Nicholas DiPinto

Robert Velarde

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Dr. Siewert

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Assignment 6

1. For our project, we are comparing the C++ programming language to the JavaScript programming language. C++ was developed by Bjarne Stroustrup in 1979 as part of his Ph.D. thesis. After exposure to the Simula programming language, Mr. Stroustrup decided he wanted to create a C compiler that would include object-orientation. He chose to improve the C language because he was working for Bell Labs, where the C language was developed, and C was a language known for its portability and speed. The first compiler he developed to accomplish this task was called “C with Classes”, which is a self-hosting compiler. The first language manual for this language was published in 1985, called “The C++ Programming Language”. The name of the language was changed to C++ to represent the idea that this language was an incremental enhancement to the C language. C++ would later be enhanced to include support for features like regular expression support, atomics support, and a threading library (History of C++ - C++ Information, 1).

The JavaScript programming language was developed by Brandon Eich in 1995 (A Short History of JavaScript, 1). However, the language did not gain popularity until 2005, after Jesse James Garrett released a paper that describes a set of technologies implemented using JavaScript (A Short History of JavaScript, 1). This paper started a movement in large developer communities to use JavaScript as a scripting language to build web applications because data could be loaded in the background without having to reload an entire web page (A Short History of JavaScript, 1). Users of the programming language claim its benefits include a “flexible syntax, loose type system, powerful reflection mechanisms, and shorter build cycles” (Kienle, 1).

We chose the C++ programming language as our primary language because it is built upon C. Therefore, the programs written in the language are expected to be portable and easy to compile, like C. We chose JavaScript as our secondary programming language because the idea for our project is based off the efforts of the Wycliffe Associates, who are trying to build a written language translation application using JavaScript. Their choice for JavaScript, as described by one of their managers, can be attributed to its popularity, flexible language, and portability. In this project, we will be building our own simple translation machine written using both the C++ and JavaScript programming languages so that we may compare the two languages.

1. Running the JavaScript program requires opening your web browser. Any web browser will work, but the best one to use is Google Chrome because of its simple to use Debug Console. Google Chrome is free to download at <https://www.google.com/chrome/browser/desktop/index.html?brand=CHBD&gclid=Cj0KEQjwuOHHBRDmvsHs8PukyIQBEiQAlEMW0PtGSVmZSqZcVonijIZi3kvgPyKtNTUFwvQXLPZ3oQIaAuQh8P8HAQ&dclid=COHrwfCNtNMCFYVufgodQlgCpg>. After downloading Google Chrome, one can run the JavaScript program by double-clicking on the HTML file called, “translate.html”.
2. The first key difference between the two programming languages is that JavaScript is classified as a scripting language. Therefore, there is not an explicit compilation step before running code written in JavaScript. Skipping this compilation step causes errors to only be caught during run time when debugging the program. Although skipping the first compilation step could be viewed as more efficient, it can also lead to potential dangers when testing the program because the debug console will not reveal warnings or errors in the program until they are encountered during run time. Without the initial compilation step, running a program in JavaScript can prove more dangerous than running a program in C++.

A second difference that arises between programming languages and scripting languages is that scripting languages can only be ran inside of separate programs rather than independently, like programs written in C++. In the case of JavaScript, code written in JavaScript cannot be ran independently, but needs to be implemented inside of HTML files. This difference can make learning JavaScript, and scripting languages in general, more difficult to learn because someone trying to learn the language must also learn the basics of another language to implement their program. For instance, learning JavaScript required that I also learn how to create a web page in HTML that can implement the JavaScript code. C++ is easier in this respect because implementing a program in C++ requires knowing the two commands to compile and run the code inside the command line.

Lastly, C++ and JavaScript use different methods for assigning data types. In C++, when someone declares a variable they must explicitly state the type for that variable, and that variable’s type can never change. However, in JavaScript, programmers do not declare the variable’s when initializing the variable. Rather, the variable’s type is inferred during run time based on the value being passed into it. Additionally, a variable’s type in JavaScript is dynamic, which means that its type can change at any time during run time whenever a new value is assigned to the variable. The addition of this feature in JavaScript makes the programming language more flexible in terms of numeric calculations because calculating a floating-point number using integers does not require any casting.

1. Given JavaScript’s large support for strings, including regular expression support, it is an easier to use language for program’s centered around string manipulation. Additionally, support from many different APIs, like the Google API, gives JavaScript the ability to perform many different features, like the ability to create maps using GPS coordinates. However, one could argue that the number of features in JavaScript makes it an intimidating language to learn. Considering JavaScript’s built-in functions that simplifies common algorithms in C++, like breaking a large string into individual words, into one function call, JavaScript can be easier to implement in terms of number of lines of code. In terms of debugging, JavaScript is weaker because it does not catch errors unless it runs into them during run time since the code is not compiled until run time. Overall, JavaScript is a more powerful and simpler to use language if the user is an experienced programmer who can recognize the dangers of using the language. However, if the user is not experienced in programming, then they should not be using JavaScript because it is more complex to learn, and harder to completely debug.

**References**

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