

SDV602 assignment 2 MILESTONE 3

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# Reflection on the programming language or system:

1. **The heritage and philosophy of the programming language:**

Heritage:  
Python is a language developed in 1991 by Guido Van Rossum.   
This language was inspired by Rossum’s interest to project his frustrations with other programming languages, as he found others having a lack of readability and applying unnecessary complexity. He had a motivation to ensure that his newly developed language is the epitome of ‘simplicity and readability’.  
The name came from “Monty Python’s Flying Circus’, which is an old BBC comedy series from the ‘70s. Van Rossum mentioned he *“thought he needed a name that was short, unique and slightly mysterious*”. *(Python FAQ, n.d.)*  
In his code, he proves to make it more enjoyable by including variables like “spam” and “eggs”, instead of “foo” and “bar”.

The philosophy of Python is encapsulated in ‘The Zen of Python’. This rule includes phrases to emphasize the importance of readability and simplicity.   
One of the principles include, “There should be one – and preferable only one – obvious way to do it”. This phrase promotes the idea of showing consistency within practices made in programming.

Python is supported by multiple paradigms including ‘procedural’, ‘object-oriented’ and ‘functional’ programming.  
These three are applied in different ways – procedural is used for procedures and functions, object-oriented is within classes and objects, and functional is used for mathematical functions.  
The variety of paradigms mean that theres full flexibility within the language. As well as this, there are assortments of libraries and tools that can be used to heighten the quality of the programming projects.

Key players within this included Python Software Foundation. Their contribution towards the development of the programming language was to promote Python and to *“support and facilitate the growth of a diverse and international community of python programmers” (Python Software Foundation, n.d)*

1. **The platform(s) for developing and running software applications for the language:**

Python is a cross-platform language which means that it is capable of integration within popular operating systems (including Windows, MacOS and Linux), as well as mobile platforms like IOS and Android.

By having the facilities to promote flexibility and portability, it showcases that Python can be tailored to a developers personal needs, which is beneficial.

Integrated Development Environments (IDEs):

Python has IDEs which supports different compilations of tools that developers can use. IDE refers to an application that offers extensions which supports different capabilities like editing source code, debugging etc. Examples of IDEs include:

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| IDE | Description |
| 1. **Visual Studio Code** | VS Code is open-source and lightweight editor by Microsoft which includes Python extensions for interactivity and debugging. |
| 1. **PyCharm** | This is an editor developed by JetBrains which introduces version control and debugging tools. In general, PyCharm is known to facilitate tools required for data science and web development, which is beneficial for most of the software programmer demographic. |
| 1. **Sublime Text 3** | Sublime Text is a customizable, reliable code editor. To accommodate Python, it features syntax highlighting, introduces an effective directory management and supports packages for the development of Python projects. (Gupta, 2024) |

Frameworks and Libraries:

Python is known to have a variety of libraries which assists the development of Python projects. Developers are able to manage libraries using PIP, which is a package manager.   
Some libraries and frameworks that can be used include:

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| Frameworks and Libraries | Description |
| 1. **Flask and Django** | These are both open-source frameworks used for web development. |
| 1. **PyTorch** | This is an open-source library specially used for machine learning, which allows the development of applications for image recognition, language processing etc. |
| 1. **NumPy, Pandas, Matplotlib** | NumPy and Matplotlib are tools, while Pandas is a library – these are all designed for data analysis and visualization. |

1. **The characteristics, strength and weakness:**

Python is a very powerful, popular programming language that has a dynamic type system, which means that variables do not require “explicit type declaration”.

Python has many praised strengths:

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| Strengths | Description |
| 1. Open Source | Python is kept open-source, which means it is freely accessible for the public, which promotes collaboration and community building. |
| 1. Easy to Use | Python is presented simplistic so that it easier to learn. The syntax is made easier for readability as only indentation is used, rather than the use of curly bracket. |
| 1. Expressive Language | Python can run a lot more without having to write much. Most other programming languages require a few lines to do a single message print, however, Python only uses ‘print(“Hello World”), which is much easier. |
| 1. Cross-Compatibility | Python can run equally on any platform in use, including Windows, MacOS, Linux etc. |
| 1. Extensible | Python is able to use other languages like C/C++ to compile code. This is done by *“converting the program into byte code, and any platform can use that byte code” (JavaTPoint, n.d.)* |

Some weaknesses include:

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| Weaknesses | Description |
| 1. Memory Consumption | Pythons type system can lead to using excessive amounts of memory, which limits the performance of development. |
| 1. Less secure | Python is considered to be *“less secure than other programming languages such as java or C++”* as since data types aren’t determined at compile team – this means that theres higher risk of vulnerabilities (including SQL injection attacks). (Gavrilova, 2023) |
| 1. Database Access Layer Issues | *“Python has issues with database access layers which restricts it to use in a big company.” (TechSkillGuru, n.d.)* |

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