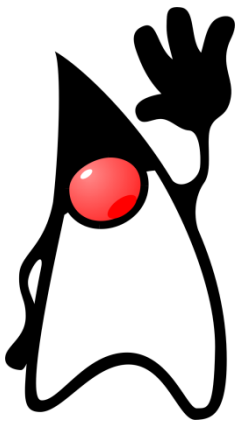


¡HOLA MUNDO!

COBOL

```
IDENTIFICATION DIVISION.
PROGRAM-ID. HELLO-WORLD.
PROCEDURE DIVISION.
    DISPLAY 'Hello, world!'.
    STOP RUN.
```

FORTRAN

```
program hello
    write(*,*) 'Hello, world!'
end program hello
```

Lisp

```
(print "Hello, world!")
```

Pascal

```
program HelloWorld;

begin
  WriteLn('Hello, world!');
end.
```

Ocaml

```
print_endline "Hello, world!"
```

Haskell

```
main = putStrLn "Hello, world!"
```

C

```
#include <stdio.h>

int main(void)
{
    puts("Hello, world!");
}
```

Clojure

```
(println "Hello, world!")
```

C++

```
#include <iostream>

int main()
{
    std::cout << "Hello, world!\n";
}
```

C#

```
using System;
class Program
{
    public static void Main(string[] args)
    {
        Console.WriteLine("Hello, world!");
    }
}
```

JAVA

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

Python

```
print "Hello, world!"
```

Javascript

```
console.log('Hello, world!');
```

SCALA

```
object HelloWorld extends App {
  println("Hello, world!")
}
```

Antes de ver la versión Java…

…aclaremos la cuestión CLASE / OBJETO

Clase es a **tipo** como **objeto** es a **variable**

```
int var1;
Persona pepe;
```

var1 es una **variable** de **tipo entero**

pepe es un **objeto** de **clase persona**

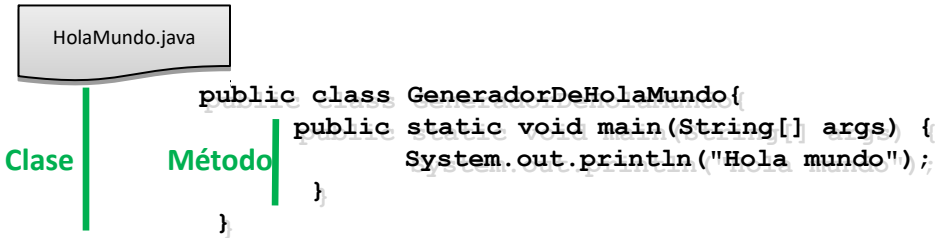
Una **clase** es un "**tipo complejo**"; una agrupación de **variables** (constantes), **objetos**, e incluso **código** que puede actuar sobre sus propios elementos u otros.

Un **objeto** es una cápsula (de memoria de ordenador) que tiene un "estado" (determinado por los valores de sus variables y el estado de sus objetos) así como un comportamiento (definido por el código que encierra).

La clase es la "definición" a partir de la cual se generan ("instancian") los elementos que participan en la aplicación. (esto tiene cuestiones de detalle que se matizarán más adelante)

HolaMundo.java

```
public class GeneradorDeHolaMundo{
      public static void main(String[] args) {
            System.out.println("Hola mundo");
       }
 }
```

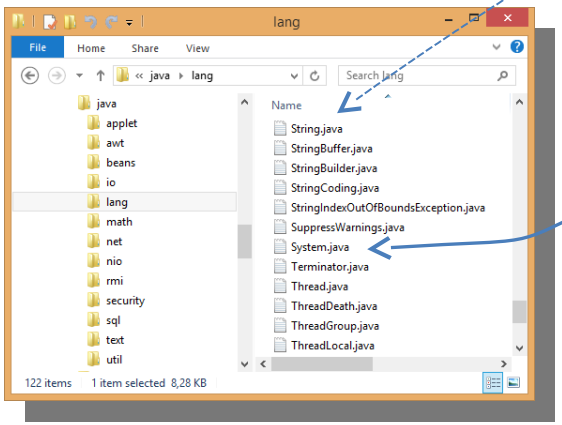

HolaMundo.java
Clase
Método
public class GeneradorDeHolaMundo{
public static void main(String[] args) {
System.out.println("Hola mundo");
}
}

