COMP207P Coursework 2 Report

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1 Arithmetic Operators

If an arithmetic instruction is detected, the calculation is carried out by the function

public Number optimizedOperations(InstructionList instructionList, InstructionHandle handle, ConstantPoolGen cpgen)

The function returns the result of the calculation, which depends on the type of operation and the type of the value used.

Operations may be one of:

ADD
SUB
MUL
DIV
NEG
REM

Value types are:

INT
LONG
FLOAT
DOUBLE

In order to retrieve the correct values to calculate the desired result, the function

public Number getValueFromStack(InstructionList instructionList, InstructionHandle handle, ConstantPoolGen cpgen)

is called. This function iterates through the instruction list until it finds the most recent value that has been pushed onto the stack by the bytecode instructions.

A bytecode instruction may be one of:

BIPUSH
SIPUSH
ICONST
LCONST
FCONST
DCONST
LDC
LDC2_W

The value is subsequently deleted from the instruction list since it will be replaced by the calculated result. This is done using the function

public void deleteInstruction(InstructionList instructionList, InstructionHandle handle)

2 Comparison Operators

Comparison operators are dealt with in a similar way to arithmetic operators.

Comparison operators are:

LCMP
FCMPG
FCMPL
DCMPG
DCMPL

They are detected by the boolean function

public Boolean comparisonOperator(InstructionHandle handle)

and analysed using the aforementioned **optimizedOperations** function, where the two values are retrieved using the **getValueFromStack** function. They are then compared, returning an integer value of 0, 1 or -1 corresponding to the result. As with arithmetic operators, the instruction is then deleted.