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JARS (Java Applet Rating Service) A Web site which scores Java applets on the Internet and publishes the results.

(See www.jars.com.)

Java A general purpose high-level language (HLL) which is

- not platform or operating system sensitive, yielding ‘write-once-run-anywhere’ code
- object-oriented
- class-based
- concurrent.

(See *MPP*.) The resulting compiled bytecode can be run on Windows 3.x, Windows NT, Windows 95/98, Macintosh environments, UNIX etc. OS independence is a key characteristic of Java (Ref. 1), making it suitable for deployment of applets, where client OSes are of a heterogeneous nature. Web-based Java applets:

- are interpreted by Java-enabled browsers
- may access code libraries on the client machine
- may download class libraries from the server.

Development tools for Java include:

- the Java Development Kit (JDK)
- Microsoft J++, which is included in Microsoft Visual Studio
- VisualAge for Java
- Java Servlet Development Kit.

The Java language semantics and high-level instructions are similar to C and C++. It is considered a static programming language (Ref. 2), but is likely to be given dynamic functionality through appropriate development environments and compilers. Compilation of Java source code yields in a bytecoded instruction set and binary format (Ref. 3). James Gosling adapted Java for use in embedded consumer electronics applications.

Java applet

References

1. *The Java Language Specification*, Sun Microsystems, 1996
2. *Dylan Reference Manual*, Apple Computer, 1995
3. *Java Virtual Machine Specification*, Addison-Wesley, 1996

Java applet A program created using the Java programming language, and typically deployed over the Web. It resides on the server side, and is downloaded to a Java-enabled Web browser. It is then interpreted and run. The browser must feature the Java Virtual Machine, which is a software-based processor.

Java array A matrix of entities of the same type, which may be simple or composite. The matrix or array can be multi-dimensional, and is declared using square brackets ([]).

```
int meters[];  
char[] table;  
long transform[][];
```

The size of an array is not specified when declared.

JavaBeans A standard component architecture which is similar to ActiveX technology. The resulting objects can be used to build applets, servlets and applications. The components are referred to as Beans, and compliant development tools provide access to the Beans using a toolbox. Visual programming plays an important role when architecting a Beans-based program; the developer simply selects Beans and modifies their appearance, behaviour and interactions with other Beans. JavaBeans-compatible development tools include:

- JavaSoft JavaBeans Development Kit (BDK)
- Lotus Development BeanMachine
- IBM VisualAge for Java
- SunSoft Java Workshop
- Borland JBuilder
- Asymetrix SuperCede
- Sybase PowerJ
- Symantec Visual Cafe.

JavaBeans–ActiveX Bridge A Microsoft OCX control that permits the integration of JavaBeans as if they were ActiveX controls.

(See www.splash.javasoft.com/beans/bridge/)

JavaBeans Development Kit (BDK) A JavaSoft BDK aimed at Bean and tool developers, and not applications developers.

Java Blend A database application development tool which is an environment for combining Java objects with enterprise databases. Applications can be developed by coding in Java, and the resulting objects can be mapped to databases and vice versa. It does not require knowledge of SQL. Java Blend was codeveloped by The Baan Company and Sun Microsystems.

Java blocks A segment of source code enclosed by braces: { and }.

(See *Java data type*.)

Java Boolean data type A data type used to store the two values *true* or *false*; it is declared by a statement of the form:

```
boolean switch;
```

Java Boolean literals A Java type that has one of two states: *true* or *false*.

Java Card A smart card implementation that uses Java technology. The Java Card specifications can also be applied to devices, which have:

- 16 Kbyte ROM
- 8 Kbyte EEPROM
- 256 bytes RAM.

Java casting types A process of converting one data type into another. Casting is often necessary when a function returns a type different from the type you need to perform an operation. The `int` returned by the standard input stream (`System.in`) is *cast* into a `char` type using the statement:

```
char k = (char)System.in.read();
```

Java character data type A data type that stores a single Unicode character. Variables of the type `char` are created using statements of the form:

```
char sigma, omega;
```

Java character literals A character represented by a single Unicode character. Its syntax relies on a pair of single quotation marks.

Java comments and whitespace A textual comment and whitespace consists of spaces, tabs and linefeeds.

```
/* multiple line comment */  
// a single line comment  
/** a multiple-line comment, which can be used with  
the javadoc tool to create documentation**/
```

Java data type

Java data type A means of defining a storage method for information, such as the storage of variables in memory. The following statement declares a variable, a variable type and identifier:

```
Type Identifier [, Identifier];
```

The statement:

- allocates memory to a variable type `Type`
- names the `Type` '`Identifier`'
- uses the bracketed identifier to indicate that multiple declarations of the same type may be made.

