

Installing Java

Table of contents

1 Jargon.....	3
2 Introduction.....	4
3 How to install the JDK.....	4
3.1 Microsoft Windows 95.....	4
3.1.1 Installing the JDK.....	4
3.1.2 Setting the Path Variable.....	5
3.2 Microsoft Windows 98.....	5
3.2.1 Installing the JDK.....	5
3.2.2 Setting the Path Variable.....	6
3.3 Microsoft Windows 2000.....	7
3.3.1 Installing the JDK.....	7
3.3.2 Setting the Path Variable.....	7
3.4 Microsoft Windows XP.....	8
3.4.1 Installing the JDK.....	8
3.4.2 Setting the Path Variable.....	9
3.5 Linux (Red Hat, Fedora Core & Mandrake).....	10
3.5.1 Installing the JDK.....	10
3.5.2 Setting the Path Variable.....	10
3.6 Sun Solaris.....	10
3.7 MacOS.....	10
4 Compiling and Running Java Programs.....	11
4.1 Compiling Java Programs.....	11
4.1.1 Microsoft Windows.....	11
4.1.2 Linux.....	11

4.1.3 Solaris.....	12
4.2 Running Java Programs.....	12
4.3 Common Errors and Solutions.....	12
5 Valuable Resources.....	12
5.1 The Java Application Programmer Interface.....	12
5.2 Sun's Java Page.....	13
6 Summary.....	13
7 Exercise Set.....	13
7.1 Multiple Choice.....	13
7.2 Exercises.....	14
7.3 Programming Exercises.....	14

1. Jargon

API

Application Programming Interface, Set of related classes and methods that provide certain functionality. The API represents the parts of a class exposed through access modifiers to code written by other programmers.

Compiler

A computer program that translates a high-level programming language into machine language. The program fed into the compiler is called the source program; the generated machine language program is called the object program.

Computer

An electronic device that has the ability to store, retrieve, and process data, and can be programmed with instructions that it remembers. The physical parts that make up a computer (the central processing unit, input, output, and memory) are called hardware. Programs that tell a computer what to do are called software.

Environment Variable

A variable that specifies how an operating system or another program runs, or the devices that the operating system recognizes.

JDK

Java Development Kit, A software package that contains the minimal set of tools needed to write, compile, debug, and run Java applets and applications.

Java

Java is an object-oriented programming language developed initially by James Gosling and colleagues at Sun Microsystems. The language, initially called Oak (named after the oak trees outside Gosling's office), was intended to replace C++, although the feature set better resembles that of Objective C. Java should not be confused with JavaScript, which shares only the name and a similar C-like syntax. Sun Microsystems currently maintains and updates Java regularly.

Platform

In computing, a platform describes some sort of framework, either in hardware or software, which allows software to run. Typical platforms include a computer's architecture, operating system, or programming languages and their runtime libraries.

Program

A set of intangible instructions that tells a computer how to operate. Computer programs are also known as software.

SDK

Software Development Kit A set of programs that allows software developers to create products to run on a particular platform or to work with an API.

Software

A computer program that helps the user accomplish a specific task; for example, a word processing program. Application programs should be distinguished from system programs, which control the computer.

2. Introduction

In order to develop software using the Java language you will need to install a suitable compiler and interpreter on your computer. This will enable you to compile and run Java programs that you write.

This is not a complex process but varies depending on which platform you use. The platform will dictate the method you use to set variables as different platforms use different methods for achieving this task. Windows itself has different ways depending on which version of Windows you use. Linux and Unix based platforms also have numerous different ways of performing the same task.

Once you have installed Java, you may wish to consult some references. There are a number of excellent references available to Java programmers; some of these include Sun Microsystems's Java Page and the Java API.

You can get the JDK @ java.sun.com (<http://java.sun.com>)

3. How to install the JDK

For this installation, the latest version of Java was used at the time of writing, Java 1.5.0, but previous and later versions should work just fine.

3.1. Microsoft Windows 95

3.1.1. Installing the JDK

1. Run the setup program `jdk-1_5_0-windows-i586.exe`

Running the setup program.

2. Click "Continue" on the warning message.

Warning message.