HolaMundo.java

Clase

Método

```
public class GeneradorDeHolaMundo{
    public static void main(String[] args) {
        java.lang.System.out.println("Hola mundo");
    }
}
```



System.java

```
/**
 * The <code>System</code> class contains several useful class fields
 * and methods. It cannot be instantiated.
 *
 * <p>Among the facilities provided by the <code>System</code> class
 * are standard input, standard output, and error output streams;
 * access to externally defined properties and environment
 * variables; a means of loading files and libraries; and a utility
 * method for quickly copying a portion of an array.
 *
 * @author  unascribed
 * @since   JDK1.0
 */
public final class System {

    /* register the natives via the static initializer.
     *
     * VM will invoke the initializeSystemClass method to complete
     * the initialization for this class separated from clinit.
     * Note that to use properties set by the VM, see the constraints
     * described in the initializeSystemClass method.
     */
    private static native void registerNatives();
    static {
        registerNatives();
    }

    /** Don't let anyone instantiate this class */
    private System() {
    }

    /**
     * The "standard" input stream. This stream is already
     * open and ready to supply input data. Typically this stream
     * corresponds to keyboard input or another input source specified by
     * the host environment or user.
     */
    public final static InputStream in = null;

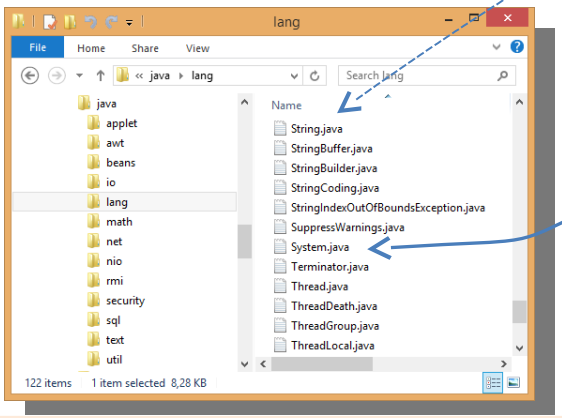
    /**
     * The "standard" output stream. This stream is already
     * open and ready to accept output data. Typically this stream
     * corresponds to display output or another output destination
     * specified by the host environment or user.
     * <p>
     * For simple stand-alone Java applications, a typical way to write
     * a line of output data is:
     * <blockquote><pre>
     *     System.out.println(data)
     * </pre></blockquote>
     * <p>
     * See the <code>println</code> methods in class <code>PrintStream</code>.
     *
     * @see     java.io.PrintStream#println()
     * @see     java.io.PrintStream#println(boolean)
     * @see     java.io.PrintStream#println(char)
     * @see     java.io.PrintStream#println(char[])
     * @see     java.io.PrintStream#println(double)
     * @see     java.io.PrintStream#println(float)
     * @see     java.io.PrintStream#println(int)
     * @see     java.io.PrintStream#println(long)
     * @see     java.io.PrintStream#println(java.lang.Object)
     * @see     java.io.PrintStream#println(java.lang.String)
     */
    public final static PrintStream out = null;
```

HolaMundo.java

```
public class GeneradorDeHolaMundo{
    public static void main(String[] args) {
        System.out.println("Hola mundo");
    }
}
```

Clase

Método



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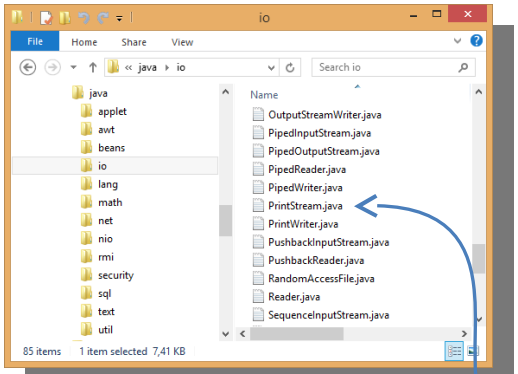
     * @see     java.io.PrintStream#println(char)
     * @see     java.io.PrintStream#println(char[])
     * @see     java.io.PrintStream#println(double)
     * @see     java.io.PrintStream#println(float)
     * @see     java.io.PrintStream#println(int)
     * @see     java.io.PrintStream#println(long)
     * @see     java.io.PrintStream#println(java.lang.Object)
     * @see     java.io.PrintStream#println(java.lang.String)
     */
    public final static PrintStream out = null;
```

PrintStream.java




