# Introduction of Python and JavaScript

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In the field of computer science, Python and Javascript are two very well-liked languages. In thissection, we would like to IntroducePython and JavaScript.   
This is demonstrated below:

## Python

Python is a popular high-level programming language that is used for a wide range of applications, from web development to scientific computing. It was created in the late 1980s by Guido van Rossum and has since become one of the most widely used programming languages in the world.

One of the reasons for Python's popularity is its simplicity and ease of use. Python has a clean syntax that is easy to read and write, making it a great language for beginners to learn. It also has a large and active community of developers, which means there are plenty of resources available to help you learn and troubleshoot any issues you may encounter.

Python is an interpreted language, which means that it is executed line-by-line rather than compiled beforehand. This makes it a great choice for prototyping and testing code quickly. Python also supports object-oriented programming, functional programming, and procedural programming paradigms, making it a versatile language that can be used in a variety of contexts.

One of the key features of Python is its extensive standard library, which includes modules for everything from regular expressions to web development. Python also has a large ecosystem of third-party packages that can be easily installed using the pip package manager.

Overall, Python is a powerful and flexible language that is great for beginners and experienced developers alike. Whether you are just starting out with programming or looking to build complex applications, Python is a language that you should consider learning.

## Javascript

JavaScript is a popular programming language that is used to create interactive and dynamic web pages. It was created in the mid-1990s by Brendan Eich and has since become one of the most widely used programming languages in the world.

One of the key features of JavaScript is its ability to manipulate web page content in real-time, which makes it a great language for creating dynamic and interactive user experiences. JavaScript is also used to build applications that run on both the client-side (in the browser) and the server-side (on the web server).

JavaScript is an interpreted language, which means that it is executed line-by-line rather than compiled beforehand. This makes it a great choice for web development, as changes can be made and tested quickly without the need to recompile the entire program.

JavaScript has a large and active community of developers, which means there are plenty of resources available to help you learn and troubleshoot any issues you may encounter. It also has a rich ecosystem of libraries and frameworks, such as React, Angular, and Vue, which can be used to simplify the development of complex web applications.

Overall, JavaScript is a versatile and powerful language that is essential for web development. Whether you are creating a simple website or a complex web application, JavaScript is a language that you should consider learning.

## Python History

* 1989

Guido van Rossum, a Dutch programmer, begins working on a new programming language called Python.

* 1991

The first version of Python (0.9.0) is released. It is a simple, interpreted language with support for modules, exceptions, and user-defined functions.

* 1994

Python 1.0 is released. This version includes many new features, including lambda, map, filter, and reduce functions.

* 2000

Python 2.0 is released. This version includes many new features and improvements, such as garbage collection, list comprehensions, and a new Unicode-based string type.

* 2008

Python 3.0 is released. This version is a major break from previous versions of Python, with many changes that are not backward-compatible. Some of the new features in Python 3.0 include a new print function, better Unicode support, and a simpler syntax for exception handling.

* 2010

Python 2.7 is released. This version is the last of the Python 2.x series, and will be supported until 2020.

* 2015

Python 3.5 is released. This version includes many new features and improvements, such as async/await syntax for coroutines, type hints, and the pathlib module for working with file paths.

* 2017

Python 3.6 is released. This version includes many new features and improvements, such as formatted string literals, asynchronous generators and comprehensions, and a new secrets module for generating cryptographically secure random numbers.

* 2018

Python 3.7 is released. This version includes many new features and improvements, such as data classes for creating classes with automatically generated methods, improved type annotations, and better support for async/await.

* 2019

Python 3.8 is released. This version includes many new features and improvements, such as assignment expressions (also known as the "walrus operator"), positional-only parameters, and improved f-strings.

* 2020

Python 3.9 is released. This version includes many new features and improvements, such as support for new syntax features like match statements and decorators with parameters, as well as performance

## JavaScript History

* 1995

Brendan Eich, a programmer at Netscape, creates a new scripting language called Mocha, which is later renamed to LiveScript, and eventually to JavaScript.