3. Click "Accept Terms in License Agreement" then click on the Next button.

Licence Agreement.

4. Select the components to install. If you are low on free space you can leave out the

Installing Java

Demos and Source Code.

Components to Install

5. The wizard will now install the JDK files on your system. This may take a while.

Installing the files

6. Click the Next button to install the J2SE Runtime Environment

Install the Java Runtime Environment

7. In the next dialog select the browsers to integrate the JRE with, I recommend all. Click the Next button.
8. The installation should be complete! Click the Finish button.

Installation complete

3.1.2. Setting the Path Variable

We need to set the path variable so that the system can find the Java compiler.

1. Open the Windows Explorer and navigate to the C:\ drive. Right-click on the file named `Autoexec.bat` and select edit from the menu.

Edit the autoexec.bat file

Warning:

`Autoexec.bat` may not be visible if it is set as a hidden file. You should set folder options to display hidden files by selecting Options from the Folder menu.

2. The file may be empty, but it will most likely contain some entries. You should add the following entries at the bottom of the file, after the last entries:

```
set JAVA_HOME=C:\Program Files\Java\jdk1.5.0
set PATH="%PATH%;%JAVA_HOME%\bin"
```

Note:

If you changed the installation location of java to some other location, you will have to change the location here to.

3. Save the file, close the text editor and restart your computer.

3.2. Microsoft Windows 98

3.2.1. Installing the JDK

1. Run the setup program `jdk-1_5_0-windows-i586.exe`

Running the setup program.

2. If you use Windows 98 First Edition and get the warning message, click "Continue" on the warning message.

Warning message.

3. Click "Accept Terms in License Agreement" then click on the Next button.

Licence Agreement.

4. Select the components to install. If you are low on free space you can leave out the Demos and Source Code.

Components to Install

5. The wizard will now install the JDK files on your system. This may take a while.

Installing the files

6. Click the Next button to install the J2SE Runtime Environment

Install the Java Runtime Environment

7. In the next dialog select the browsers to integrate the JRE with, I recommend all. Click the Next button.
8. The installation should be complete! Click the Finish button.