```
/**
 * A <code>PrintStream</code> adds functionality to another output stream,
 * namely the ability to print representations of various data values
 * conveniently.  Two other features are provided as well.  Unlike other output
 * streams, a <code>PrintStream</code> never throws an
 * <code>IOException</code>; instead, exceptional situations merely set an
 * internal flag that can be tested via the <code>checkError</code> method.
 * Optionally, a <code>PrintStream</code> can be created so as to flush
 * automatically; this means that the <code>flush</code> method is
 * automatically invoked after a byte array is written, one of the
 * <code>println</code> methods is invoked, or a newline character or byte
 * (<code>'\n'</code>) is written.
 *
 * <p> All characters printed by a <code>PrintStream</code> are converted into
 * bytes using the platform's default character encoding.  The <code>{@link
 * PrintWriter}</code> class should be used in situations that require writing
 * characters rather than bytes.
 *
 * @author     Frank Yellin
 * @author     Mark Reinhold
 * @since      JDK1.0
 */

public class PrintStream extends FilterOutputStream
    implements Appendable, Closeable
{

   !!!!!!!!! CODIGO BORRADO   !!!!!!!!!!!!!

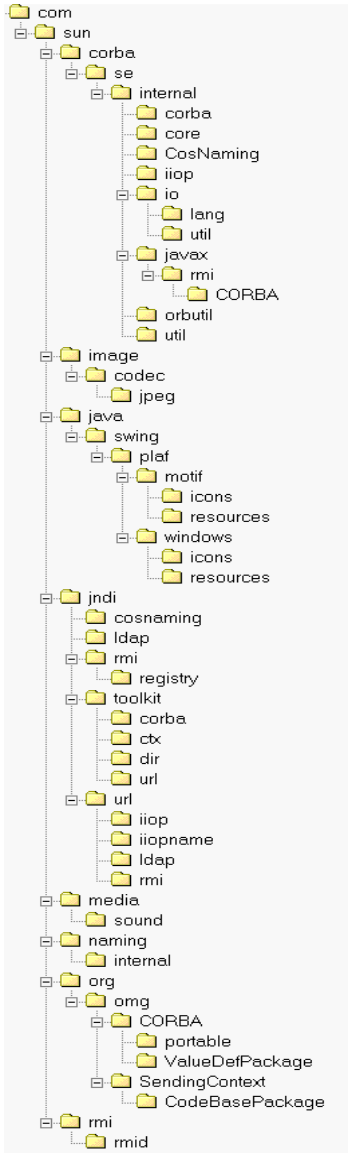
    /**
     * Prints a String and then terminate the line.  This method behaves as
     * though it invokes <code>{@link #print(String)}</code> and then
     * <code>{@link #println()}</code>.
     *
     * @param x  The <code>String</code> to be printed.
     */
    public void println(String x) {
        synchronized (this) {
            print(x);
            newLine();
        }
    }
```

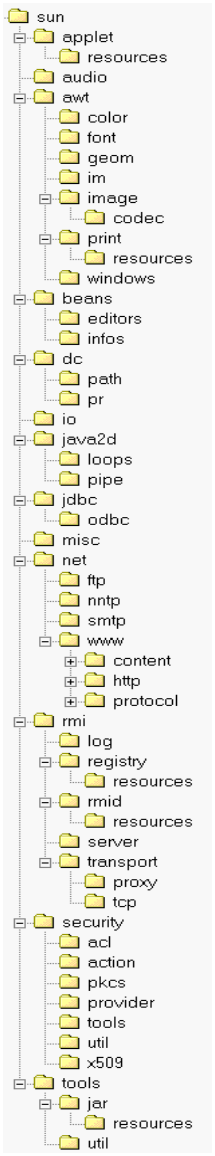
¿QUÉ TENDRÉ A MI DISPOSICIÓN PARA DESARROLLAR EN JAVA?

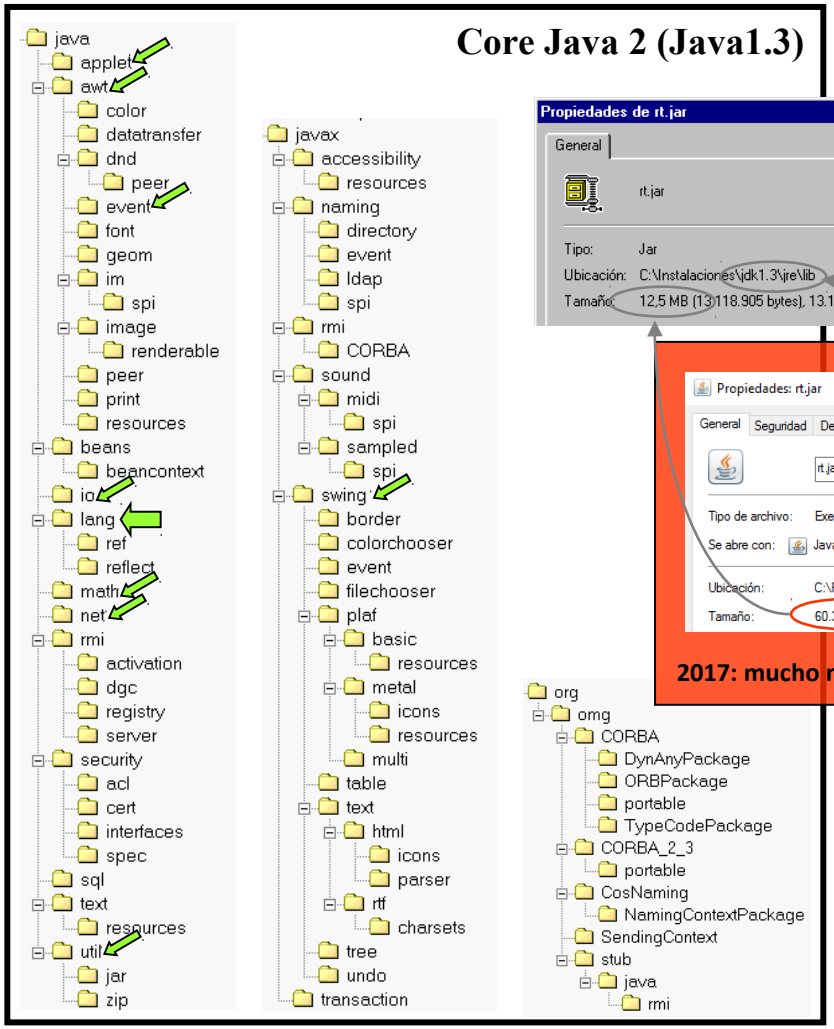
La biblioteca de ejecución de Java

Estructura del contenido de C:\...\jdk1.3\jre\lib\rt.jar
Mucho mayor en 1.8

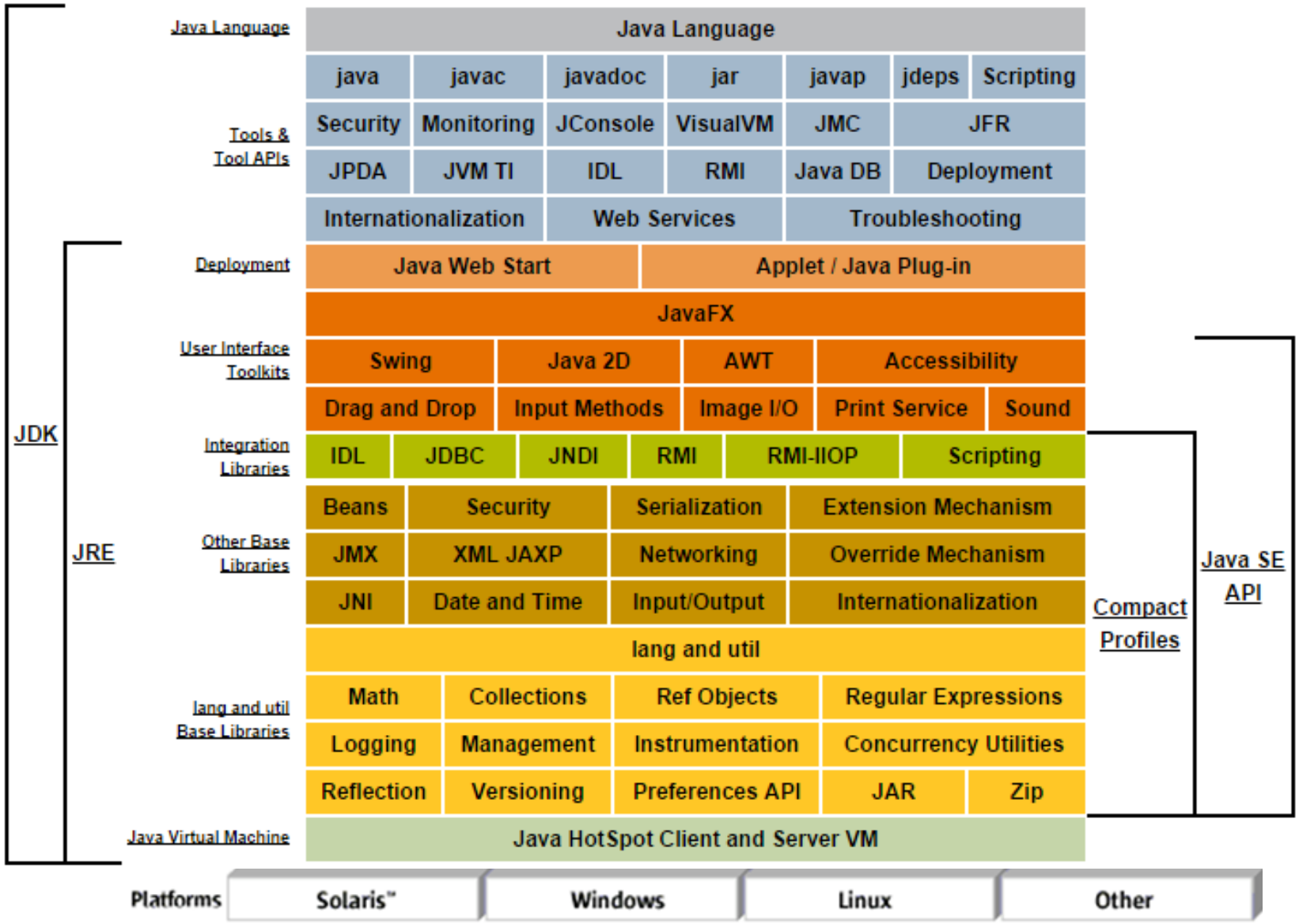
Ojo: 1.9 ya no tiene rt.jar
(pero la biblioteca se estructura igual)





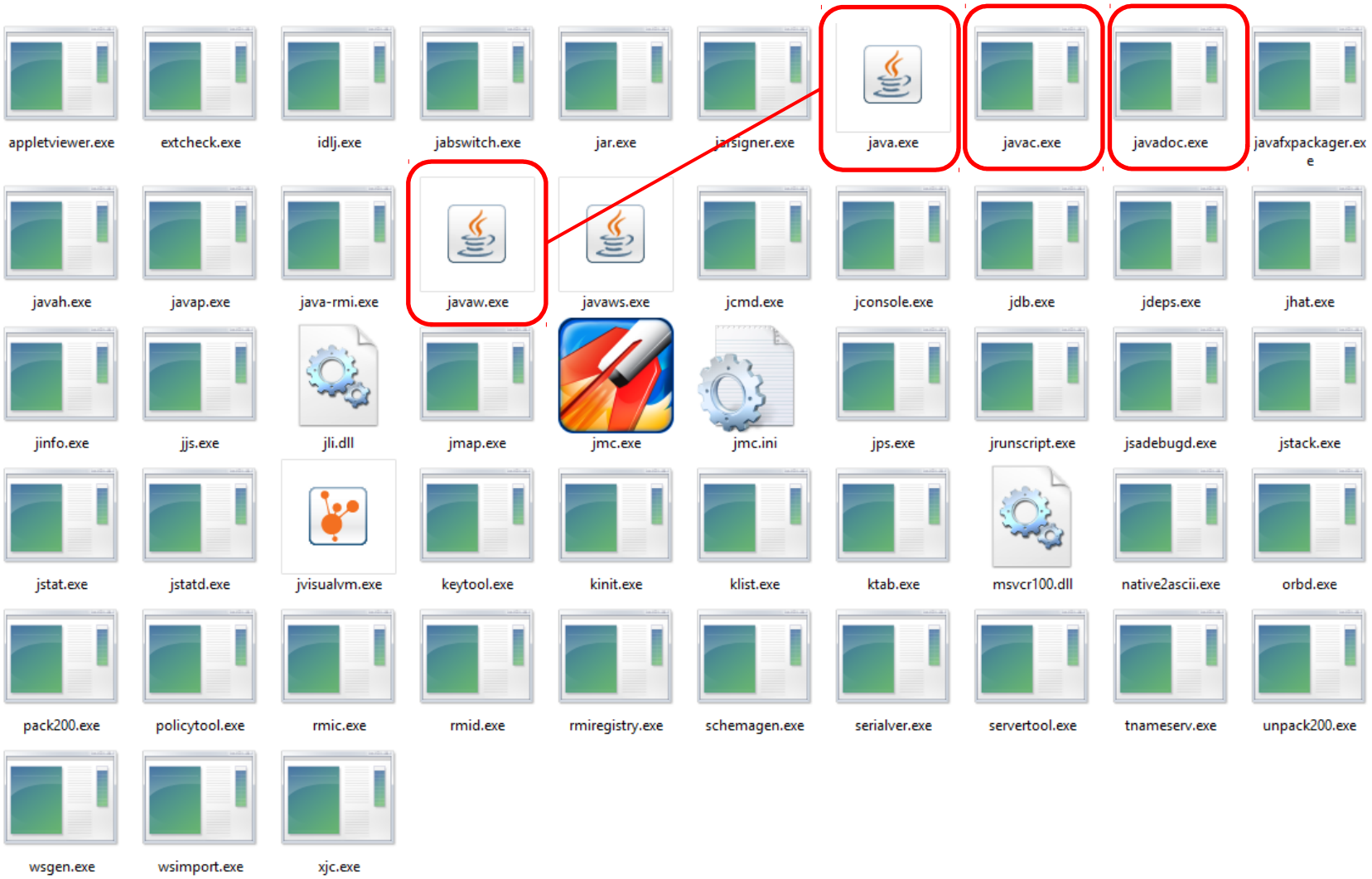


Una visión estructurada del entorno de desarrollo y ejecución de Java



