Butler University

Assignment 1: Comparison of C++ and Java

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CS441-01

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9 September 2019

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There are hundreds of languages that can be used to write programs, which makes picking the right programming language difficult. Programmers might be tempted to choose the language they are most comfortable with, even though there might be a different language that better fits the specifications. For this assignment, I wrote the same program in Java and C++, and will be analyzing them using four criteria: Readability, Writability, Reliability, and Cost.

Readability is the first criteria to think about when assessing programming languages. The programs that were written for this assignment are nearly identical in the sense that the data types, operators, and keywords (e.g. *for, do, while, if/else*). Syntactically, the two programs were very similar to each other. However, the Java program contained keywords that C++ did not such as *public* and *static*. These keywords indicate how a function is accessed. While this was not necessarily important in this program, knowing how a function is accessed, or what can access a function, makes reading and maintaining the program easier. It is the addition of keywords such as these that make Java more readable than C++.

Writability is another key thing to think about when comparing programming languages. Writability is the ease with which a language can be used to create programs. Both languages have multiple ways to express the same operation (ex. *count++;* and *count = count + 1;*). When taking this expressivity into account, it is important to note that while it benefits the writability, it can have negative effects on the readability of a language. While both languages are similar in their expressivity, C++ allows for the developer to have control over managing the memory using pointers, while Java's memory is managed by the system (Keerthi). Depending on the experience level of the developer, this can be a good or bad thing. Another thing that affects the writability is the availability of documentation. The documentation for Java is put out by Oracle

and the language is well documented, while good C++ documentation is a little harder to come by. Knowing how a program is intended to be used makes creating programs much simpler.

Another big part of creating programs is making sure that the program runs how it is specified under all circumstances. This is also known as the language's reliability. Java is more reliable than C++ for a couple of reasons. First, aliasing, the presence of multiple distinct names for the same memory location, make programming languages more difficult to write and understand. Pointers, in C++, are an example of aliasing ("Pointers"). As stated earlier, writing a program using pointers can cause problems if the developer does not have experience using them. Pointers do not exist in Java, which gives the language an edge as far as reliability goes. Automatic garbage collection is another feature that adds to Java's reliability. In C++, the developer is in charge of garbage collection and if it is not done correctly it can lead to problems, such as memory leaks. Overall, Java makes the system do more work, while C++ relies on the developer, making Java a more reliable language.

Cost is the last factor used to analyze programming languages, and for many companies, the most important factor. While writing my programs, there was no monetary cost to me. However, the time I spent researching and writing these programs also are considered a cost. I have very little experience using C++, so I needed to spend more time researching and writing that program. I am very familiar with Java, so I spent significantly less time on the Java program. For me, the cost of using Java was lower than the cost of using C++. When comparing the cost of different programming languages, it is important to take into account not only the monetary costs, but the time it will take for the developers to learn and create the programs.

When analyzing different programming languages, it is important to look at the readability, writability, reliability, and cost of the languages. If I were choosing between using

C++ and using Java, I would pick Java because it is what I am most familiar with. This does not make Java the correct choice in all situations. When analyzing a programming language, it is imperative that you use the four criteria mentioned above in conjunction with the experience of the developers and the specifications of the program.

Works Cited

Keerthi. “C++ Vs Java - Know The Top 8 Most Important Differences.” *EDUCBA*, 13 Sept. 2019, www.educba.com/c-plus-plus-vs-java/.

“Pointers.” *Cplusplus.com*, www.cplusplus.com/doc/tutorial/pointers/.