* 1996

The first version of JavaScript is released in Netscape Navigator 2.0. This version includes support for basic scripting, such as form validation and mouse rollovers.

* 1997

ECMAScript is created as a standard for JavaScript. This version includes many new features, such as regular expressions, try/catch exception handling, and strict mode.

* 1998-2000

The browser wars between Netscape and Microsoft result in the introduction of many new JavaScript features, such as XMLHttpRequest, which enables the creation of dynamic web applications.

* 2002-2005

The rise of Ajax (Asynchronous JavaScript and XML) leads to increased use of JavaScript for creating responsive and interactive web applications.

* 2005

esse James Garrett coins the term "Ajax" in an article on his website.

* 2006

jQuery, a popular JavaScript library, is released. It simplifies many common JavaScript tasks and improves cross-browser compatibility.

* 2009

Node.js, a server-side JavaScript runtime, is created. It allows developers to use JavaScript for creating web applications on the server, as well as the client.

* 2015

ECMAScript 6 (ES6), also known as ECMAScript 2015, is released. It includes many new features, such as let and const for declaring variables, arrow functions, and classes.

* 2016-2018

ES7, ES8, and ES9 are released, with features such as async/await for asynchronous programming, rest and spread operators, and Object.values/Object.entries.

* 2019

ES10, also known as ECMAScript 2019, is released. It includes features such as Array.flat(), Array.flatMap(), and optional chaining.

* 2020

ES11, also known as ECMAScript 2020, is released. It includes features such as nullish coalescing and optional chaining.

* 2021

ES12, also known as ECMAScript 2021, is released. It includes features such as logical assignment operators and string replaceAll().

# Usage Differences between Python and JavaScript

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Current time: 2:33:19 PM

**JavaScript** and **Python** are both top 10 popular programing languages in the world and are used for a wide range of applications. Because of their strengths and weakness, they are used for different purposes.

## JavaScript

**JavaScript** is well-known as a front-end programing language, meaning it is used for develop an application for the interaction with users, but not the data, like a reaction of a button or a text box. Also, it means that JavaScript is commonly not used for back-end development, the control on the server or database.

### Web Development

**JavaScript** is mainly used for website development to control the behaviors of the website. It makes the website more flexible and interesting. For example, the website will pop up different content by clicking different buttons. In a website, **JavaScript** provides and create the interactions, like mouseover action and animations, and make it more user-friendly, like a game and go-top button.

Enter your guess between 1 and 100:

### Node.js

**Node.js** is a operation environment, introducing in 2009, that allow developers to run JavaScript on server side. It makes developers possible to create a wide range of applications with JavaScript, such as command-line tool, and desktop applications. One of the advantages of **Node.js** is using **JavaScript** as a back-end programming language, meaning that it is not require to use 2 languages for front-end and back-end to reduce the cost of development. Also, it makes the programs faster and more efficient.

Here is a Youtube video talking about what Node.js can do:

## Python

**Python** is one of the most popular programing languages because of easy to read. Nowadays, Python is used in different ways, like artificial intelligence (AI), file management, and web crawling. Compare with JavaScript, **Python** is better for handling data. So, Python is commonly used for back-end development.

### Data Science

**Python** is a well-known language for data science, as a lot of powerful open-source libraries like Pandas can be imported easily to manage the data. Because of the libraries used for web crawling, like BeautifulSoup, **Python** can not only used for data analysis, but also used for collecting data.

This is an example how to build a scatter plot by Python. From [www.kaggle.com/code/pmarcelino/comprehensive-data-exploration-with-python](https://www.kaggle.com/code/pmarcelino/comprehensive-data-exploration-with-python)

### Personal Desktop Applications

**Python** is one of the most beginner-friendly programing languages and it allows beginners to spend a short time to learn how to develop a program for personal-use, like file management. For example, using the library “os”, the program can get all file name in giving folder path and change the file location by change the file name (file path). Besides, since there are a lot of open-source libraries and great community, more and more things beginners can do, like creating a bag of picture or gif, and writing word documents with pattern or repeating context.

