We start by defining the semantics of declarations (for variables, arrays and functions).

Upon evaluating the array dimensions, the code generation rule below desugars multi-dimensional array declaration to uni-dimensional one. The inclusion of values in expressions follows the methodology of syntactic definitions (as, e.g., SOS): extend the syntax of the language with values. If writing the semantics directly on the syntax of the language instead of writing a parser, then one would not need to include values in expressions. Values can be defined in declarations and functions, and they are evaluated when they are accessed. Values can also be passed as arguments to functions and returned as results. The semantics of SIMPLE is now complete.

Currently we have to explicitly declare the syntactic lists in this implementation of SIMPLE’s configuration. This is part of the basic semantic infrastructure of SIMPLE, which allows the programmer to define the semantics of the language in a modular way. The configuration of SIMPLE consists of a top level cell, which is the root of the configuration tree. This cell contains one singleton cell for each of the four basic elements of the language: variables, constants, functions and control structures.

The semantics of variables and constants is straightforward. Variables are declared in a block, and their scope is the block containing the declaration. Constants are defined in a declaration, and their scope is the entire program. The semantics of functions is more complex. Functions are declared in a separate section of the program, and their scope is the block containing the declaration. The function body is executed in the context of the function, and any variables declared in the function body have a local scope.

The semantics of SIMPLE’s control structures is defined by a set of rules that describe how the program is executed. These rules are computational, in the sense that they describe the sequence of steps that the program takes to evaluate an expression. The rules are structural, in the sense that they are applied to the syntactic structure of the program. The simple mechanism of configuration abstraction allows the programmer to define the semantics of the language in a modular way. The configuration serves as a backbone for the process of configuration abstraction, which allows users to only mention the relevant cells in each semantic rule. The configuration can be done mostly automatically, except for the special result computations. Finally, the configuration serves as a backbone for the process of configuration abstraction, which allows users to only mention the relevant cells in each semantic rule. 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