Las herramientas de ejecución y desarrollo de Java

El “bin”



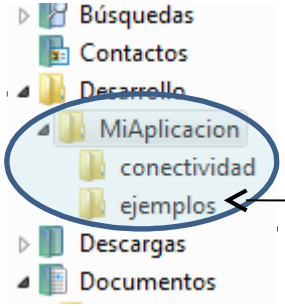
Compilación y ejecución

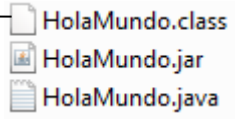
```
C:\Documents and Settings\german>javac
Usage: javac <options> <source files>
where possible options include:
  -g                         Generate all debugging info
  -g:none                    Generate no debugging info
  -g:{lines,vars,source}     Generate only some debugging info
  -nowarn                    Generate no warnings
  -verbose                   Output messages about what the compiler is doing
  -deprecation               Output source locations where deprecated APIs are used
  -classpath <path>          Specify where to find user class files and annotation processors
  -cp <path>                 Specify where to find user class files and annotation processors
  -sourcepath <path>         Specify where to find input source files
  -bootclasspath <path>      Override location of bootstrap class files
  -extdirs <dirs>            Override location of installed extensions
  -endorseddirs <dirs>       Override location of endorsed standards path
  -proc:{none,only}          Control whether annotation processing and/or compilat
  -processor {class1}[,{class2},{class3}...]Names of the annotation processors to
  -processorpath <path>      Specify where to find annotation processors
  -d <directory>             Specify where to place generated class files
  -s <directory>             Specify where to place generated source files
  -implicit:{none,class}     Specify whether or not to generate class files for im
  -encoding <encoding>       Specify character encoding used by source files
  -source <release>          Provide source compatibility with specified release
  -target <release>          Generate class files for specific VM version
  -version                   Version information
  -help                      Print a synopsis of standard options
  -Akey[=value]              Options to pass to annotation processors
  -X                         Print a synopsis of nonstandard options
  -J<flag>                   Pass <flag> directly to the runtime system
```