Here is a 19 lines Python program to move all files to a single root folder.

### Machine Learning

**Python** is also known as a machine learning language. Recently, AI drawing and AI chatting is very popular. In personal computer, Python can train a personal model to generate picture or chat by using libraries, like PyTorch.

Stable Diffusion webUI is the most famous AI drawing program which is using Python to build, source: [github.com/AUTOMATIC1111/stable-diffusion-webui](https://github.com/AUTOMATIC1111/stable-diffusion-webui)

# Syntax Differences between Python and JavaScript

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In the field of computer science, Python and Javascript are two very well-liked languages. In this section, we would like to investigate the syntactic differences between Python and JavaScript.   
This is demonstrated below:

## Code block

### Python

The amount of whitespace in Python indicates to the computer what is and is not a component of a function. Users may use space or tab to perform the indentation. Without proper indentation, the program will probably result with an error.

### JavaScript

The amount of whitespace in Javascript has no meaning. A Javascript code block can be defined with curly brackets ("{}") for grouping statements to be executed together. To make it easier to comprehend, indentation will also being used.

## How to define Variable?

### Python

The equal sign ("=") is put after the variable name when creating variables in Python.

### JavaScript

Users can define variables in JavaScript by using the terms var, let, and const.

## Commenting

Code comprehension is aided by comments. For future use, one might remark on a paragraph, for example.

### Python

1. Single-line comments

Python will treat anything that comes after the hashtag ("#") as a comment.

1. Mulit-line comments

For each line of a multi-line comment, Python will begin with a hashtag ("#"), as shown below:

### JavaScript

1. Single-line comments

JavaScript will treat anything that comes after the double slashes ("//") as a comment.

1. Mulit-line comments

Unlike Python, JavaScript can use the symbols ("/\*") and ("\*/") to wrap up a multi-line comment.

## Logical operators

### Python

* and is the AND operator
* or is the OR operator
* not is the NOT operator

### JavaScript

* && is the AND operator
* || is the OR operator
* ! is the NOT operator

## Inputs & Outputs

### Python

1. Inputs

In Python, the function input() can be used for asking input. Variables would be assigned to store the input data.

1. Outputs

In Python, the function print() can be used to show the results.

Result of the print() function:

### JavaScript

1. Inputs

In JavaScript, the function prompt() can be used for asking input.

1. Outputs

By using the console.log() function in JavaScript, users can send the values inside the bracket to the terminal and display them.

👇To try the coding mentioned above, click the button below.   
(Apart from using the console.log() function, we will use another function document.getElementById().value to show the outcome in the textbox)

## If-Conditional

The main Syntax difference between the two languages' if-condition expressions is that Python uses "elif" rather than "else if".

### Python

In Python, the users have to put the colon (":") after the condition.

### JavaScript

In JavaScript, the users have to put the condition inside the brackets ("()")

👇Again, do not hesitate to test the script above!😜

## Loops

The concept called "loop" is available in almost all computer languages, and it allows for the repeated execution of one or more statements.

In this section, we will introduce two type of loops, which are For-Loop and While-Loop.   
The For-Loop is often used to carry out a task a finite number of times.   
The While-Loop is used to carry out a task repeatedly as long as a continuation condition is true.

### Python

1. For-Loop

In Python, users may use the keyword in and the function range() to perform the iteration.

1. While-Loop

In Python, the users have to put the colon (":") after the condition. The loop would end once the condition become false

### JavaScript

1. For-Loop

In JavaScript, users have to define several values within the brackets. In the brackets, users must specify the loop variable with its starting value (e.g., var i = 0), the condition that must be true to keep the loop running (e.g., i <= 99), and how each loop will change the loop variable (e.g., i++). Moreover, each expression need to be separated by a semicolon (";").

1. While-Loop

In JavaScript, the syntax is acutally similar to Python, except that users have to put the condition inside the brackets.

