

Languages-beta: SIMPLE-2-Expressions *

The P_LanCompS Project

SIMPLE-2-Expressions.cbs | PLAIN | PRETTY

Language "SIMPLE"

2 Expressions

Syntax $Exp : exp ::=$

- | `'(exp)'`
- | `value`
- | `lexp`
- | `lexp '=' exp`
- | `'++' lexp`
- | `'-' exp`
- | `exp '(' exps? ')'`
- | `'sizeof' '(' exp ')'`
- | `'read' '(' ')'`
- | `exp '+' exp`
- | `exp '-' exp`
- | `exp '*' exp`
- | `exp '/' exp`
- | `exp '%' exp`
- | `exp '<' exp`
- | `exp '<=' exp`
- | `exp '>' exp`
- | `exp '>=' exp`
- | `exp '==' exp`
- | `exp '!=' exp`
- | `'!' exp`
- | `exp '&&' exp`
- | `exp '||' exp`

Rule $[['(Exp)']]: exp = [[Exp]]$

*Suggestions for improvement: plancomps@gmail.com.
Reports of issues: <https://github.com/plancomps/CBS-beta/issues>.

Semantics $\text{rval}[_ : \text{exp}] : \Rightarrow \text{values}$

Rule $\text{rval}[V] = \text{val}[V]$

Rule $\text{rval}[LExp] = \text{assigned}(\text{lval}[LExp])$

Rule $\text{rval}[LExp \text{ '=' } Exp] =$
 give(
 $\text{rval}[Exp]$,
 sequential(
 $\text{assign}(\text{lval}[LExp], \text{given})$,
 given))

Rule $\text{rval}[++ \text{ LExp}] =$
 give(
 $\text{lval}[LExp]$,
 sequential(
 $\text{assign}(\text{given}, \text{integer-add}(\text{assigned}(\text{given}), 1))$,
 $\text{assigned}(\text{given})$))

Rule $\text{rval}[- \text{ Exp}] = \text{integer-negate}(\text{rval}[Exp])$

Rule $\text{rval}[Exp \text{ '(' } Exps? \text{ ')'}] = \text{apply}(\text{rval}[Exp], \text{tuple}(\text{rvals}[Exps?]))$

Rule $\text{rval}[\text{'sizeOf' '(' Exp ')'}] = \text{length}(\text{vector-elements}(\text{rval}[Exp]))$

Rule $\text{rval}[\text{'read' '(' ')'}] = \text{read}$

Rule $\text{rval}[Exp_1 \text{ '+' } Exp_2] = \text{integer-add}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '-' } Exp_2] = \text{integer-subtract}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '*' } Exp_2] = \text{integer-multiply}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '/' } Exp_2] = \text{checked integer-divide}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '%' } Exp_2] = \text{checked integer-modulo}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '<' } Exp_2] = \text{is-less}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '<=' } Exp_2] = \text{is-less-or-equal}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '>' } Exp_2] = \text{is-greater}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '>=' } Exp_2] = \text{is-greater-or-equal}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '==' } Exp_2] = \text{is-equal}(\text{rval}[Exp_1], \text{rval}[Exp_2])$

Rule $\text{rval}[Exp_1 \text{ '!=' } Exp_2] = \text{not}(\text{is-equal}(\text{rval}[Exp_1], \text{rval}[Exp_2]))$

Rule $\text{rval}['!' \text{ Exp}] = \text{not}(\text{rval}[Exp])$

Rule $\text{rval}[Exp_1 \text{ '&\&' } Exp_2] = \text{if-else}(\text{rval}[Exp_1], \text{rval}[Exp_2], \text{false})$

Rule $\text{rval}[Exp_1 \text{ '||' } Exp_2] = \text{if-else}(\text{rval}[Exp_1], \text{true}, \text{rval}[Exp_2])$

Syntax $Exps : \text{exps} ::= \text{exp} \text{ (',' exps)?}$

Semantics $\text{rvals}[_ : \text{exps?}] : (\Rightarrow \text{values})^*$

Rule $\text{rvals}[] = ()$

Rule $\text{rvals}[Exp] = \text{rval}[Exp]$

Rule $\text{rvals}[Exp \text{ ',' } Exps] = \text{rval}[Exp], \text{rvals}[Exps]$

Syntax $LExp : \text{lexp} ::= \text{id} \mid \text{lexp} \text{ '[' } \text{exps} \text{ ']}'$

Rule $[[LExp \text{ '[' } Exp \text{ ',' } Exps \text{ ']'}] : \text{lexp} =$
 $[[LExp \text{ '[' } Exp \text{ ']'}] \text{ '[' } Exps \text{ ']}'$

Semantics $\text{lval}[_ : \text{lexp}] : \Rightarrow \text{variables}$

Rule $\text{lval}[Id] = \text{bound}(\text{id}[Id])$

Rule $\text{lval}[LExp \text{ '[' } Exp \text{ ']'}] =$
 checked index(integer-add(1, $\text{rval}[Exp]$), vector-elements($\text{rval}[LExp]$))