```
C:\Documents and Settings\german>java
Usage: java [-options] class [args...]
           (to execute a class)
   or  java [-options] -jar jarfile [args...]
           (to execute a jar file)

where options include:
    -client       to select the "client" VM
    -server       to select the "server" VM
    -hotspot      is a synonym for the "client" VM  [deprecated]
                  The default VM is client.

    -cp <class search path of directories and zip/jar files>
    -classpath <class search path of directories and zip/jar files>
                  A ; separated list of directories, JAR archives,
                  and ZIP archives to search for class files.
    -D<name>=<value>
                  set a system property
    -verbose[:class|gc|jni]
                  enable verbose output
    -version      print product version and exit
    -version:<value>
                  require the specified version to run
    -showversion  print product version and continue
    -jre-restrict-search | -jre-no-restrict-search
                  include/exclude user private JREs in the version search
    -? -help      print this help message
    -X            print help on non-standard options
    -ea[:<packagename>...|:<classname>]
    -enableassertions[:<packagename>...|:<classname>]
                  enable assertions
    -da[:<packagename>...|:<classname>]
    -disableassertions[:<packagename>...|:<classname>]
                  disable assertions
    -esa | -enablesystemassertions
                  enable system assertions
    -dsa | -disablesystemassertions
                  disable system assertions
    -agentlib:<libname>[=<options>]
                  load native agent library <libname>, e.g. -agentlib:hprof
                    see also, -agentlib:jdwp=help and -agentlib:hprof=help
    -agentpath:<pathname>[=<options>]
                  load native agent library by full pathname
    -javaagent:<jarpath>[=<options>]
                  load Java programming language agent, see java.lang.instrument
    -splash:<imagepath>
                  show splash screen with specified image
```





Un programa Java comienza por la ejecución de un fichero (una clase) que puede ir invocando la ejecución de otras dentro de uno o varios subárboles de directorios o ficheros JAR (cada subárbol o cada JAR es una "biblioteca de clases")

Compilar y ejecutar estando en "MiAplicacion"

