

# RGA - Semi-Conditional Grammars

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## Abstract

Context-conditional grammars are based on context-free rules that can be extended by a set of permitting and a set of forbidding strings. If a rule has at least one of these sets, it is called a conditional rule, otherwise it is called a context-free rule. A rule can be applied if all permitting strings are present in the current sentential form and at the same time none of the forbidding strings is present. Conditional grammars have a degree( $r,s$ ), where  $r$  and  $s$  are the length of the longest possible permitting and forbidding strings, respectively.

In our presentation we are going to cover two variations of context-conditional grammars: semi-conditional grammars and simple semi-conditional grammars.

Semi-conditional grammars are a special case of context-conditional grammars in which every rule contains no more than one permitting string and no more than one forbidding string. Depending on the grammar degree and the presence of erasing rules, semi-conditional grammars can generate the same set of languages as context-free, context-sensitive or phrase-structure grammars. An interesting finding is that every recursively enumerable language can be generated by an SC(2,1) with no more than 9 conditional rules and 10 nonterminals.

The second variation - simple semi-conditional grammars are a special case of semi-conditional grammars with no more than one condition per rule (permitting or forbidding). Depending on the grammar degree and the presence of erasing rules, simple semi-conditional grammars can generate the same set of languages as context-free, context-sensitive or phrase-structure grammars. An interesting finding is that every recursively enumerable language can be generated by an SSC(2,1) with no more than 9 conditional rules and 10 nonterminals or by an SSC(3,1) with no more than 8 conditional rules and 9 nonterminals.