

Data Types (13)

Type	Range	Description
boolean	{0,1}	Z
byte	-2^7 to 2^7-1 , inclusive	B
short	-2^{15} to $2^{15}-1$, inclusive	S
int	-2^{31} to $2^{31}-1$, inclusive	I
long	-2^{63} to $2^{63}-1$, inclusive	L
char	16 bit unsigned Unicode (0 to $2^{16}-1$)	C
float	32-bit IEEE 754 single-precision float	F
double	64-bit IEEE 754 double-precision float	D
return-Address	address of an opcode within the same method	
class reference		Lclass-name;
interface reference		Linter-name
array reference		[L..[component type]
void		V

Type Conversion Instructions

i2l, i2f, i2d, l2f, l2d, and f2d

Only i2f is used in MP compiler

Operand Stack Management Instructions

dup, pop, dup2, pop2, swap

Object Creation and Manipulation

Create a new class instance	new
Create a new array	newarray, anewarray, multianewarray
Access field of classes (staticfield/class variables) and field of class instances (non-static fields, known as instance variables)	getfield, putfield, getstatic, putstatic
Load an array component onto the operand stack	<T>aload
Store a value from the operand stack as an array component	<T>astore

Jasmin Instructions (10)

Arithmetic Instructions

Load and store instructions

Control transfer instructions

Type conversion instructions

Operand stack management instructions

Object creation and manipulation

Method invocation instructions

Throwing instructions (not used)

Implementing finally (not used)

Synchronisation (not used)

Load and Store

Load a local variable onto the operand stack	Store a value from the operand stack into a local variable
<T>aload -> T: b,s,i,-	<T>astore -> T: b,s,i,-
T: b,s,i,l,f,d,c,a	l,f,d,c,a

Load and Store (cont)

	Value
bipush	int const, -2^7 to 2^7-1
sipush	int const, -2^{15} to $2^{15}-1$
ldc	int, float, quote string const
ldc_w	long, double const
ldc2_w	long, double const
aconst_null	null
iconst_m1	-1
iconst_<i>	0,...,5
lconst_<l>	0,1
fconst_<f>	0.0, 1.0 and 2.0
dconst_<d>	0.0, 1.0

Method Invocation Instructions

invokestatic

invokevirtual

invokespecial

invokeinterface <method-spec> <num-args>

Arithmetic Instructions

Add	iadd, ladd, fadd, dadd
Subtract	isub, lsub, fsub, dsub
Multiply	imul, lmul, fmul, dmul
Divide	idiv, lddiv, fdiv, ddiv
Remainder	irem, lrem, frem, drem
Shift	ishl, ishr, iushr, lshl, lshr, lushr
Bitwise OR	ior, lor
Bitwise AND	iand, land
Bitwise exclusive OR	ixor, lxor
Local variable increment	iinc
Comparison	dcmpl, dcmpl, fcmpl, fcmpl, lcmp, lcmp

Control Transfer Instructions

Unconditional branch	goto, goto_w, jsr, jsr_w, ret	
Conditional branch	ifeq, iflt, ifle, ifne, ifgt, ifge	compare an int to zero
	ifnull, ifnonnull	compare a ref to null
	if_icmpeq, if_icmpne, if_icmplt, if_icmpgt, if_icmple, if_icmpge	compare two integers
	if_acmpeq, if_acmpne	compare two references
Compound conditional branch	tableswitch, lookupswitch	

Jasmin Directives

```
.source <source.java>
.class < the current class>
.super < the super class>
.limit
.method < the method description>
.field <the field description>
.end
.var < the variable description>
.line < the line number in source code>
```



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