# CS1102 Project (2022-2023 Semester B)

## Project topic: Our Experience with Python Programming

## Group ID: 17

## Techniques demonstrated in our webpages:

* Basically all the stuff that taught in the lecture 04 & 05
* Navigation bar
* Side bar
* Drop-down list
* Link to a section by using the anchor tag
* Fancy buttons
* Fixed bar
* Prompt function and textbox to increase interactivity

## Self-discovery

After the project, we eventally understand the reason why Python would become one of the most popular programming lanaguage the world. The syntax of Python is very clear, and it is a great choice for beginners up to the professionals. Even though none of us had used this language before, we can still easily pick up the coding. Moreover, Python has a variety of practical uses, which you may find more information in our "Introduction" page and "Usage" page. Actually, the applications of Python and JavaScript in the real world are not essentially the same, therefore it may not be fair to compare them. In certain siutations, they are not interchangeable.

Apart from the project content, I would say that CSS is the most frustrating aspect of building this website. At the beginning of the project, I had underestimated the complexity of CSS, and attempt to do tasks without making any effort to understand all the necessary attributions and values. However, the reality was brutal; CSS is so difficult to use when trying to center objects or even just position separate elements. Fortunately, I was able to figure it out in the end, and right now, the appearance of our webpages seems good!

Lastly, I really hope that everyone seeing this website will find it enjoyable and useful. Thank you very much! 💕

# Introduction of Python and JavaScript

##### Last edit: April 17, 2023 By Bolin LIU

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

## Python

Python is a popular high-level programming language used for a variety of applications ranging from web development to scientific computing. Guido van Rossum invented it in the late 1980s, and it has since become one of the world's most popular programming languages.

Python's success stems from its simplicity and ease of usage. Python has a simple syntax that is easy to understand and write, making it an excellent language for novices. It also has a huge and active developer community, so there are lots of tools to assist you learn and debug any difficulties you may have.

Python is an interpreted language, which means it is run line by line rather than being pre-compiled. As a result, it's an excellent solution for quickly developing and testing code. Python also provides support for the object-oriented, functional, and procedural programming paradigms.

Python's vast standard library, which contains modules for everything from regular expressions to web development, is one of its defining qualities. Python also has a thriving ecosystem of third-party packages, which can be readily installed via the pip package manager.

Overall, Python is a robust and adaptable programming language that is suitable for both novice and expert developers. Python is a language that you should consider studying whether you are new to programming or seeking to construct complicated applications.

## Javascript

JavaScript is a popular computer language used to generate interactive and dynamic web sites. Brendan Eich designed it in the mid-1990s, and it has since become one of the world's most popular programming languages.

One of JavaScript's primary advantages is its ability to alter web page information in real-time, which makes it an excellent language for developing dynamic and interactive user experiences. JavaScript is also used to create apps 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 it is performed line by line rather than being pre-compiled. This makes it an excellent choice for web development since changes can be made and tested rapidly without recompiling the entire application. Because JavaScript has a big and active developer community, there are several resources accessible to assist you learn and debug any difficulties you may experience. It also includes a thriving ecosystem of tools and frameworks, including as React, Angular, and Vue, that may be utilized to make complicated online applications easier to design.

Overall, JavaScript is a versatile and strong programming language that is required for web development. JavaScript is a language that you should consider learning if you are constructing a basic website or a complex online application.

## Python History

## JavaScript History

# Usage Differences between Python and JavaScript

##### Last edit: April 6, 2023 By Jason Wong

The time you spent on this page: 00:01:03

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

##### Last edit: April 6, 2023 By Charlie Lau

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

##### Last edit: April 17, 2023 By Sannie Cheung

**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.