A recently conceived suite of object-oriented software metrics focus is on semantic aspects of software, in contradistinction to traditional software metrics, which focus on syntactic aspects of software. Semantic metrics represent a more human-oriented view of software than do syntactic metrics. The semantic metrics of a given computer program are calculated by use of the output of a knowledge-based analysis of the program, and are substantially more representative of software quality and more readily comprehensible from a human perspective than are the syntactic metrics.

Semantic metrics have the potential to help software engineers identify fragile, low-quality sections of code much earlier in the development process than is possible by use of syntactic metrics. By enabling earlier and better detection of faults, semantic metrics are expected to make maintenance of software less time-consuming and expensive and to make software more reusable. Because it is less costly to correct faults found earlier than to correct faults found later in the software-development process, it is expected that the overall cost of developing software will be reduced. Moreover, because semantic metrics provide better measures of internal documentation descriptiveness (descriptiveness of the comments and identifiers in software), all aspects of development of software can be expected to benefit from improved understanding of the software.

Prototype software called “SemMet” for computing semantic metrics is undergoing development. In SemMet, semantic metrics are described within the context of knowledge-based systems that consist of semantic networks formed from conceptual graphs. Conceptual graphs are often used for semantic networks for natural language processing; however, the use of conceptual graphs is also a general and fairly common knowledge-representation technique. In the computation of semantic metrics, concepts and conceptual relations from conceptual graphs inside a knowledge base are used as input. The output semantic metrics are presented in a report.

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In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to: Letha Hughes Etzkorn, Ph.D., P.E., Assistant Professor, Computer Science Department, University of Alabama in Huntsville, Huntsville, AL 35899. Refer to GSC-14752-1, volume and number of this NASA Tech Briefs issue, and the page number.