Provide a short list with information about the most popular programming languages. How do they differ from C#?

The programming languages which will be reviewed are C, C++, C# and Java. The advantages and disadvantages of the four chosen programming languages shall be presented together with the most suitable fields in which they can be applied.

C is a minimalistic programming language because it could be compiled in a straightforward manner by a relatively simple compiler. C offers low-level access to memory via pointers and the ability to access specific hardware addresses. C generates only a few instructions of machine languages for each of its core language elements and does not require extensive run-time support. It can be concluded that C language is suitable for many systems-programming applications that had traditionally been implemented in assembly languages.

However, as C is structured oriented programming language and focuses on the procedural programming paradigm, it is relatively hard to control the large-scale program.

As C language has high level and machine level mixed programming capacity, it is used in most hardware related applications. It is very suitable for writing programs in embedded device, chip designing, industrial automation products and so forth and so on. Meanwhile, Software such as “Unix”, “windows”, and other antivirus can also be created by C language. Last but not at least, algorithm can also be implemented in C language easily.

C++ was originally designed to be an enhancement to C language. Basically it inherits all the advantages of C language. In addition, it has more features than C, such as encapsulation, multiple inheritance, and Polymorphism. It can be concluded that it is relatively easy to use C++ to develop a large or huge system compared with C language as C++ supports the object-oriented (OO) features.

However, C++ has some disadvantages. C++ code is easily prone to errors related to data types because C++ does not offer very strong type-checking. C++ does not support platform independent. It can't run on the all kinds of platforms. The main disadvantage is that C++ is not a pure object oriented programming language as it doesn’t have the feature of garbage collection. C++ adopts the pointers which lead to no security for the data.

C++ can be widely used in the software industry. As C++ can be a very fast programming language after compiled, the software such as application software, device drivers and high-performance server can be designed by C++.

C# is designed for programming the Microsoft .NET Framework. C# is a combination of all the other programming languages in an almost perfect balance. C# is a pure object-oriented language. The concise syntax of C is also added to it. C# syntax is more similar to Java rather than to C++. Pointer memory management in C# is not a problem anymore because the garbage collector takes care of this, much like Java.

The relational database management system (RDBMS) such as Mysql, Oracle, and Microsoft SQL Server can work with C# by the simple connection procedures.

On the other hand, C# has the disadvantages. C# is not flexible. C# depends greatly on .NET framework. Without the component in the .NET framework, C# is difficult to implement.

C# can be applied to the application development because C# is a rapid application development (RAD) language. It can reduce the period of the application development significantly. Furthermore C# is also very suitable for the development of web application because C# consists of a large framework of pre-developed components which can simplify the code of web applications.

Java is a pure object-oriented programming language. It makes modular programs available in order to reuse the code. Java is open source. People can use it for free. It is also platform-independent, which is one of the most significant advantages of Java. Programs written in Java can easily move from one computer system to another.

Java also has some disadvantages. Java is a memory-consuming programming language. Java is slow because it has an extra layer between the systems and the programs. The extra layer is Java Virtual Machine (JVM). Anything done by the Java programs has to be executed by the Java Virtual Machine. Then it makes the system to do the actual instructions.

Java has three different forms, Java 2 Standard Edition (J2SE), Java2 Micro Edition (J2ME), and Java2 Enterprise Edition (J2EE) which is quite similar to what we have in Windows operating systems such as Windows Vista Home Basic Edition, Windows Vista Business Edition and Windows Vista Ultimate Edition. Each form of Java has its suitable application field. J2SE, which is also called CORE Java, is suitable for the desktop applications. J2ME is mainly used in embedded systems development, such as mobile phones, wireless application and PDA programming. J2EE, designed for enterprise applications, is mainly used for the development of distributed network program, such as e-commerce website and ERP systems.

All in all, it can be concluded that all four programming languages C, C++; C#, and Java have the advantages and disadvantages. All four programming languages have their most suitable fields to apply. People can get fast and stable performance from the software written in a suitable programming language.