Java CodeCount™ Counting Standard

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Revision Sheet

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1.0	6/22/07	Original Release	CSSE

1.0   CHECKLIST FOR SOURCE STATEMENT COUNTS

PHYSICAL AND LOGICAL SLOC COUNTING RULES

Measurement Unit	Order of Precedence	Physical SLOC	Logical SLOC	Comments
Executable lines	1	One per line	See table below	Defined in 2.9
Non-executable lines				
Declaration (Data) lines	2	One per line	See table below	Defined in 2.4
Compiler directives	3	One per line	See table below	Defined in 2.5
Comments				Defined in 2.8
On their own lines	4	Not included (NI)	NI	
Embedded	5	NI	NI	
Banners	6	NI	NI	
Empty comments	7	NI	NI	
Blank lines	8	NI	NI	Defined in 2.7

Table 1 Physical and Logical SLOC Counting Counts

LOGICAL SLOC COUNTING RULES

No.	Structure	Order of Precedence	Logical SLOC Rules	Comments
R01	"*for*", "*while*", "for each" or "*if*" statement	1	Count once.	"*while*" is an independent statement.
R02	*do* {…} *while* (…); statement	2	Count once.	Braces *{…}* and semicolon *;* used with this statement are not counted.
R03	Statements ending by a semicolon	3	Count once per statement, including empty statement.	Semicolons within "*for*" statement are not counted. Semicolons used with R01 and R02 are not counted.
R04	Block delimiters, braces {…}	4	Count once per pair of braces *{..}*, except where closing brace is followed by a semicolon, i.e. *};* or an opening brace comes after a keyword "*else*".	Braces used with R01 and R02 are not counted. Function definition is counted once since it is followed by *{…}*.
R05	Compiler directive	5	Count once per directive.	

Table 2 Logical SLOC Counting Rules

2.0   DEFINITIONS

2.1 SLOC – Source Lines Of Code is a unit used to measure the size of software program. SLOC counts the program source code based on a certain set of rules. SLOC is a key input for estimating project effort and is also used to calculate productivity and other measurements.

2.2 Physical SLOC – One physical SLOC is corresponding to one line starting with the first character and ending by a carriage return or an end-of-file marker of the same line, and which excludes the blank and comment line.

2.3 Logical SLOC – Lines of code intended to measure "statements", which normally terminate by a semicolon (C/C++, Java, C#) or a carriage return (VB, Assembly), etc. Logical SLOC are not sensitive to format and style conventions, but they are language-dependent.

2.4   Data declaration line or data line – A line that contains declaration of data and used by an assembler or compiler to interpret other elements of the program.

The following table lists Java keywords that denote data declaration lines:

abstract	boolean	const	int	long
byte	short	char	extends	float
double	implements	class	interface	native
void	static	package	private	public
protected	operator	volatile	template	

Table 3 Data Declaration Types

NOTE: See Section 3 of this document for examples of data declaration lines.

2.5 Compiler directive - A statement that tells the compiler how to compile a program, but not what to compile. It does not get translated directly into executable code.

package	import

Table 4 Compiler Directives

2.6   Blank line – A physical line of code, which contains any number of white space characters (spaces, tabs, form feed, carriage return, line feed, or their derivatives).

2.7   Comment line – A comment is defined as a string of zero or more characters that follow language-specific comment delimiter.

Java comment delimiters are "*//*" and "*/**". A whole comment line may span one or more lines and does not contain any compilable source code. An embedded comment can co-exist with compilable source code on the same physical line. Banners and empty comments are treated as types of comments.

2.8 Executable line of code - A line that contains software instruction executed during runtime and on which a breakpoint can be set in a debugging tool. An instruction can be stated in a simple or compound form.

- o An executable line of code may contain the following program control statements:
  - Selection statements (if, *?* operator, switch)
  - Iteration statements (for, while, do-while)
  - Empty statements (one or more ";")
  - Jump statements (return, break, continue, exit function)
  - Expression statements (function calls, assignment statements, operations, etc.)
  - Block statements

  NOTE: See Section 3 of this document for examples of control statements.

