

# Joint symbol glossary for TOPLAS RNLGR and AI BRNLGR paper

$\mathbf{N}$	set of nonterminals
$\mathbf{T}$	set of terminals
$S$	start nonterminal
$\epsilon$	empty string
$\alpha, \beta, \dots$	strings of grammar symbols, that is $\alpha \in (\mathbf{N} \cup \mathbf{T})^*$
$a, b, \dots$	terminals
$X, Y, \dots$	nonterminals
$h, k, l$	DFA states
$\overline{R}$	$q, t$ reduction numbers
	$u, v, w$ GSS nodes
	$x, y, z$ SPPF nodes
$\overline{R}$	$q$ the number of a reduction, $A ::= \alpha \cdot \omega$
$\overline{R}$	$ q $ the length of a reduction, $ \alpha $ in this example
$\overline{B}$	$d$ length of input
$\overline{B}$	$a_1 \dots a_{d+1}$ input string, $a_{d+1}$ contains the end-of-string symbol \$
$\overline{R}$	$n$ length of input
$\overline{R}$	$a_1 \dots a_{n+1}$ input string, $a_{n+1}$ contains the end-of-string symbol \$
	$i$ current index into the string, current frontier index
$\mathcal{T}$	parse table
	$\mathcal{T}(l, a_i)$ parse table entry for state $l$ and the $i^{\text{th}}$ input symbol: entry is a set of actions
	$acc$ parse table action accept
	$pk$ parse table action push (shift or goto) to state $k$
$\overline{B}$	$r(X, m, f)$ parse table action reduce by symbol $X$ , length $m$ , right nullable index $f$
$\overline{B}$	$t$ a reduction length
$\omega$	a required nullable part or a nonterminal, used as an index into $I$
$I$	index of $\epsilon$ -SPPFs
	$I(\epsilon) = 0$
	$I(1) \dots$ the $\epsilon$ -SPPFs for the nonterminals and the required right nullable parts $\gamma$
$\overline{R}$	$u_0$ $\epsilon$ -SPPF node labelled $\epsilon$
$\overline{R}$	$u_{I(\omega)}$ root node of the $\epsilon$ -SPPF for $\omega$
	$v_0$ initial node of GSS, labelled with the start state of the DFA
	$U_0 \dots U_d$ GSS frontiers
	$t$ an element of a frontier
$\mathcal{R}$	set of pending reductions
	$(v, X, m, f, y)$ element of $\mathcal{R}$ : $X ::= \alpha_1 \alpha_2 \omega$ is applied from $v$ , $m =  \alpha_1 $
	$v$ GSS node from which reduction is to be applied
	$X$ left hand side symbol of reduction
	$m$ remaining length of reduction path to be traced ( $ \alpha_1 $ , above)
	$f$ index of required right nullable part, or 0 if not right nullable reduction
	$y$ SPPF node labelling first edge of path down which reduction is applied: if $m = 0$ then $y = \epsilon$
$\mathcal{Q}$	set of pending shifts
$\mathcal{Q}'$	temporary set of pending shifts
	$(v, k)$ element of $\mathcal{Q}$
	$v$ GSS node to which the shift is to be applied
	$k$ the state being shifted to, the label of the GSS node which becomes the parent of $v$
$\overline{B}$	$\chi$ set of paths $v$ of length $(m - 1)$ (or length 0 if $m = 0$ ) from a GSS node
$\overline{R}$	$\chi$ set of pairs $(u, x)$ where $u$ is a GSS node and $x$ is a SPPF node: the degenerate path from $v$ to $u$ labelled $x$
$\overline{B}$	$y_{m-1}, \dots, y_1$ the edge labels on a path in $\chi$
$\overline{B}$	$y_m$ initial path node: set to the $y$ in reduction being processed
	$w$ GSS node: the source for goto action $pl$ or shift action $pk$
	$u$ the final node on a path in $\chi$
	$c$ index of GSS level containing $u$
$\mathcal{N}$	set of SPPF nodes created whilst processing current level
$\mathcal{I}$	set of intermediate SPPF nodes created whilst processing current level
$\overline{B}$	$t$ a new packed SPPF node (note: $t$ also used for GSS element in reductions loaded by shifter)
$\overline{R}$	$p$ a new packed SPPF node
$\overline{B}$	$y$ in ADD_CHILDREN, SPPF node to which children are to be attached
	$z$ SPPF node under construction
$\overline{B}$	$\Lambda$ sequence of SPPF nodes
$\overline{R}$	$\Delta$ ordered pair of SPPF nodes
$\overline{R}$	$\Upsilon$ sequence of SPPF nodes: $\Delta$ with $\epsilon$ -SPPF root appended