JAVA九大基本类型

Int

Long

Char

Byte

Short

Float 五大特殊值 NaN 正0 负0 正无穷 负无穷

double

Boolean

returnAddress 指令指针（与对象指针不同，不是对象引用，而是指令的地址）

前八种是java语言基本类型，returnAddress是虚拟机比java语言多出的一种，也叫指令指针。

Java虚拟机类型分基本类型（语言八大类型+指令地址）与引用类型（对象地址）。

指令指针用反射获取不到，在运行过程中不可修改。JAVA虚拟机只有三个指令可以操作指令指针

Jsr ret jsr\_w。

Returnaddress就是下一个指令的地址。

例如try cache finally

*newarray指令可以创建boolean数组。*

Boolean数组的操作是*baload与bastore。*

*引用有三种类引用、对象引用、数组引用。*

*JAVA虚拟机所有的指令都是单字节的，但又2个除外。*

lookupswitch *tableswitch*

*iload* fload加载int和float类型的本地变量。

虚拟机指令缩写

i for an int operation, l for long, s for short,  
b for byte, c for char, f for float, d for double, and a for reference.

2个特殊指令复合条件指令

*instanceof*, *checkcast*.

操作栈指令

*pop*, *pop2*, *dup*, *dup2*, *dup\_x1*, *dup2\_x1*, *dup\_x2*, *dup2\_x2*, *swap*

条件控制指令

*ifeq*, *ifne*, *iflt*, *ifle*, *ifgt*, *ifge*, *ifnull*, *ifnonnull*, *if\_icmpeq*,  
*if\_icmpne*, *if\_icmplt*, *if\_icmple*, *if\_icmpgt if\_icmpge*, *if\_acmpeq*, *if\_acmpne*.

无条件指令

*goto*, *goto\_w*, *jsr*, *jsr\_w*, *ret*

调用方法指令，总共5个

*invokevirtual* invokes an instance method of an object, dispatching on the  
(virtual) type of the object. This is the normal method dispatch in the Java  
programming language.  
• *invokeinterface* invokes an interface method, searching the methods  
implemented by the particular run-time object to find the appropriate method.  
• *invokespecial* invokes an instance method requiring special handling, whether an  
instance initialization method (§2.9), a private method, or a superclass method.  
• *invokestatic* invokes a class (static) method in a named class.  
• *invokedynamic* invokes the method which is the target of the call site object  
bound to the *invokedynamic* instruction. The call site object was bound to a  
specific lexical occurrence of the *invokedynamic* instruction by the Java Virtual  
Machine as a result of running a bootstrap method before the first execution of  
the instruction. Therefore, each occurrence of an *invokedynamic* instruction has  
a unique linkage state, unlike the other instructions which invoke methods.

线程同步指令

*monitorenter* and *monitorexit*