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**Project 3 – Programming Languages Explanation**

The Project 3 coding assignment is a functional combination of two programming languages, C++ and Python, in order to produce output requirements. This was an effective introduction to how different programming languages can work together and to the possible benefits of doing so.

Building the base of the program and the menu selection in C++ is beneficial as you are able to code directly to the output console instead of, for example, the Python interpreter shell. C++ also includes iostream and iomanip libraries that allow easy streaming and formatting for input and output. As for drawbacks, C++ in general requires more ‘background’ code such as header files and is more difficult to compile and test than Python.

Building the file reading functionality in Python was also beneficial. I personally enjoy writing in Python as it feels ‘breezy’ in non-technical terms compared to C++. It is very high level and easy to script and test quickly. File input can be opened in a single line, read to a list in a single line, and the list can be iterated in another single line. A functional word-counter type dictionary is included in the ‘collections library’ to easily count the words in the input file. I also enjoyed editing the Python portion of the project without having to recompile the binary .exe. As for drawbacks, interfacing with Python through C++ adds an extra layer of difficulty and setup to the project, and then also requires a Python installation on any computer that this then needs to run.

I think this project was a good example of a synergistic combination of C++ and Python. I feel it made development smoother than Project 2 which was all C++. This is due to using the two languages each in a situation where they shine, making development easier by using the ‘right’ tool where needed. Another example where Python can be effectively combined with another language is in website back-end development, where Python’s simple syntax and available web app frameworks can help aid development efforts (Giampedraglia, 2019).

Combining languages in a single project does not just apply to Python either. For example, we could use a language like Java to develop an application user interface more easily than in either C++ or Python, since there are many available development tools for this in Java (TechSore, 2021). For this grocery-tracking application, it could allow us to build a front end where the user can easily select different files and where the output can be formatted in different ways than are available in the console.

**References:**

Giampedraglia, P. (2019, Nov. 23) *Why we choose python as a backend language.* asap developers. <https://www.asapdevelopers.com/python-backend-language/>

TechSore (2021, Aug. 3) *Java GUI framework and other applications of java.* <https://techsore.com/java-applications/>