**1.3 JDK Environment and Tools :-**

Java is a general-purpose computer programming language that is concurrent, class-based, object-oriented etc.

Java applications are typically compiled to **bytecode** that can run on any Java virtual machine (JVM) regardless of computer architecture.The latest version is **Java 8**.

Below are the environment settings for both Linux and Windows. JVM, JRE and JDK  all three are platform dependent because configuration of each Operating System is different. But, Java is platform independent.

There are few things which must be clear before setting up the environment

1. **JDK**(Java Development Kit) : JDK is intended for software developers and includes development tools such as the Java compiler, Javadoc, Jar, and a debugger.
2. **JRE**(Java Runtime Environment) : JRE contains the parts of the Java libraries required to run Java programs and is intended for end users. JRE can be view as a subset of JDK.
3. **JVM:** JVM (Java Virtual Machine) is an abstract machine. It is a specification that provides runtime environment in which java bytecode can be executed. JVMs are available for many hardware and software platforms.

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| **JDK Tools and Utilities** |  |

**General**

* [**General Information**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#general) (file structure, classpath, how classes are found, changes)

**Standard JDK Tools and Utilities**

* [**Basic Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#basic) (javac, java, javadoc, apt, appletviewer, jar, jdb, javah, javap, extcheck)
* [**Security Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#security) (keytool, jarsigner, policytool, kinit, klist, ktab)
* [**Internationalization Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#intl) (native2ascii)
* [**Remote Method Invocation (RMI) Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#rmi) (rmic, rmiregistry, rmid, serialver)
* [**Java IDL and RMI-IIOP Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#idl) (tnameserv, idlj, orbd, servertool)
* [**Java Deployment Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#deployment) (pack200, unpack200)
* [**Java Plug-in Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#plugin) (htmlconverter)
* [**Java Web Start Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#javaws) (javaws)

**Experimental JDK Tools and Utilities**

**NOTE** - The tools described in this section are unsupported and **experimental** in nature and should be used with that in mind. They might not be available in future JDK versions.

* [**Monitoring and Management Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#manage) (jconsole, jps, jstat, jstatd)
* [**Troubleshooting Tools**](https://www.cs.mun.ca/java-api-1.5/tooldocs/index.html#debug) (jinfo, jmap, jsadebugd, jstack)

**NOTE** - Some tools have separate reference pages for Windows, Linux and Solaris to accommodate minor differences in configuration and usage -- for example, the character used to specify directory separators may be different.

**General Information**

The following documents contain important information you will need to know to get the most out of the SDK tools.

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| **JDK File Structure** | [[Solaris](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/jdkfiles.html)] [[Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/linux/jdkfiles.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/jdkfiles.html)] |
| **Setting the Classpath** | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/classpath.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/classpath.html)] |
| **How Classes are Found** | [[Solaris, Linux and Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/findingclasses.html)] |
| **Tool Changes in Java 2 SDK, v1.4** | [[Solaris, Linux and Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/tools-changes.html)] |

**Basic Tools**

These tools are the foundation of the JDK. They are the tools you use to create and build applications.

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| **Tool Name** | **Brief Description** | **Links to Reference Pages** |
| **javac** | The compiler for the Java programming language. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/javac.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/javac.html)] |
| **java** | The launcher for Java applications. In this release, a single launcher is used both for development and deployment. The old deployment launcher, **jre**, is no longer provided. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/java.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/java.html)] |
| **javadoc** | API documentation generator. See [Javadoc Tool](https://www.cs.mun.ca/java-api-1.5/guide/javadoc/index.html) page for doclet and taglet APIs. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/javadoc.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/javadoc.html)] |
| **apt** | Annotation processing tool. See [Annotation Processing Tool](https://www.cs.mun.ca/java-api-1.5/guide/apt/index.html) for program annotation processing. | [[Solaris, Linux, and Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/share/apt.html)] |
| **appletviewer** | Run and debug applets without a web browser. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/appletviewer.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/appletviewer.html)] |
| **jar** | Create and manage Java Archive (JAR) files. See [Java Archive Files](https://www.cs.mun.ca/java-api-1.5/guide/jar/index.html) page for the JAR specification. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/jar.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/jar.html)] |
| **jdb** | The Java Debugger. See [JPDA](https://www.cs.mun.ca/java-api-1.5/guide/jpda/index.html) for the debugger architecture specifications. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/jdb.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/jdb.html)] |
| **javah** | C header and stub generator. Used to write native methods. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/javah.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/javah.html)] |
| **javap** | Class file disassembler | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/javap.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/javap.html)] |
| **extcheck** | Utility to detect Jar conflicts. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/extcheck.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/extcheck.html)] |

**Security Tools**

These security tools help you set security policies on your system and create apps that can work within the scope of security policies set at remote sites.

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| **Tool Name** | **Brief Description** | **Links to Reference Pages** |
| **keytool** | Manage keystores and certificates. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/keytool.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/keytool.html)] |
| **jarsigner** | Generate and verify JAR signatures. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/jarsigner.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/jarsigner.html)] |
| **policytool** | GUI tool for managing policy files. | [[Solaris and Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/solaris/policytool.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/policytool.html)] |

These security tools help you obtain, list, and manage Kerberos tickets.