Installation complete

3.2.2. Setting the Path Variable

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```
set JAVA_HOME=C:\Program Files\Java\jdk1.5.0
set PATH="%PATH%;%JAVA_HOME%\bin"
```

Note:

Installing Java

If you changed the installation location of java to some other location, you will have to change the location here to.

3. Save the file, close the text editor and restart your computer.

3.3. Microsoft Windows 2000

3.3.1. Installing the JDK

Note:

You should be logged in as Administrator or have Administrative privileges to perform this installation. If not, you should get your System Administrator to do the install for you.

1. Run the `jdk-1_5_0-windows-i586.exe` setup program.
2. Select Accept with the Terms in the License Agreement and click the Next button.

Accept the terms in the licence

3. Select the components you wish to install. If you are low on disk space you can leave out the Demos and Source Code. Click the Next button to continue.

Select components to install

4. The installer will now copy files to your computer, this may take a while.

Copying files to your computer

5. Install the Public Java Runtime Environment by clicking the Next button. You should not have to edit any settings here.

Install the runtime environment

6. Select which browsers to integrate the runtime environment with. I recommend all.

Select browsers to integrate the runtime with

7. That should take care of the installation. The JDK is now successfully installed on your system.

Installation completed.

3.3.2. Setting the Path Variable

We need to set the path variable so that the system can find the Java compiler.

Note:

We will create the variables in the global system space so that any user on the system can use the java tools. If you don't want this, you can create the variables in the Administrator's user space, but then only the administrator will be able to use the java

tools. This might be what you want if there is only one user on the computer.

1. Right click on the My Computer icon on the desktop and select Properties from the pop up menu. Click the Environment Variables button.

My Computer Properties

2. Under the System Variables section click the New button to add a new variable.

Environment Variables

3. Add a variable named JAVA_HOME with the value C:\Program Files\Java\jdk1.5.0 and click the Ok button.

The Java Home Variable

Note:

If you installed Java to a different location, you should change the value here to reflect this.

4. Lastly edit the variable named PATH, add a semi colon (;) after the last entry in the value field and then add C:\Program Files\Java\jdk1.5.0\bin

The PATH variable

3.4. Microsoft Windows XP

3.4.1. Installing the JDK

Note:

You should be logged in as Administrator or have Administrative privileges to perform this installation. If not, you should get your System Administrator to do the install for you.

1. Run the `jdk-1_5_0-windows-i586.exe` setup program.

Run the setup program

2. Select Accept with the Terms in the License Agreement and click the Next button.

Accept the terms in the licence

3. Select the components you wish to install. If you are low on disk space you can leave out the Demos and Source Code. Click the Next button to continue.

Select components to install

4. The installer will now copy files to your computer, this may take a while.

Installing Java

Copying files to your computer

5. Install the Public Java Runtime Environment by clicking the Next button. You should not have to edit any settings here.

Install the runtime environment

6. Select which browsers to integrate the runtime environment with. I recommend all.

Select browsers to integrate the runtime with

7. That should take care of the installation. The JDK is now successfully installed on your system.

Installation completed.

3.4.2. Setting the Path Variable

We need to set the path variable so that the system can find the Java compiler.

Note:

We will create the variables in the global system space so that any user on the system can use the java tools. If you don't want this, you can create the variables in the Administrator's user space, but then only the administrator will be able to use the java tools. This might be what you want if there is only one user on the computer.

1. Right click on the My Computer icon on the desktop and select Properties from the pop up menu. Click the Environment Variables button.

My Computer Properties

2. Under the System Variables section click the New button to add a new variable.

Environment Variables

3. Add a variable named JAVA_HOME with the value C:\Program Files\Java\jdk1.5.0 and click the Ok button.

The Java Home Variable

Note:

If you installed Java to a different location, you should change the value here to reflect this.

4. Lastly edit the variable named PATH, add a semi colon (;) after the last entry in the value field and then add C:\Program Files\Java\jdk1.5.0\bin

The PATH variable

3.5. Linux (Red Hat, Fedora Core & Mandrake)

3.5.1. Installing the JDK

Note:

This how-to assumes you have root privileges and that you are to install Java system wide so that all users can use the Java tools.

1. Start a shell. Copy the Linux installer to the `/usr/local` directory.

```
cp jdk-1_5_0-linux-i586.bin /usr/local
```

2. Now change into the `/usr/local` directory and run the installer.

```
cd /usr/local
chmod +x jdk-1_5_0-linux-i586.bin
./jdk-1_5_0-linux-i586.bin
```

3. Read through the license agreement and if you agree type `yes`. This will start the installer.

4. If everything goes well you should end up with output that ends with:

```
Done.
```

3.5.2. Setting the Path Variable

1. Create the file named `java.sh` in the directory named `/etc/profile.d` using your favourite text editor. I used `Vi`.

```
cd /
touch /etc/profile.d/java.sh
vi /etc/profile.d/java.sh
```

2. Add the following to the file.

```
export JAVA_HOME=/usr/local/jdk1.5.0
export PATH=${PATH}:${JAVA_HOME}/bin
```

3. Make the script executable.

```
chmod +x /etc/profile.d/java.sh
```

4. Log out and then log in again for the changes to take effect.

3.6. Sun Solaris

The JDK should be installed and setup by default. For information on upgrading go to [Sun's Website](http://www.sun.com) (<http://www.sun.com>) and browse through the Solaris documentation.

3.7. MacOS

Most newer versions of MacOS have the JDK installed and setup by default. For information

Installing Java

on upgrading check out the MacOS documentation.

4. Compiling and Running Java Programs

4.1. Compiling Java Programs

We will now test our installation by compiling and running a simple Java Program.

4.1.1. Microsoft Windows

1. Open the Notepad text editor Start > All Programs > Accessories > Notepad and type the following program into it:

```
class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

2. Save the program to the C:\ drive in a file named HelloWorld.java. Make sure to select "All Files" in the Type field of the Save As dialog box.
3. To compile the program, open the Dos Prompt Start > All Programs > Accessories > Command Prompt and type:

```
cd\
javac HelloWorld.java
```

If you don't get any errors then everything went well. If you get errors, check firstly that you saved the program on the C:\ drive and that it is named HelloWorld.java.