Java data types may be:

- simple, which include integer, floating-point, Boolean and character
- composite, which are based on simple types, and include strings, arrays, classes and interfaces.

Java development tool A tool/environment that allows programmers to create Java applets, Java programs, JavaBeans and possibly Java Servlets.

Java Electronic Commerce Framework A point-of-sale (POS) application framework.

Java floating-point literals A means of storing and processing fractional numbers, which are expressed in decimal notation (i.e. 200.76) or in scientific notation (2.00.76e2). Floating-point literals default to the `double` type, which is a 64 bit value. The '`f`' or '`F`' suffix harnesses the 32 bit value.

JavaHelp A software product which allows the creation of on-line Help for Java applets, applications, OSes and devices. It can also be used to deploy on-line Help over the Web and intranets. JavaHelp is:

- written using the Java language
- implemented using JFC components
- platform-independent
- browser-independent
- supported by browsers that comply with the Java Runtime Environment.

Java identifier A Java token that stores names that are applied to variables methods and classes.

Java integer data types A means of representing signed integer numbers; they include:

- `byte` (8 bit)
- `short` (16 bit)

- `int` (32 bit)
- `long` (64 bit).

Integer variables are declared thus:

```
int x;  
short scale;  
long lumin, light;  
byte alpha, beta, gamma;
```

Java integer literals A literal may be:

- decimal (base 10)
- hexadecimal (base 16), with the '0X' prefix
- octal, with the 'O' prefix.

By default, integer literals are stored in the `int` type, which has a 32 bit value. They may be stored in the `double` type, which has a 64 bit value, using the 'l' or 'L' suffix.

(See *Java literal*.)

Java keywords A meaningful vocabulary of entities which perform specific functions and include:

| | | | |
|-----------------------|-------------------------|------------------------|---------------------------|
| <code>abstract</code> | <code>double</code> | <code>int</code> | <code>super</code> |
| <code>boolean</code> | <code>else</code> | <code>interface</code> | <code>switch</code> |
| <code>break</code> | <code>extend</code> | <code>long</code> | <code>synchronized</code> |
| <code>byte</code> | <code>false</code> | <code>native</code> | <code>this</code> |
| <code>byvalue</code> | <code>final</code> | <code>new</code> | <code>threadsafe</code> |
| <code>case</code> | <code>finally</code> | <code>null</code> | <code>throw</code> |
| <code>catch</code> | <code>float</code> | <code>package</code> | <code>transient</code> |
| <code>char</code> | <code>for</code> | <code>private</code> | <code>true</code> |
| <code>class</code> | <code>goto</code> | <code>protected</code> | <code>try</code> |
| <code>const</code> | <code>if</code> | <code>public</code> | <code>void</code> |
| <code>continue</code> | <code>implements</code> | <code>return</code> | <code>while</code> |
| <code>default</code> | <code>import</code> | <code>short</code> | |

Java lexical translation A process by which Java source code is converted into Java tokens. It is implemented by the lexical analyser facet of the compiler, which:

- translates Unicode escapes into Unicode characters, allowing the Java listing to be represented using ASCII characters
- generates a stream of input characters and line terminators
- generates Java input elements, or Java tokens, which are terminal symbols.

See: *The Java Language Specification*, Sun Microsystems, 1996.

Java literal

Java literal An element that maintains a constant value; it may be:

- numeric
- integer
- floating point
- Boolean
- character
- string.

Character literals refer to a single Unicode character. Multiple-character strings that are implemented as objects are also literals.

JavaMail An API used to build Java-based mail and messaging applications.

Java Management API (JMAPI) A library of objects and methods used for the development of network and service management solutions targeted at heterogeneous networks.

Java Media and Communication APIs, including 2-D, 3-D, and Java Telephony A Sun Microsystems product family that allows developers to develop interactive multimedia applications for the Web.

Java Naming and Directory Interface (JNDI) A connectivity API which provides an interface with enterprise, heterogeneous naming and directory services. It is a JavaSoft API and a Java Standard Extension.

JavaOS A compact operating system dedicated to running Java programs/applets. The JavaOS family includes:

- JavaOS for Network Computers (NCs), which is described as a stand-alone Java Application Platform for NCs
- JavaOS for Appliances, which is intended for communications devices
- JavaOS for Consumers, which is aimed at consumer electronics devices.

JavaPC A software solution for migrating PCs to Java platforms. JDK 1.1 compliant Java applications can be stored locally or on a network, and can be run on DOS and Windows 3.x platforms.