```
>javac ejemplos/HolaMundo.java
>java ejemplos.HolaMundo
```

Compilar y ejecutar estando en otro directorio

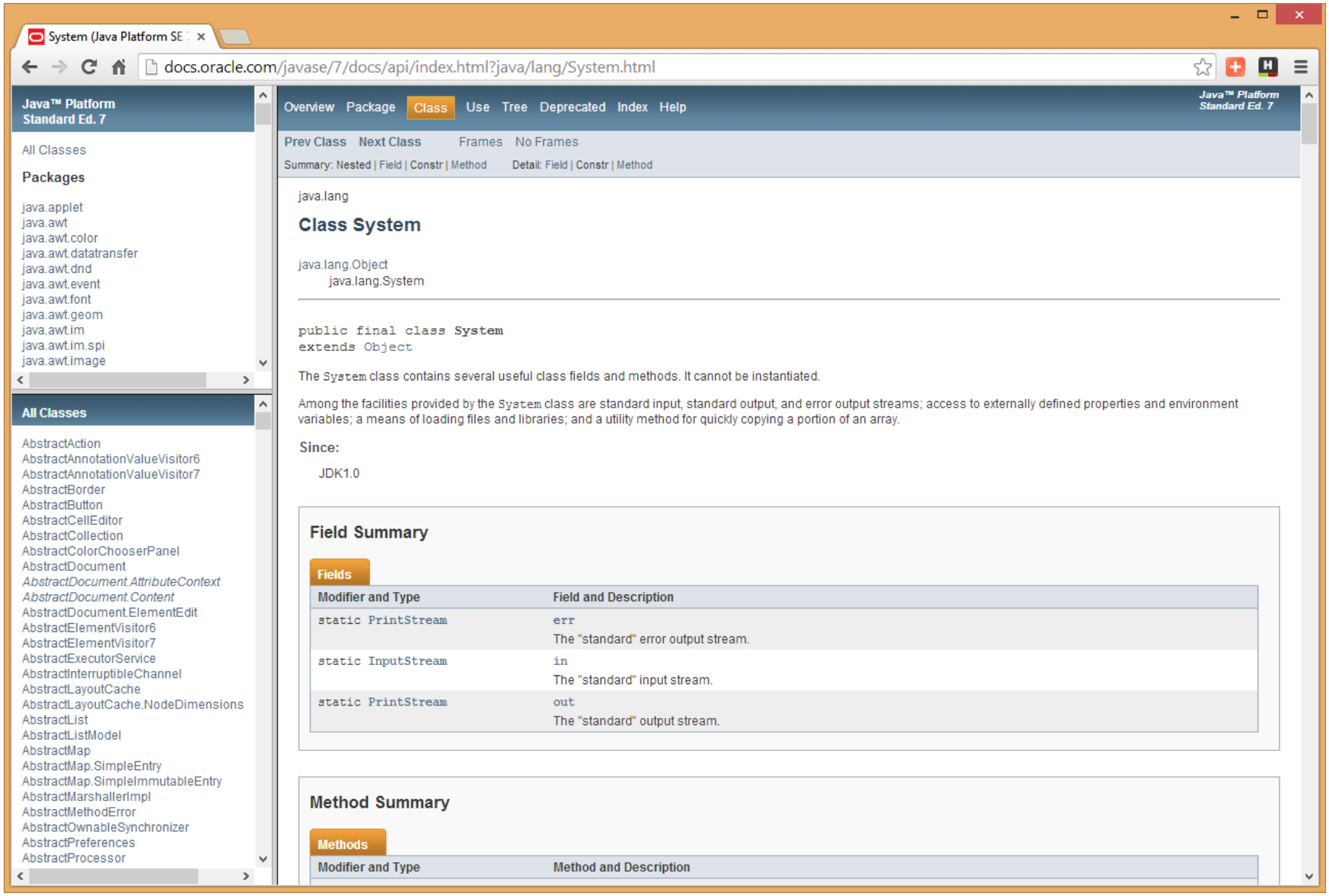
```
>javac -cp c:/Desarrollo/MiAplicacion ejemplos/HolaMundo.java
>java -cp c:/Desarrollo/MiAplicacion ejemplos.HolaMundo
```

Ejecutar mediante un JAR

```
>java -cp c:/Desarrollo/MiAplicacion/ejemplos/HolaMundo.jar HolaMundo
>java -jar c:/Desarrollo/MiAplicacion/ejemplos/HolaMundo.jar
```

OJO: para hacer esta prueba hay que incluir la línea **package ejemplos;** en el código fuente de HolaMundo.java

Documentación



Los programas ejecutables Java. Desensamblado de codebytes y decompilación


```
C:>javap -c HolaMundo
Compiled from "HolaMundo.java"
public class HolaMundo extends java.lang.Object{
public HolaMundo();
  Code:
   0:   aload_0
   1:   invokespecial   #1; //Method java/lang/Object."<init>":()V
   4:   return

public static void main(java.lang.String[]);
  Code:
   0:   getstatic       #2; //Field java/lang/System.out:Ljava/io/PrintStream;
   3:   ldc     #3; //String Hola, mundo
   5:   invokevirtual   #4; //Method java/io/PrintStream.println:(Ljava/lang/String;)V
   8:   return

}
```

Decompilación: probar con [Java Optimize and Decompile Environment (JODE)]

"Ofuscacion"

Comprobar el funcionamiento:

- Escritura de GeneradorDeHolaMundo.java
- En shell del SO: compilar, ejecutar, desensamblar, documentar.
- Idem con package
- Decompilar
- Idem en Netbeans.