ID-10-T

Software Metrics Calculation System

USER MANUAL

Version 2.0

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Contents

1 Introduction

This chapter will introduce you the Software Metrics Calculation System.

1.1 Overview

The Software Metrics Calculation System (SMCS) is a piece of software that allows the user to analyze and view various metrics about their source code. This document will describe the features and usage of SMCS.

1.2 Background

The customer, Dr. Stringfellow, was interested in a software system that would help ensure that her computer science students are writing programs that fit her specifications. SMCS was created by the Software Engineering group ID-10-T to fulfill this need.

1.3 How to use this document

This document is split into four chapters:

- Chapter 1: An introduction to SMCS.
- Chapter 2: Describes the purpose of SMCS and the software requirements.
- Chapter 3: Details how to use SMCS.
- Chapter 4: Describes the metrics available in SMCS.
- Chapter 5: Lists contact information and how to report a bug.

2 Software Overview

This chapter will give an overview of SMCS.

2.1 Software Purpose

The main objective of SMCS is to help first and second year computer science students become better programmers. This software will calculate and display metrics about the users source code such as line of code, lines of documentation, cyclical complexity, etc. These metrics will be used to give the user feedback on their code and to correct commonly made mistakes.

2.2 Software Requirements

The minimum requirements for SMCS are relatively low.
They are:

- Minimum Operating System: Windows XP, OS X 10.7, Linux 2.6.23
- Web Browser: Firefox, Chrome, Edge, Safari

3 Getting Started

This chapter will detail how to use SMCS.

3.1 How to Start SMCS

To start SMCS in standalone mode simply double click on the application. This will start a local web server on port 8080 and launch your default web browser to the SMCS code submission page. If you wish to host SMCS on a server so that it is accessible from anywhere, open config.json and change the ”standalone” configuration option to false, ensure that port 8080 is forwarded correctly and then start SMCS. SMCS will only open the web browser if it is in standalone mode.

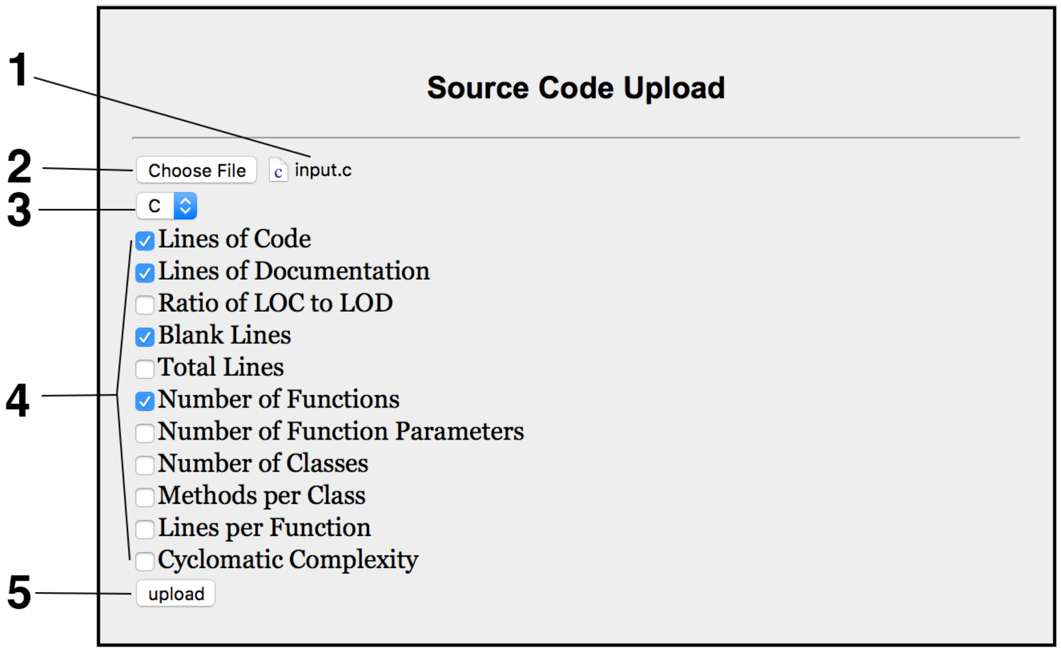
3.2 User interface

The user interface is split into two pages, a source code submission page and an analysis results page. The next three pages show these two pages labeled with descriptions of the UI elements.

The page shown in figure 3.1 is used to select the source code and metrics you want to use in the analysis. The elements of this page are described below.

1. File Name - This is the file that is currently selected.
2. Choose File - Use this button to select a source code file.
3. Language Selection - If the correct language is not automatically selected, use this combobox to select the correct one.
4. Metrics Selection - Use these checkboxes to select the metrics you wish to use.

