In this module, we will be introduced to working with the C++ programming language. What are some of the issues that you had installing and running the Eclipse IDE for C/C++ developers? Working with the C++ language, discuss the different data types available. What are some of the differences, if any, between data types in C++ versus Java? What tips can be utilized to identify possible vulnerabilities using C++ data types? Be sure to provide an appropriate source code example to illustrate your points.

I personally didn’t have issues installing Eclipse

C++ data types include numerical, reference and pointers, compound types, and Boolean, Numerical data types include integers, doubles, floats, short, long and long double. Reference data types are denoted by & while pointer values are denoted by \*. The sample code below shows how to use call by pointer (GeeksforGeeks, Passing by pointer Vs Passing by Reference in C++). Compound types include data types that hold collections of other data such as strings, which are a collection of chars, or arrays and vectors, which can hold any data type. (Fisher, P.)

Java and C++ data types differ in several ways. One of the main differences is that Java is call by value only (Differences and Similarities Between C++ and Java) while C++ can be pass by value OR pass by references (IBM). Another difference is that Java does not have a struct or union data types, instead, a class can be used. Struct and union are data structures that can store different types of data types (Difference Between Structure and Union in C). A char type in Java is allocated 2 bytes in memory to allow for international characters (Differences and Similarities Between C++ and Java), while C++ char is only allocated 1 byte (Fisher, P.). Finally, a Boolean value in C++ is either a 0 (false) or 1(true), while a Boolean in java is a true Boolean with value true or false (Differences and Similarities Between C++ and Java).

As mentioned earlier, C++ can be a call by reference/pointer. This unfortunately is a vulnerability of C++ as a common form of cyber-attacks is against tables of function pointer (vtable). According to Elsabagh, M., Fleck, D. A vtable is a reserved read-only table in the binary that contains function pointers to the definitions of virtual functions accessible through a polymorphic class. This occurs when attackers hijack memory data which points to return addresses within the code, to execute random code of their pleasing. The attacks can either rewrite, inject or reuse a vtable to corrupt a function or object. (Elsabagh, M, 2017)

Passing by pointer Vs Passing by Reference in C . (2017, May 29). Retrieved from <https://www.geeksforgeeks.org/passing-by-pointer-vs-passing-by-reference-in-c/>

Fisher, P. (2017, April 24). C++ data types . [Video File]

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<http://ee402.eeng.dcu.ie/introduction/chapter-5---introduction-to-java/5-6---differences-and-similarities-between-c-and-java>

Difference between Structure and Union in C. (2019, September 2). Retrieved from <https://www.geeksforgeeks.org/difference-structure-union-c/>

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