



Institute of Information Technology
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Assignment on
Software Metrics of Coding Helper

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Properties Of Software

Code Size

Program code is an integral component of software. Such code includes source code, intermediate code, byte code, and even executable code. We look at approaches for directly measuring code size. We must take great care to clarify what we are counting and how we are counting it. In particular, we must explain how each of the following is handled:

- Count of the number of physical lines (including blank lines).
- Count of all lines except blank lines and comments
- Count of all statements except comments (statements taking more than one line count as only one line)
- Count of all lines except blank lines, comments, declarations and headings
- Count of all statements except blank lines, comments, declarations and headings
- Count of only the ESs (Executable Statement), not including exception conditions

We find NLOC, CLOC, LOC, and BLOC in our project Coding Helper.

NLOC = Non commented line

CLOC = Comment lines of program text

LOC = Counting lines of code

BLOC=Blank lines of code

Given,

BLOC=434

NLOC=3826

CLOC=415

LOC=4675

Total size (LOC) = NCLOC + CLOC+BLOC

$$=3826+425+434$$

Measures of the **density** of comments in our project.

$$= \frac{CLOC + BLOC}{LOC}$$

$$= \frac{415+434}{4675}$$

$$= 0.182$$

Measuring Technique: Programmatic.

Language: Java.

Number of Characters

Result=78891

Character per class= $\frac{\text{number of character}}{\text{number of class}}$

$$= \frac{78891}{135}$$
$$=584.378$$

Measure procedure: Programmatic.

Language: Java

Number of Bytes of computer storage

Result = 450552.0

Measure procedure: Programmatic.

Language: Java

Average number of characters per line:

Result:25.068

Measure procedure: Programmatic.

Language: Java

Halstead's Approach

Halstead's software science attempted to capture attributes of a program that paralleled physical and psychological measurements in other disciplines. He began by defining a program P as a collection of tokens, classified as either operators or operands. The basic for these tokens are the following:

Unique Operator, $\mu_1=14$

Unique Operand, $\mu_2=123$

Total Operator, $N_1=770$

Total Operand, $N_2=1345$

The length of P is defined as:

$$\begin{aligned} N &= N_1 + N_2 \\ &= 770 + 1345 \\ &= 2115 \end{aligned}$$

while the vocabulary of P is:

$$\begin{aligned} \mu &= \mu_1 + \mu_2 \\ &= 14 + 123 \\ &= 137 \end{aligned}$$

The volume of a program, akin to the number of mental comparisons needed to write a program of length N or the minimum number of bits to represent a program, that is

$$\begin{aligned} V &= N \times \log_2 \mu \\ &= 2115 \times 7.0980 \\ &= 15012.27 \end{aligned}$$

Design Size

Design size measure size in terms of packages, design patterns, classes, interfaces, abstract classes, operations, and methods in a software project.

1. Number of Sub-Packages

Result=7

Measure procedure: Manually.

Language: Java

2. Number of Classes

Result= 40

Measure procedure: Programmatic.

Language: Java

3. Total File

Result= 37

Measure procedure: Programmatic.

Language: Java

4 Number of Interfaces

Result= 2

Measure procedure: Programmatic.

Language: Java

5 Number of Abstract Class

Result=0

Measure procedure: Programmatic.

Language: Java

6 Number of Methods

Result= 135

Measure procedure: Programmatic.

Language: Java

7 Number of Methods Per Class

Result= 3.375

Measure procedure: Programmatic.

Language: Java

8 Number of Overloaded Methods

Result= 7

Measure procedure: Manual.

Language: Java

9 Design Pattern

Result= We did not use any design pattern

10 Number of private methods

Result=3