5. Upload - Use this button to run the selected metrics on your source code.



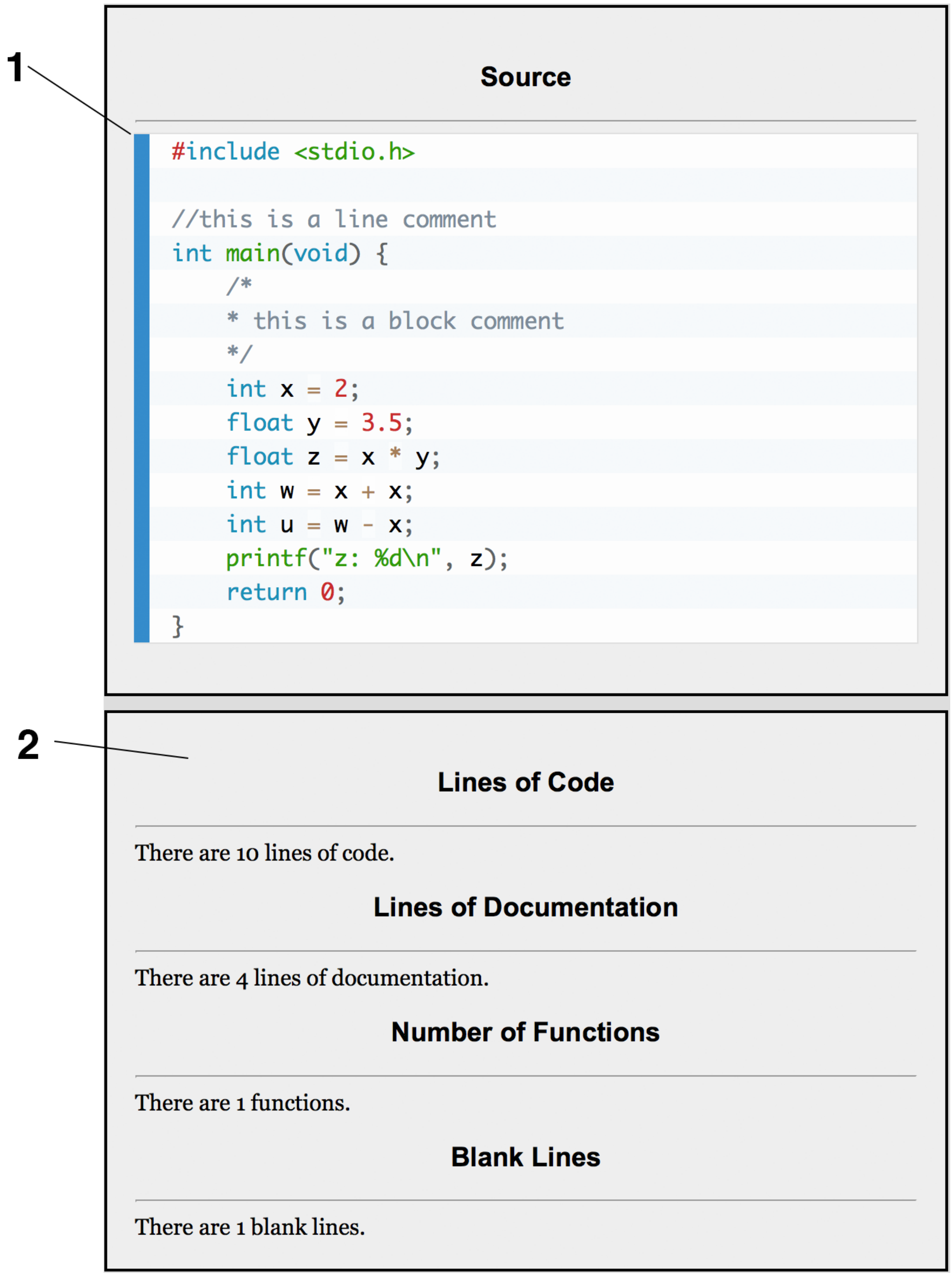
Source Code Upload

- [✓] Lines of Code
- [✓] Lines of Documentation
- [ ] Ratio of LOC to LOD
- [✓] Blank Lines
- [ ] Total Lines
- [✓] Number of Functions
- [ ] Number of Function Parameters
- [ ] Number of Classes
- [ ] Methods per Class
- [ ] Lines per Function
- [ ] Cyclomatic Complexity

Figure 3.1: Source code submission page with labeled elements.

The page shown in figure 3.2 displays the selected source code and the results of its analysis. The elements of this page are described below.

1. Source Code - Your selected source code file syntax highlighted
2. Metrics Results - A listing of the results of the metrics you selected.



```c
#include <stdio.h>

//this is a line comment
int main(void) {
    /*
    * this is a block comment
    */
    int x = 2;
    float y = 3.5;
    float z = x * y;
    int w = x + x;
    int u = w - x;
    printf("z: %d\n", z);
    return 0;
}
```

Lines of Code

There are 10 lines of code.

Lines of Documentation

There are 4 lines of documentation.

Number of Functions

There are 1 functions.

Blank Lines

There are 1 blank lines.

Figure 3.2: Analysis results page with labeled elements.

4 Available Metrics

This chapter describes the metrics available to use in SMCS.

4.1 Lines of ...

Metrics that the number of lines of a certain type.

- Code - The number of lines of code in your source.
- Documentation - The number of lines of documentation in your source.
- Ratio - The ration of Lines of Code to Lines of Documentation. It could be a problem if the ratio of documentation to code is too low.
- Whitespace - The number of blank lines in you source.
- Total Lines - The total number of lines in your source.

Note: A line that contains code and documentation will be counted as both a line of code and documentation.

4.2 Number of ...

Metrics that count the number of times a programming structure appears.

- Functions - The number of functions in your source.
- Function parameters - The number of parameters in each function. If you have too many parameters in a function it could cause trouble, especially if it is used often.
- Classes - The number of
- Methods per Class - The number of methods in each class.
- Lines per Function - the number of lines in each function.

4.3 Cyclomatic Complexity

Cyclomatic Complexity is the number of linearly independent paths within a program. It is used to measure the complexity of a program.

Example C code:

```
if (A == 10) {
    if (B > C) {
        A = B;
    } else {
        A = C;
    }
}
printf(A);
printf(B);
printf(C);
```

This code has a three separate paths that it can take so it has a cyclomatic complexity of three.

5 Appendix

5.1 How to Report a Bug

If any bugs are discovered, please send an email to ID10T.BUG@example.com.
Please include the following information when reporting a bug:

- A complete description of the problem what led to it.
- What operating system and web browser you are using.
- What error messages are displayed.

5.2 Contacts

Contact information for ID-10-T team members.

Member Name	Phone Number
Christopher Silva	940-782-1234
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