**Differences:**

| C++ | Java |
| --- | --- |
| C++ supports **Multiple Inheritance** but it can lead to the **Diamond Problem** so it has virtual inheritance to overcome this problem. | Java does not support **multiple inheritance** rather single inheritance. Java uses “interfaces” that does not allow declaration of data members and defining of methods inside the interface, classes implement interfaces and define their own implementation for those methods. So it never causes **diamond problem.** |
| In functions, primitive data types can be **passed by values**, **references** or as **pointers**. However, object types may or may not be passed as reference. | In methods, primitive data types are **passed by value** and object types are passed as **reference**. |
| C++ supports the concepts of **Object-Oriented programming** but functions and variables can be **global**. | All programming is **Object-Oriented**. Each method is declared inside a class. There is no concept of **global variables.** |
| In C++, developers have to manually allocate and deallocate memory using functions like new and delete. This **manual memory management** gives developers fine-grained control but also opens the door to memory-related bugs like memory leaks and dangling pointers if not managed carefully | Java has a built-in **garbage collector** that automatically identifies and reclaims memory occupied by objects that are no longer referenced. This helps prevent memory leaks and simplifies memory management. |
| C++ source code is compiled in the form of an **object code** that produces an **output** when executed. | Java source code is a **byte code**, which makes it **platform-independent.** |

**Similarities:**

| C++ | Java |
| --- | --- |
| C++ supports **support Object Oriented Programming** | Java is **Object Oriented Programming** |
| Primitive data types are the same as java.  byte , short , int , long , float , double , bool and char | Primitive data types are the same as c++.  byte , short , int , long , float , double , bool and char |
| Similar Syntax as Java  Loop , switch, if else (conditional statements),  User defined functions. | Similar Syntax as C++  Loop , switch, if else (conditional statements),  User defined methods. |
| Supports exception handling (Uses **try, catch** and **throw**keywords ) | Supports exception handling (Uses **try, catch** and **throw**keywords ) |
| Has a wealth of online tutorials, forums, and **learning resources,** making them accessible to beginners and experienced programmers alike. | Has a wealth of online tutorials, forums, and learning resources, making them accessible to beginners and experienced programmers alike. |
| C++ is open source programming language | Java is open source programming language |

<https://www.linkedin.com/pulse/basic-overview-open-source-programming-languages-faisal-azmi#:~:text=Some%20of%20the%20famous%20names,regarded%20as%20excellent%20programming%20languages>.

[**https://dl.acm.org/doi/pdf/10.1145/292422.292441**](https://dl.acm.org/doi/pdf/10.1145/292422.292441)

[**http://www.mcours.net/cours/pdf/info/Java\_and\_C\_A\_critical\_comparison.pdf**](http://www.mcours.net/cours/pdf/info/Java_and_C_A_critical_comparison.pdf)

**https://www.coursera.org/articles/java-vs-c**