



IMEGS: An Incremental Multi-language Editor Generator and System

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To date all syntax-directed editors have been created as language-specific. However, the research project IMEGS was undertaken to investigate the feasibility of more language-independent syntax-directed editors. IMEGS is a programming environment which will allow for the creation, modification, incremental compilation and execution of programs in a wide variety of block-structured languages. In addition, IMEGS allows users to define and extend the languages to be used.

The goals of IMEGS are: 1) to provide a syntax-directed editor which can be used for a number of languages and 2) to allow the user to define these languages in a more flexible manner than in previous syntax-directed editor generators.

The IMEGS environment has five modes: security, editing, phrase definition, nonterminal modification, and production modification. When entering IMEGS, the user specifies the language to be used. The information previously defined for a language is loaded from a file for that language.

The security mode specifies which users can modify IMEGS languages. In this manner, an instructor can define a language to be used by his class while his students would be unable to affect this definition or define another language to use. (In fact, to users without the proper access, the IMEGS environment appears to be merely a syntax-directed editor.)

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The editing mode allows the user to work on programs in the language specified by the user. The editing environment allows for the creation, modification, incremental compilation, and execution of programs using a syntax-directed editor. This syntax-directed editing is selection-oriented.

The remaining modes (phrase definition, nonterminal modification, and production modification) are used to define and modify IMEGS languages. In each of these modes, the user is given a series of software tools to facilitate language definition.

Phrases in an IMEGS-defined language consist of expressions. Compilation of phrases is driven by an operator-precedence parser. The user is able to define the precedence rules for the expressions in the phrase definition mode.

Templates are defined for each production using an attributed grammar. The nonterminal modification mode allows the user to define new nonterminals which can be used in production templates. The user is also queried for the attributes which are to be associated with this nonterminal.

The production modification mode defines the template syntax, prettyprinting rules and associated semantics. The definition of the syntax and prettyprinting rules for a production is screen-oriented. The user may define the semantics by either using the IMEGS semantic language; to by using previously-defined parts of the language currently being extended to define the template semantics. For instance, a while loop might be defined using the if and goto statements.

In summary, IMEGS provides a syntax-directed environment for a variety of languages. The languages themselves can be defined and extended within the environment.