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| **Tool Name** | **Brief Description** | | **Links to Reference Pages** | |
| **kinit** | Tool for obtaining Kerberos v5 tickets. Equivalent functionality is available on the Solaris operating environment via the kinit tool. For example, for Solaris 8, see the [kinit reference page](http://docs.sun.com/?q=kinit&p=/doc/806-0624/6j9vek58d&a=view). | | [[Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/linux/kinit.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/kinit.html)] | |
| **klist** | Command-line tool to list entries in credential cache and key tab. Equivalent functionality is available on the Solaris operating environment via the klist tool. For example, for Solaris 8, see the [klist reference page](http://docs.sun.com/?q=kinit&p=/doc/806-0624/6j9vek58e&a=view). | | [[Linux](https://www.cs.mun.ca/java-api-1.5/tooldocs/linux/klist.html)] [[Windows](https://www.cs.mun.ca/java-api-1.5/tooldocs/windows/klist.html)] | |
| **ktab** | Command-line tool to help the user manage entires in the key table. Equivalent functionality is available on the Solaris operating environment via the kadmin tool. For example, for Solaris 8, see the [kadmin reference page](http://docs.sun.com/?q=kadmin&p=/doc/816-0211/6m6nc66th&a=view). | |  | |
| **Java Tool** | | | **Description** | | |
| appletviewer | | | To run applets outside of a web browser. | | |
| extcheck | | | To detect version conflict between a target jar file and installed extension jar files. | | |
| idlj | | | To generate Java bindings for a given IDL file. | | |
| jabswitch | | | To enable Java applications that implement Java Accessibility API to be visible to assistive technologies on MS Windows systems. | | |
| jar | | | To aggregate and compress multiple files into a singe JAR file. | | |
| jarsigner | | | To digitally sign a jar file and also to verify the signatures and integrity of signed jar files. | | |
| java | | | To launch Java applications. | | |
| javac | | | To compile Java source files to binary class files. | | |
| javadoc | | | To generate API documentation out of Java source files. | | |
| javafxpackager | | | To package JavaFx applications for deployment. | | |
| javah | | | To generate C language header and stubs while writing native methods. | | |
| javap | | | To disassemble Java class files. | | |
| java-rmi | | | To generate stubs, skeletons and other RMI related tasks. | | |
| javaw | | | To run a GUI based Java application in its own window in MS Windows. | | |
| javaws | | | To launch a Java application that is distributed through web. | | |
| jcmd | | | To send diagnostic command requests to a Java JVM. | | |
| jconsold | | | GUI tool to monitor a Java application running in a JVM. | |
| jdb | | | To debug a Java class. | |
| jdeps | | | To analyze Java class dependencies. | |
| jhat | | | To parse and browse through Java heap dumps. | |
| jinfo | | | To print configuration information for a given process or core file or remote debug server. | |
| jjs | | | To invoke the Nashorn JavaScript engine. | |
| jmap | | | To print shared object memory maps or heap memory details of a Java application process. | |
| jmc | | | To monitor, analyze and debug Java applications. | |
| jps | | | To list instrumented HotSpot Java VMs on a target system. | |
| jrunscript | | | To run scipting language files like JavaScript. | |
| jsadebugd | | | To attach to a Java process and acts as a debug server, so that remote clients can connect to it. | |
| jstak | | | To print stack trace of threads for a given Java process. | |
| jstat | | | To display performance statistics for an instrumented HotSpot JVM. | |
| jstatd | | | To launch a RMI server to monitor creation and termination of instrumented HotSpot Java virtual machines. | |
| jvisualvm | | | To monitor, analyze and debug running Java application via a GUI. | |
| keytool | | | To create, manage, store keys and security certificates. | |
| kinit | | | To obtain and cache Kerberos ticket-granting tickets. | |
| klist | | | To list entries in credential cache and key tab. | |
| ktab | | | To manage the entries in the security key table. | |
| native2ascii | | | To convert files encoded in any character encoding supported by JRE to files encoded in ASCII. | |
| orbd | | | To locate and invoke persistent objects on servers in CORBA environments. | |
| pack200 | | | To transform a Java JAR file into a compressed pack200 file using the Java gzip compressor. | |
| policytool | | | To create and modify the external policy configuration files that define the system Java security policy. | |
| rmic | | | To generate stubs and skeletons for Java remote objects. | |
| rmid | | | To start the activation system daemon that allows remote objects to be registered and activated in a JVM. | |
| rmiregistry | | | To start a remote object registry. | |
| schemagen | | | To generate schema for Java architecture XML bindings. | |
| serialver | | | To return Java class serialVersionUID. | |
| servertool | | | To enable programmers to register, unregister, startup and shutdown a persistent server. | |
| tnameserv | | | To provide access to Java naming service. | |
| unpack200 | | | To transform back a pack200 file to a Java JAR file. | |
| wsgen | | | To read an existing web service implementation class and generate Java JAX-WS portable artifacts. | |
| wsimport | | | To read a WSDL and generate Java JAX-WS portable artifacts. | |
| xjc | | | Binding compiler for Java Architecture for XML Binding. | |