SDV602 ESSAY

Comparing Python and JavaScript

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Python

Python was initially worked on by Guido van Rossum. Guido began development on Python in the late 1980's, and officially released 'Python 0.9.0' in 1991. Python was intended to be a successor to the 'ABC' programming language. Python was created to provide developers an easy-to-read programming language, that would contain useful syntax to express concepts using shorter lines of code.

Python was originally created for developing websites and software, task automation (scripts) and data analysis/visualising. Python's readability and effective syntax has also been spread into different areas of development recently, such as web scraping and artificial intelligence training.

Python has also been adapted into other libraries such as PHP, Numpy and PyTorch.

A very popular Python framework is named Django. Django is a high-level web framework built on Python.

Package Manager and Package's

Python's recommended package manager is known as 'pip', and as of today, hosts over 350,000 packages. However, Python also uses Homebrew as an alternative package manager with 5,190 packages.

Because Python contains so many packages, there are a lot of popular packages. Python can come bundled with some of these packages if they are popular enough, alternatively, the package would need to be installed using 'pip'. I have included a list of the 5 most popular Python packages, what they're used for and if they come bundled in Python 3's installation.

1. NumPy – Used for complex math equations. NumPy provides tools to build multi-dimensional arrays and perform calculations on the data stored in them. NumPy is bundled with Python 3.
2. TKinter – Used for building quick and simple GUI applications for Python. As Python has integration for a wide variety of packages, TKinter inherently has integration for other packages and software such as SQLite3, SQL Server and MatPlotLib. This allows a developer to create useful applications such as data management applications. TKinter is bundled with Python 3.
3. Requests – This package allows a developer to make HTTP requests using Python. This includes GET, POST, DELETE and INSERT requests, this is useful for interacting with servers such as an API server. Requests is not bundled with Python 3.
4. Pandas – Pandas is a data analysis package that allows a developer to manipulate and analyse data. Specifically, it uses data frames to capture and organise data into a table containing rows and columns, much like a spreadsheet. Pandas is bundled with Python 3.
5. MatPlotLib – MatPlotLib is a plotting package. MatPlotLib allows a developer to create a plot using pre-defined data. This can be used to create data analysis dashboards. Used in conjunction with a package such as Pandas and TKinter, a developer can create a data

analysis GUI application with Pandas reading and cleaning the data, MatPlotLib plotting the data into an easy-to-read plot, and TKinter providing the GUI aspect of the application. MatPlotLib is not bundle with Python 3.

Characteristics, Strengths and Weaknesses

Python is an easy-to-read, easy-to-code, free and open-source high level programming language. It is very extensible and can be used in a wide range of projects, from games to multi-level applications that can be distributed throughout a company.

Strengths – It is easy to learn, it has a large community with lots of documentation available online, it is very flexible in a wide range of projects.

Weaknesses – Can be challenging to integrate Python applications with other programming languages, it has a fairly low execution speed making it feel sluggish at times, there are many problems with the language that will only get displayed at runtime, it is not well suited for memory-intensive applications.

JavaScript

Introduction

JavaScript, or as it was known at the time, LiveScript was created in 1995 by Brendan Eich. It was originally designed as a scripting language to be used on the Netscape Navigator at Brendan's company. JavaScript has since evolved into a high-level web scripting language, typically used in conjunction with HTML and CSS to create dynamic and interactive web content but has since been implemented into a wide-range of services such as servers and one-page application frameworks. JavaScript is used in approximately 97% of all websites, as of 2022.

A very popular JavaScript library is named React. React is used by developers to create single-page web applications. Single-page web applications has become very popular in the web development industry lately because of its seamless transition between web pages, along with the ability to add dynamic and interactive data in a much more efficient way than vanilla JavaScript.

Pack Manager and Package's

JavaScript's primary package manager is npm, however you can also use Bower or Yarn as a package manager.

JavaScript does not come bundled with any 3rd party packages and because npm contains over 1.3m packages, it is often criticised for requiring a lot of space, and on JavaScript projects that require a wide-variety of packages, the project can easily become bloated.

Since there are so many packages, there are a lot of popular packages contained in npm. Below I have listed the top 5 most popular packages as of 2022.

1. Axios – Axios is a promised-based HTTP client for JavaScript. JavaScript being a dynamic scripting language, already has URL fetching capabilities, however it is limited to GET requests. Axios more HTTP methods such as POST, DELETE, INSERT and GET.
2. Mongoose – Mongoose is a npm package that provides a solution for JavaScript to interact with MongoDB, a document-orientated database. Mongoose used in conjunction with Axios can make for a quick and effective solution to creating an application that communicates to an API, typically this combination will be used in the server-side.
3. jQuery – jQuery is a JavaScript language that speeds up the production of JavaScript projects. jQuery takes a lot of common JavaScript tasks and wraps them in methods that can be called in the project.
4. React – React is a free, open-source front-end JavaScript library created by Meta (formally known as Facebook). React allows a developer to create a single-page application (e.g., Netflix).
5. Node.js - Node.js is an open-source, cross-platform, back-end JavaScript runtime environment. Node.js uses JavaScript and can execute JavaScript outside of the web.

An example of a full-stack web application would be a React front-end, with a Node.js back-end that would incorporate Mongoose and Axios to handle different HTML methods and interact with a MongoDB database.

Characteristics, Strengths and Weaknesses

JavaScript is a fast, light-weight scripting language that is easy to understand and learn. JavaScript is very versatile, being used in video games, web development, server development, as well as a few other areas.

Strengths – JavaScript is fast, very popular and has a wide-range of documentation spanning over each package, is a great beginner language but is also very useful for big projects.

Weaknesses – Client-side security is not great and requires additional packages and knowledge to improve to an industry standard, JavaScript requires browser support to function.

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