1. Python’s requests module is a 3rd party library, that developers can use to remove the complexities of making HTTP requests (GET, POST, PUT, DELETE and more).

It’s a widely used Python library that is used to interact with APIs, and simplifies the process of using Python’s built in modules for developers.

It is used to allow developers to send HTTP requests using Python, servers respond with HTML or JSON. To be used it has to be installed in a project using pip or other installation methods

2. JSON is a text-based data format, derived from JavaScript, but it is language independent. This allows most modern programming languages to read and write JSON data. It uses a easily readable format in key/value pairs. It is often used in web development, NoSQL databases and APIs.

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| **JSON Advantages** | **JSON Disadvantages** |
| JSON is easily readable making it easier to understand what’s happening. | JSON has no error handling for calls. And will only provide a response if a script works. |
| JSON is very lightweight and small in data size | JSON can be dangerous on untrusted services or untrusted browsers as it can be hacked making web apps open to attacks. |
| Compatible with most modern programming languages | JSON has limited data type support and doesn’t support dates, comment on binary data. |
| JSON is fast to use | JSON lacks schema validation which can lead to data integrity issues. |

XML is a markup language. It is used to store and transport data using tags to describe the structure and meaning. Like JSON it is also human readable, and was a used to exchange data before JSON became popular.

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| **XML Advantages** | **XML Disadvantage** |
| XML is human readable and uses tags to represent the data content. | XML generates files that can be very large and it’s not very memory efficient. |
| XML maintains data structure and integrity by allowing the transfer of data and the data’s description and the use of custom tags. | XML is not ideal for lightweight web APIs or small data payloads due to its large file size. |
| XML is platform independent, meaning it can be read and processed on any platform or operating system. | XML data is less human friendly than JSON, which can be due to the use of XML tags. |
| XML is widely used and therefore has a set of defined standards when it is used. | XMLs large size and structure slow down performance of files. |

3. Provide a brief explanation of what a RESTful API is, how it works and what it is used for. List at least four advantages and four disadvantages of RESTful APIs.

A RESTful API is used as an interface by 2 computer systems to exchange information securely over the web. APIs use HTTP methods to communicate with other systems. It follows REST rules and guidelines on how a web API should be created. Due to RESTful APIs using stateless communication, meaning each request is independent and servers don’t remember previous interactions, all relevant data my be included in requests.

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| **Advantages of RESTful APIs** | **Disadvantages of RESTful APIs** |
| RESTful APIs use standard HTTP methods, making it easier to understand | A RESTful APIs statelessness means each request must include all necessary data, as the server does remember previous requests. |
| RESTful APIs are platform and language independent and can interact with any language that support HTTP | RESTful APIs have no set standards, so implementation can vary between APIs. |
| RESTful APIs are flexible, can easily have new features and functionality added. | RESTful API versioning can cause compatibility issues with existing applications. |
| RESTful APIs usually use JSON data so they’re lightweight and fast. | If not configured correctly, RESTful APIs can become a single point of failure in systems. |