Q3.

Programming and coding is a very important and functional tool to the engineering industry in this technology era. Utilizing programs and algorithms enhance the engineering operations in terms of automaticity and efficiency. In this freshman seminar project, we acknowledged one of the most common used programming language, python, as well as other programming related software such as ‘Github’ and ‘Gitbash’.

Introduction of Python

Python was first released in 1991, created by Guido van Rossum, a successor to the ABC language from Netherlands [1]. The programming language construct and object-oriented features are targeted to assist programmers to write codes clearly for either small or large-scale coding projects [2]. Python interpreters are available in variety of operating systems, which attracts a global community of programmers to further develop and maintain a system called CPython, which is a free and open-source reference implementation [3].

Features of Python

Python is a multi-paradigm programming language. There are several features which fully support functional programming and aspect-oriented programming, such as metaprogramming [4] and metaobjects [5]. The language also provides dynamic typing and a combination of reference counting and a cycle-detecting garbage collector for memory management [6]. There is also a binding method, which enables programmers to bind variable names and commands during the program execution. Besides the common functions like arithmetic operators or basic algorithms, python was designed to be highly extensible comparing to other programming languages. This compact modularity was popular in terms of adding programmable interfaces to existing applications.

Introduction of Github

Engineering industries intend to develop more in utilizing artificial intelligence and robotics facilities for manufacturing, which requires numerous coding operations. However, these industries have to collaborate with each other in order to combine all the different parts of the product, which reflectively demonstrate the importance of communicating and sharing the working process through the internet. Github, acting as an online communicating platform, enables different users to upload their works onto the cloud server, as known as a repository. Github allows for real-time collaboration, and encourages teams to work together to build and edit the site content at the same page [7].

Features of Github

As mentioned above, Github enable multiple users, which are called developers or programmers to work on a single project at the same time, reduces the risk of duplicative and conflicting work. For example, some online collaborating working interfaces allows several users to commit changes at the same time, but that might result in data inconsistency and redundancy. With Github, developers can build code, track changes and respond to problems that might arise during the design and development process simultaneously [7]. Moreover, a repository consists of a master branch, and several sub-branches which represent the role of a leader and crewmates. The master is basically the host of the team, controlling all actions conducted to the repository, while other developers could synchronize their files and works with the master branch, so that everyone could review the process and make changes to the work simultaneously.

In conclusion, python is doubtlessly one of the most common and functional programming language in the world. On the other hand, Github is also important as to provide an online collaborating interface for developers to work together at the same pace. These software and tools are creating a major trend in bringing benefits to engineering design and operations, in terms of collaborating projects between industries or specific developers, which improve the performances of the engineering industry eventually.

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