## 🎯 Key Takeaway

|  | **Python** | **JavaScript** |
| --- | --- | --- |
|  |  |  |
| **Code block** | Indentation is a must, and without it, the program will probably result with an error | The amount of whitespace has no meaning, indentation is just for readability |
| **Definition of Variable** | Equal ("=") sign | Terms var, let, and const |
| **Commenting** | Hashtag ("#") for both the single-line comments and multi-line comments | Double slashes ("//") for single-line comments; symbols ("/\*") and ("\*/") to for multi-line comments |
| **Logical operators** | and, or, not | &&, ||, ! |
| **Inputs & Outputs** | Function input() for asking input; Function print() for showing result | Function prompt() for asking input; Function console.log() for showing result |
| **If-Conditional** | Put the colon (":") after the condition | Put the condition inside the brackets ("()") |
| **Loops** | Keyword in and function range() for For-Loop; Put the colon (":") after the condition for While-Loop | Define the expressions in the brackets and separate them with a semicolon (";") for For-Loop; Put the condition inside the brackets for While-Loop |

# Python vs JavaScript: Library Usage

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**JavaScript** and **Python** support the library function, which is the pre-written Python/ JavaScript code collection. *Python libraries* are used to perform specific tasks or solve specific problems. Conversely, *JavaScript libraries* add functionality or effects to a web page. In this section, we would like to introduce the libraries in **Python** and **JavaScript**.

## JavaScript Libraries

**JavaScript** has a vast collection of libraries for client-side scripting and server-side development. These libraries can be readily installed and imported using package managers like npm. Utilizing the Javascript library function would help you implement standard functionality you're your web instantly. Here are some popular JavaScript libraries you may hear of:

1. React

React is a popular front-end JavaScript framework that automatically updates the DOM whenever your data changes. The key to React's power is composable components. You build encapsulated components once and reuse them throughout your application. For example, you might create an EmojiSearch component for search functionality, a Comment component for comments, and Auth component for authentication. Then compose them together to build the page you want.

# [Emoji Search](https://ahfarmer.github.io/emoji-search/)

As shown in the emoji search demo, you can create reusable components for search, comments, filters, etc. Then compose them together in different ways to generate multiple pages from a single set of components. Whenever the underlying data updates, React efficiently re-renders only the changed components.

In summary, React revolutionized front-end development by handling updates, facilitating composable components, and enabling adaptable user experiences. You get to focus on designing interfaces instead of manually updating the DOM.

1. jQuery

For adding some interactivity to your pages, **jQuery** is fun. It has shortcuts for animations, getting external data, event responses, and updating HTML, CSS, and JavaScript elements - all in simple lines of code. Try this:

Click Me!

1. Moment.js

Dates are tricky, so **Moment.js** was a lifesaver. It helps format dates in any locale, handle timezones and daylight savings, give relative dates like "tomorrow", and convert between calendars. Extra plugins provide internationalization, time differences, duration, and holiday functionality. Finally, a dating tool that works! No more searching documentation to figure out which method does what. Moment hides date complexity so you can focus on building impressive web apps.

## Python Libraries

**Python**provides many libraries for scientific computing, data analysis, machine learning, and web development. Unlike JavaScript, these libraries are required to download through Python's package manager, pip. After that, they can be easily used in your code by import the library. Here are some popular libraries you hear of:

1. NumPy

[**NumPy**](https://numpy.org/) is great for working with multi-dimensional arrays and matrices. It is essential for engineering and science domains. Fast array operations and integration of C/C++ or Fortran code are performed efficiently.

1. Pandas

[**Pandas**](https://pandas.pydata.org/) simplified working with tabular data. It is perfect for analyzing and manipulating data tables. CSV files could be loaded into data frames. Selected columns, stats computed row-wise or column-wise, grouping data, pivoted and merged datasets effortlessly by using **Pandas**. Example:

Result:

## Random

The **random** library is great for generating random numbers and shuffling sequences. You can use random.randint() to get a random integer in a specified range, random.random() to get a float between 0 and 1, and random.shuffle() to randomly shuffle the elements of a list.