- o An executable line of code may not contain the following statements:
  - Compiler directives
  - Data declaration (data) lines
  - Whole line comments, including empty comments and banners
  - Blank lines

3.0   EXAMPLES OF SLOC COUNTING

EXECUTABLE LINES

SELECTION STATEMENTS				
ID	**STATEMENT DESCRIPTION**	**GENERAL FORM**	**SPECIFIC EXAMPLE**	**SLOC COUNT**

ESS1	if, else if, else and nested if statements	if (<boolean expression>) <statements>;
		
		if (<boolean expression>) <statements>;
		else <statements>;
		
		if (<boolean expression>) <statements>;
		else if (<boolean expression>) <statements>;.
		.
		.
		else <statements>;
		
		NOTE: complexity is not considered, i.e. multiple "&&" or "||" as part of the expression.
			if (x != 0) System.out.print ("non-zero");
			
			if (x > 0) System.out.print ("positive");
			else System.out.print ("negative");
			
			if (x == 0) System.out.print ("zero");
			else if (x > 0) System.out.print ("positive");
			else { System.out.print ("negative");
			}
			
			if ((x != 0) && (x > 0)) System.out.print (x);
				1
				1
				
				1
				1
				0
				1
				
				1
				1
				1
				1
				0
				1
				0
				
				1
				1

ESS2	? operator	Exp1?Exp2:Exp3	x > 0 ? System.out.print ("positive") : System.out.print ("negative");	1

ESS3	switch and nested switch statements	switch (<expression>)
		{
		    case <constant 1> :
		       <statements>;
		       break;
		    default
		       <statements>;
		}
			switch (number)
			{
			    case 1:
			       foo1();
			       break;
			    default
			       System.out.print ("invalid case");
			}
				1
				0
				0
				1
				1
				0
				1
				0

ESS4	try-catch	try {} catch() {}	try { inputFileName=args[0];
			}
			catch (IOException e) { System.err.println(e); System.exit(1);
			}
				1
				1
				0
				1
				1
				1
				0

	ITERATIONS STATEMENTS			
ID	**STATEMENT DESCRIPTION**	**GENERAL FORM**	**SPECIFIC EXAMPLE**	**SLOC COUNT**

EIS1	for	for (initialization; condition; increment) *statement*;
		
		NOTE: "for" statement counts as one, no matter how many optional expressions it contains, i.e.
		for (i = 0, j = 0; I < 5, j < 10; i++, ,j++)
			for (i = 0; i < 10; i++)
			    System.out.print (i);
				1
				1

EIS2	empty statements (could be used for time delays)	for (i = 0; i < SOME_VALUE; i++) ;	for (i = 0; i < 10; i++) ;	2

EIS3	while	while (<boolean expression>)
		    <statement>;
			while (i < 10)
			{
			    System.out.print (i);
			    i++;
			}
				1
				0
				1
				1
				0

EIS4	do-while	do
		{
		    <statements>;
		} while (<boolean expression>);
			do
			{
			    ch = getCharacter();
			} while (ch != '\n');
				1
				0
				1
				1

EIS5	for-each	for (String name: moreNames) System.out.println(name.charAt(0));	for (String n: Names) System.out.println(ncharAt(0));	1 1

	JUMP STATEMENTS (are counted as they invoke action – pass to the next statement)			
ID	**STATEMENT DESCRIPTION**	**GENERAL FORM**	**SPECIFIC EXAMPLE**	**SLOC COUNT**
EJS1	return	return *expression*;	if (i == 0) return;	2
EJS2	break	break;	if (i > 10) break;	2
EJS3	exit function	void exit (int return_code);	if (x < 0) exit (1);	2

EJS4	continue	continue;	while (!done)
			{
			    ch = getchar();
			    if (char == '\n')
			    {
			        done = true;
			        continue;
			    }
			}
				1
				0
				1
				1
				0
				1
				1
				0
				0

EXPRESSION STATEMENTS

ID	STATEMENT DESCRIPTION	GENERAL FORM	SPECIFIC EXAMPLE	SLOC COUNT
EES1	function call	<function_name> (<parameters>);	read_file (name);	1

EES2	assignment statement	<name> = <value>;	x = y;
			char name[6] = "file1";
			a = 1; b = 2; c = 3;
				1
				1
				3

EES3	empty statement (is counted as it is considered to be a placeholder for something to call attention)	one or more ";" in succession	;	1 per each

		BLOCK STATEMENTS		
ID	STATEMENT DESCRIPTION	GENERAL FORM	SPECIFIC EXAMPLE	SLOC COUNT

EBS1	block = related statements treated as a unit	{ /* start of block */
		    <definitions>
		    <statement>
		} /* end of block */
			/* start of block */
			{
			   i = 0;
			   System.out.print ("%d", i);
			}
			/* end of block */
				0
				0
				1
				1
				1
				0

DECLARATION (DATA) LINES

ID	STATEMENT DESCRIPTION	GENERAL FORM	SPECIFIC EXAMPLE	SLOC COUNT
DDL1	function prototype variable declaration	<type> <name> (< parameter_list>); <type> <name>; Class<T>	Public static void foo (int param); double amount; Iterator<String>	1 1 1

COMPILER DIRECTIVES

ID	STATEMENT DESCRIPTION	GENERAL FORM	SPECIFIC EXAMPLE	SLOC COUNT
CDL1	directive types	package <package_name>; import <package_name>;	package test; import java.io*;	1 1