JavaScript An object-orientated scripting language optimised for the Web. Using JavaScript, Web pages/HTML documents can be given:

- dynamic content such as animations
- integrated Java applets and ActiveX controls
- interactive content
- data entry forms.

Microsoft's implementation of JavaScript is JScript. The rationale behind JScript is echoed by VBScript: it is intended as a quick method of creating and tailoring applications. Unlike JScript, VBScript is not an OOP language. Like other objects, JavaScript objects have properties and methods, and include the:

- *window*, which is at the top of the HTML document's object hierarchy
- *frame*, which is a window
- *location*, which stores URL information
- *document*, which stores document characteristics such as its URL and title
- *form*, which stores form characteristics
- *text* and *textarea*, which store text information
- *checkbox*, which is a standard Windows UI object
- *radio*, which refers to a single UI radio button
- *select*, which is an array of option objects
- *button*, which stores button information
- *password*, which is a text-entry box that disguises keyboard entries using asterisks
- *navigator*, which stores a visitor's Netscape Navigator version number.
- *string*, which provides methods for string manipulation
- *date*, which is dedicated to calendar date information
- *math*, which facilitates common constants and calculations
- *image*, which indicates image information on the current page
- *array*, which is dedicated to arrays.

JavaScript listings are integrated in HTML code by enclosing them between the following tags:

```
<SCRIPT LANGUAGE="JavaScript">  
</SCRIPT>
```

Development environments and applications that support JavaScript are numerous, and include the Microsoft ActiveX Control Pad, which also supports VBScript. (*See VBScript.*)

Comments Single and multiple line comments may be included using the syntax:

```
// A single line comment  
/* Multiple lines comment  
require this syntax */
```

JavaScript operators

```
++ increment  
-- decrement  
* multiplication  
/ divide  
% modulus  
+ addition
```

JavaScript

- subtraction
- << shift left
- >> shift right
- > greater than
- <= less than or equal to
- >= greater than or equal to
- == equal to
- != not equal to
- && logical AND
- ! logical NOT
- | | logical OR
- ^ bitwise
- | bitwise OR
- & bitwise AND

for The for statement has three optional expressions:

```
for( initial.Expression; condition; update.Expression) {  
  statement  
  statement  
  statement  
}
```

- `initial.Expression` initializes the `counter` variable, which can be a new variable declared with `var`
- the `condition` expression is evaluated on each pass through the loop. If the condition is true, the loop statements are executed
- `update.Expression` is used to increment the `counter` variable.

while A statement used to implement a conditional loop, based on a true or false validation:

```
while (condition) {  
  statement  
  statement  
  statement  
}
```

break A `break` statement stops `for` or `while` loops, and diverts program execution to the line following the loop statements.

for ... in A `for...in` statement executes the statement block for each object property:

```
for (variable in object) {  
  statement  
  statement  
}
```

function A statement which allows you to create a named JavaScript function together with parameters. The `return` statement can be used to return a value. Nested functions are not supported.

```
function name ([parameter] [...,parameter]) {
  statements...
}
```

if ... else A conditional statement that offers one of two conclusions.

```
if (condition) {
  statement
  statement
} [else {
  statement
  statement
}]
```

return This is used to specify a returned value from a function.

var The var statement is used to declare a variable, which can be local or global.

```
var variableName [=value] [..., variableName [=value]]
```

while Repeats a loop while an expression is true.

```
while (condition) {
  statements...
}
```

with Declares a default object as the focus of a set of statements.

```
with (object) {
  statement
  statement
}
```

(See CGI.)

Java separator A means of categorising Java source code; it directs the compiler appropriately, and includes:

```
{ } ; , :
```

Java string literals A string, or series of characters, within a pair of double quotation marks. String literals invoke an instance of the `String` class, which is assigned the character string.

Java Studio 1.0 A development environment that does not require Java coding on a line-by-line basis. It harnesses the JavaBeans object architecture, and is typically used to build Web applications. It is a product of Sun Microsystems.

Java tokens

Java tokens A meaningful element of a Java program when compiled. The five categories of token include:

- identifiers
- keywords
- literals
- operators
- separators.

Tokens are compiled into Java bytecode, which can be interpreted by a Java Virtual Machine.

Java Unicode The predominant character set with which Java source code is represented; it is:

- 16 bit, which gives up to 2^{16} or 65 536 possible characters
- used exclusively by Windows NT at the system level
- a worldwide standard.

In Java, three lexical translations convert a raw Unicode character stream into a sequence of Java tokens. See: *The Java Language Specification*, Sun Microsystems, 1996.