4.1.2. Linux

1. Start your favourite text editor and type the following program in it, then save it in a file named HelloWorld.java in your home directory.

```
class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

2. To compile the program, start a shell and use the Java Compiler:

```
cd ~
javac HelloWorld.java
```

If you don't get any errors then everything went well. If you get errors, check firstly that you saved the program in your home directory and that it is named HelloWorld.java.

4.1.3. Solaris

1. Start a text editor, either `vi` in the command line or Gedit. Type the following program in it then save it in a file name `HelloWorld.java` in your home directory.

```
class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

2. To compile the program, start a shell and use the Java Compiler:

```
cd ~
javac HelloWorld.java
```

If you don't get any errors then everything went well. If you get errors, check firstly that you saved the program in your home directory and that it is named `HelloWorld.java`.

4.2. Running Java Programs

1. To run the program, type:

```
java HelloWorld
```

you should get the following output:

```
Hello World!
```

4.3. Common Errors and Solutions

1. Exception in thread "main" java.lang.NoSuchMethodError: main
You must define a main method as: `public static void main(String[] args) {...}`
2. HelloWorld.java:3: illegal character: \8220
`System.out.println(öHelloWorld!ö);`
Do not type your code in a word processor application that uses smart quotes!!
3. HelloWorld.class Exception in thread "main"
java.lang.NoClassDefFoundError: HelloWorld/class
The correct way to call a program is `java HelloWorld` without the ".java" or ".class"

5. Valuable Resources

5.1. The Java Application Programmer Interface

The Java API is an Application Programmer Interface that describes in great detail the core

Installing Java

Java Foundation Classes that make up the Java Platform. It highlights which packages make up the Platform, which classes belong to which packages and what methods and fields are available in each class. It is an invaluable tool to any Java Programmer.

The Java API

5.2. Sun's Java Page

Sun Microsystems's Java page can be accessed via the Internet at <http://java.sun.com> and it provides a download page where you can download all of the Java Technology that you want. It includes documentation: API's, Tutorials, Short Courses and White Papers. It often has industry news and updates and is also an invaluable resource to any Java programmer.

Sun't Java Page

6. Summary

In order to compile and run Java programs you need to install the J2SE SDK and set the PATH environment variable. Setting an environment variable is dependent on the underlying platform.

Compiling java programs is done using the "javac" command and running them with the "java" command.

The Java API and Sun's Java page are exceptional resources for any Java programmer.

7. Exercise Set

7.1. Multiple Choice

1. The JDK is available for which platforms?
 1. Windows
 2. Linux
 3. MacOS
 4. Sun Solaris
 5. All of the above
2. The JDK contains:
 1. Tools to develop software for the Java Platform
 2. A Java Runtime Environment
 3. The core Java API
 4. The Java Source Code

5. All of the above
3. Installing the JDK requires:
 1. Extracting the JDK archive.
 2. Depends on the platform.
 3. Running the installation binary.
 4. Setting the path and classpath variables.
 5. 1 and 4.
4. The Java API:
 1. Explains which packages form the core of Java Programming Language
 2. Which classes are located in which package.
 3. Which methods a class contains.
 4. The fields that the class contains.
 5. All of the above.
5. Sun's java page:
 1. Contains the Java Tutorial.
 2. Contains all the Java Software.
 3. Is not worth visiting.
 4. 1 and 2.
 5. 2 and 3.

7.2. Exercises

1. Install the JDK on your own computer.
2. Compile and Run the Hello World program.
3. Browse through the Java API.
4. Browse the Java page at Sun Microsystems's site: java.sun.com (<http://java.sun.com>)
5. Download or browse the Java Tutorial at:
<http://java.sun.com/docs/books/tutorial/index.html>

7.3. Programming Exercises

1. Go read through the Java Tutorial at Sun's Java page and then try the following programs:
 1. Change the Hello World program so that it prints out your name.
 2. Write a program to display the first twenty powers of two.
 3. Write a program that generates a temperature conversion chart between Fahrenheit and Celsius.
 4. Write a program to display the first twenty Fibonacci numbers.
 5. Write a program that reads a number and displays it's square root.

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