

The purpose of this document is to provide you with a comprehensive list of URL pointers and programming tips on C++. Also, this document provides a Java-like String class, string tokenizer, memory functions and many other functions, which can be used in general C++ applications. C++ and Java is often used concurrently in many software projects. Programmers jump back and forth between C++ and Java will find this Java-like classes very helpful. Various examples are given which demonstrate the usage of this library and the Standard C++ Library.

This document is not a textbook on C++, and there are already several excellent on-line text books on the internet. Since C++ is being used for a long time there are very large number of C++ documents/articles/tutorials on Internet. If you are new to C++ and you never programmed in C++, then it is strongly suggested that you first either read an online C++ textbook given in chapter [C++ Online Textbooks](#) or you buy a C++ book from online bookstores such as [Amazon](#) or [barnes](#).

As someone said – *Leave the C/C++ programming to system engineers who write operating system, device drivers and fast response real-time programming, you should use Java/PHP-scripting as speed of the computers in year 2005 will be several billion times faster than computers of year 2002!!* Hardware is getting cheaper and faster.

### 1.1 Program in C++ ? C++ vs. Java/PHP

C++ is one of the most powerful languages and will be used for a long time in the future in spite of emergence of Java or PHP-scripting. Programs which need real-time ultra fast response use C/C++. C++ runs **extremely fast** and is in fact **10 to 20 times FASTER than** Java. Java is the "offspring" of C++. The only complaint against Java is – *"Java is GOD DAMN SLOW"*. Java byte-code is slower when running in a VM than the equivalent natively compiled code. Java runs faster with JIT (Just-In-Time) compiler, but it is still slower than C++. And optimized C/C++ program is about **3 to 4 times faster** than Java compiled to native code with JIT compiler or ahead-of-time compiler!! Then, why do people use Java? Because it is pure object oriented and is easier to program in Java, as Java automates memory management, and programmers do not directly deal with memory allocations. This document attempts to automate the memory management in C++ to make it much more easy to use. The library given here will make C++ look like Java and will enable C++ to compete with the Java language.

Because of manual memory allocations, debugging the C++ programs consumes a major portion of time. This document will give you some better ideas and tips to reduce the debugging time.

When should you use C++ and when you should use Java/PHP?

Bottom line is, you use C++:

- If you are developing a program where speed and performance is very important.
- If the user base of your application or program is very large. Since C++ involves compile-link-debug cycle it is more time consuming to develop application in C++. You can justify the cost only if the user base of your program is large enough. Linking large number of object files to create an executable takes time. (You can use archives, libraries or shared libraries to reduce linking time).
- If you have lot of experience programming in C++.

Use Java/PHP:

- If speed and performance is not important (relative to C/C++).
- Lower cost of development – There is no compile-link cycle, Java/PHP development is faster than C++.

- Need rapid development.
- You want no code maintenance nightmare. Maintaining C++ is more difficult than Java or PHP-scripting.
- Java and PHP-scripting is the future, hardware speed will be zooming with the introduction of molecular, atomic and sub-atomic scale computers. Future computers will be several trillion times faster than today's computer. Runtime performance of Java or PHP-script becomes less important as speed of hardware zooms in future. The computers you are using today (as of year 2002) are extremely slow and crawling and are not fast enough.

NOTE: There are lot of improvements in Java compilers (JIT and ahead-of-time). Java programs can be compiled with GNU GCJ <http://gcc.gnu.org/java>, GCJ is a portable, optimizing, ahead-of-time compiler for the Java programming language. It can compile – Java source code directly to native machine code, Java source code to Java bytecode (class files), and Java bytecode to native machine code.

GCJ resources:

- Main site GNU GCJ <http://gcc.gnu.org/java>,
- Redhat rpm GNU GCJ <http://www.redhat.com/apps/download>. Go here and under the section "Find latest RPMs" search by keyword 'gcc-java' and 'libgcj'.
- Redhat GCJ Installtion instructions <http://www.redhat.com/devnet/articles/gcj.pdf>

## 1.2 Which one Ada95, C, C++, Java or PHP?

Language choice is very difficult. There are too many parameters – people, people skills, cost, tools, politics (even national politics) and influence of businessmen/commercial companies. The best language based on technical merits does not get selected simply due to political decisions!

See the language comparison chart of David Wheeler at [Ada comparison chart](#). Ada got 93%, Java 72%, C++ 68% and C got 53%. C++ and Java are closer in points (only 4% difference). Development costs of Ada is half of C++ as per [Stephen F. Zeigler](#). Ada95 is available at –

- Ada home <http://www.gnuada.org>.
- Google [Ada index](#)

The C++ compiler is lot more complex than a C compiler and C++ programs may run bit slower than C programs. The C compiler is very mature and seasoned.

On some system, you can use compiler options, to optimize the code generated.

Nowadays, C is primarily used for low level systems programming to develop operating systems, device drivers and applications which must perform fast.

**Note: Using the String, StringBuffer, StringTokenizer and StringReader classes given in this howto, you can code in C++ which "exactly" looks like Java. Parts of this document tries to close the gap between C++ and Java, by imitating Java classes in C++. Java programmers who jump to and fro from C++ to Java will like this String class.**

If you want to bypass the edit-compile-debug-compile cycle of C++ then see scripting languages like PHP which can be used for web development and for general purpose programming. Scripting languages like PHP, PERL enable rapid application development. PHP has some features of object-oriented programming. PHP is