Java Virtual Machine A software solution that yields an environment for running Java applets. Browsers such as Netscape Navigator and Microsoft Internet Explorer feature Java Virtual Machines. It can be assumed that the 16 bit Java Virtual Machines of Netscape Navigator and Microsoft Internet Explorer are JDK 1.02 compliant.

(See *JavaPC*.)

JavaWorld An on-line magazine dedicated to Java.

(See *www.javaworld.com*.)

Jaz drive A removable storage device manufactured by Iomega. Jaz disks offer 1 Gbyte or 2 Gbyte data storage capacity.

JDK (Java Development Kit) Sun Microsystems development tool for creating Java applets and applications. It is freely available from JavaSoft (www.javasoft.com), and includes:

- API
- Applet Viewer
- compiler
- runtime interpreter
- debugger
- class file dissembler

- header and stub file generator
- documentation generator.

More specifically, the JDK includes the tools:

- `appletviewer` for viewing Java source code listings
- `jar` for compressing an packaging applications
- `java` for executing applications
- `javadoc` for documenting Java programs
- `javac` for compiling Java programs.

(See www.javasoft.com.)

JIT (just-in-time) compiler for Java A compiler which converts OS-independent Java bytecode and optimises it for execution on the target OS. The conversion naturally takes place on the client side.

JIT debugging A method of detecting bugs in a running program and responding by running an appropriate debugging process.

Jobs, Steve A co-founder of Apple Computer.

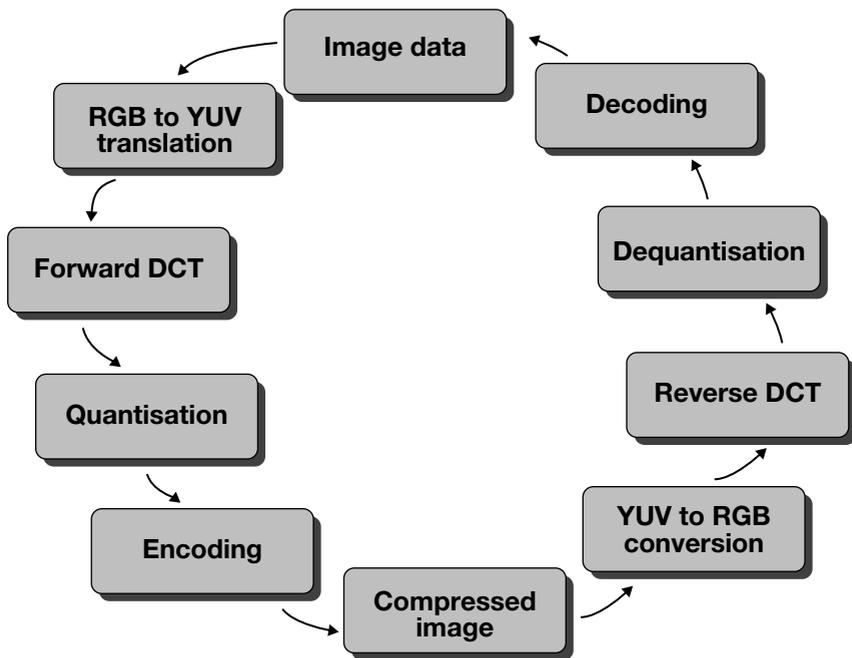
Join A process of combining records from different tables/files in a relational database management system (RDBMS).

JPEG (Joint Photographic Experts Group) An internationally agreed standard for still image compression and decompression that was devised by the JPEG, a specialist group set up by the ISO and CCITT. It is a symmetrical algorithm in that the processes required for compression mirror those of decompression. The processes include forward and reverse DCTs (Direct Cosine Transformations). It can be used to compress 8 bit, 16 bit and 24 bit graphics. Motion-JPEG (M-JPEG) video uses individual frames compressed according to the JPEG algorithm, giving full frame updates as opposed to the predominantly partial frame updates of standard MPEG video. The JPEG standard compression scheme for still photographic quality images began development in 1986. Compression and encoding techniques were evaluated during 1987 and 1988, until eventually the components of the symmetrical compression cycle were agreed, with DCT (Direct Cosine Transform) proving a central theme of the JPEG design.

(See *DCT*.)

.JPG An extension for JPEG files.

(See *DCT and JPEG*.)



JPEG algorithm – compression/decompression cycle

JScript (See JavaScript.)

Jump 1. A moment in a running program when execution is diverted from one point to another. The jump may be conditional, where it will occur because of a given event or variable value. An unconditional jump does not require such preconditions. 2. A graphic, or graphic fragment, which has a hotspot or hyperlink which is used to browse related information.