data in a hierarchical structure. The technologies and methods used to create the web databases will also vary depending on the website.

In terms of technology/methods used for creating the web database, the websites likely use a combination of technologies, such as web servers, programming languages, and databases. For example, OpenWeatherMap likely uses a combination of JavaScript and Node.js to provide weather data, while also using a database to store historical weather data.

Similarly, IMDb and Amazon likely use a combination of Java, Python, Ruby, and databases to create and maintain their XML data feeds. The specific technologies and methods used will vary depending on the website and the data being represented.

Question 2

SQL exercise:

i. Express the following query in SQL using no subqueries and no set operations. (Hint: left outer join)

select *ID* from *student* except select *s id* from *advisor* where *i ID* is not null

```
SELECT DISTINCT s.ID  
FROM student s  
LEFT OUTER JOIN advisor a  
ON s.ID = a.sID  
WHERE a.iID IS NULL;
```

Question 2

ii. Using the university schema, write an SQL query to find the names and IDs of those instructors who teach every course taught in his or her department (i.e., every course that appears in the *course* relation with the instructor's department name). Order result by name.

```
SELECT i.ID, i.name
FROM instructor i
WHERE NOT EXISTS (
  SELECT c.course_id
  FROM course c
  WHERE c.dept_name = i.dept_name
  AND NOT EXISTS (
    SELECT t.course_id
    FROM teaches t
    WHERE t.ID = i.ID
    AND t.course_id = c.course_id
  )
)
ORDER BY i.name;
```


