Maintainability Index

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Version History

Date	Author	Version	Changes
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Table of Contents

1   Maintainability Index

In 1991 Oman and Hagemeister introduced a composite metric for quantifying software maintainability. The metric is known as Maintainability Index (MI) and over the years it has evolved into numerous variants and has been successfully applied to many industrial strength software systems.

2   Computing Maintainability Index in UCC-J

Maintainability Index can be computed using the following equations: ‐

1)   3-Metric Formula: 171 – 5.2ln(aveV) – 0.23aveV(g') – 16.2ln(aveLOC)

where aveV is the average Halstead Volume per module, aveV(g') is the average extended cyclomatic complexity per module and aveLOC is the average lines of code per module

2)   4-Metric Formula: 171 – 5.2ln(aveV) – 0.23aveV(g') – 16.2ln(aveLOC) + 50.0 sin sqrt(2.46 per CM)

where aveV is the average Halstead Volume per module, aveV(g') is the average extended cyclomatic complexity per module aveLOC is the average lines of code per module and perCM is average percent of lines of comments per module.

Note:

- For these calculations, we treat a function to be a module.
- LOC refers to physical SLOC
- perCM is calculated as Total Comments (Whole + Embedded) / (Total Lines of Code – Blank Lines)
- For each individual source file, UCC calculates the Halstead Volume, cyclomatic complexity, physical SLOC and percentage of comments. Each of these is then divided by the number of functions in the file to get the respective 'per module' values. These values are then used to calculate the maintainability index of the file.

- For the system maintainability index, we aggregate the values of V, g', LOC and perCM for all files and divide them by the total number of modules in the system to get the respective values for the entire system. These values are then used to calculate the system Maintainability Index.

3 References

Welker, Kurt D. "The software maintainability index revisited." CrossTalk 14 (2001): 18-21.