Profile Demonstration

```
options
   start_node_filter = "u";
end

grammar ProfileDemo
   nonterminal S(0), A(2), B(2);
   terminal    a(1), b(2), c(1);
   start       S;

   S()     ::= a(u) A(u,v)            [ init ]
   A(u,v)  ::= A(u,v) b(u,x) B(x,v)   [ a1   ]
            |  /* eps */              [ a2   ]
   B(u,v)  ::= b(u,x) B(x,v)          [ b1   ]
            |  b(u,v)                 [ b2   ]
            |  c(u)                   [ b3   ]
end
```

Note that the reduce step for rule *a2* in state $q_1(\boldsymbol{a})$ produces a nonterminal A-edge whose second attached node has not yet been determined. This fact is also represented by the condition $n_1 =?$ in the first transition from state $q_1(\boldsymbol{a})$ to $q_2(n_0)$. If, however, the second attached node of the A-edge has been determined (in $q_7(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$ or $q_{13}(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$), condition $n_1{\uparrow}$ is satisfied, the other transition from state $q_1(\boldsymbol{a})$ to state $q_{10}(n_0,n_1)$ is taken. In this case, $n_1{\uparrow}$ means that n_1 had not yet been consumed when state $q_1(\boldsymbol{a})$ was entered first (i.e., before returning to it from $q_7(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$ or $q_{13}(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$, respectively), but is now identified and consumed.

State $q_0(\boldsymbol{a})$

$\mathsf{S}() \to \boldsymbol{.}\,\mathsf{a}(\boldsymbol{a})\,\mathsf{A}(\boldsymbol{a},n_1)$

$$\xrightarrow[n_0=\boldsymbol{a}]{\mathsf{a}(n_0)} q_1(n_0)$$

State $q_1(\boldsymbol{a})$

$\mathsf{S}() \to \mathsf{a}(\boldsymbol{a})\ \boldsymbol{.}\ \mathsf{A}(\boldsymbol{a},n_1)$	
$\mathsf{A}(\boldsymbol{a},n_2) \to \boldsymbol{.}$	*[a2]*
$\mathsf{A}(\boldsymbol{a},n_3) \to \boldsymbol{.}\,\mathsf{A}(\boldsymbol{a},n_3)\,\mathsf{b}(\boldsymbol{a},n_4)\,\mathsf{B}(n_4,n_3)$	

$$\xrightarrow[n_0=\boldsymbol{a},n_1=?]{\mathsf{A}(n_0,n_1)} q_2(n_0)$$
$$\xrightarrow[n_0=\boldsymbol{a},n_1{\uparrow}]{\mathsf{A}(n_0,n_1)} q_{10}(n_0,n_1)$$

State $q_2(\boldsymbol{a})$

$\mathsf{A}(\boldsymbol{a},n_1) \to \mathsf{A}(\boldsymbol{a},n_1)\ \boldsymbol{.}\ \mathsf{b}(\boldsymbol{a},n_2)\,\mathsf{B}(n_2,n_1)$	
$\mathsf{S}() \to \mathsf{a}(\boldsymbol{a})\,\mathsf{A}(\boldsymbol{a},n_3)\boldsymbol{.}$	*[init]*

$$\xrightarrow[n_0=\boldsymbol{a},n_1{\uparrow}]{\mathsf{b}(n_0,n_1)} q_3(n_0,n_1)$$

State $q_3(\boldsymbol{a},\boldsymbol{b})$

$\mathsf{A}(\boldsymbol{a},n_1) \to \mathsf{A}(\boldsymbol{a},n_1)\,\mathsf{b}(\boldsymbol{a},\boldsymbol{b})\ \boldsymbol{.}\ \mathsf{B}(\boldsymbol{b},n_1)$	
$\mathsf{B}(\boldsymbol{b},n_2) \to \boldsymbol{.}\,\mathsf{b}(\boldsymbol{b},n_2)$	
$\mathsf{B}(\boldsymbol{b},n_3) \to \boldsymbol{.}\,\mathsf{b}(\boldsymbol{b},n_4)\,\mathsf{B}(n_4,n_3)$	
$\mathsf{B}(\boldsymbol{b},n_5) \to \boldsymbol{.}\,\mathsf{c}(\boldsymbol{b})$	

$$\xrightarrow[n_0=\boldsymbol{b},n_1=?]{\mathsf{B}(n_0,n_1)} q_6(\boldsymbol{a},n_0)$$
$$\xrightarrow[n_0=\boldsymbol{b},n_1{\uparrow}]{\mathsf{B}(n_0,n_1)} q_7(\boldsymbol{a},n_1,n_0)$$
$$\xrightarrow[n_0=\boldsymbol{b},n_1{\uparrow}]{\mathsf{b}(n_0,n_1)} q_4(n_0,n_1)$$
$$\xrightarrow[n_0=\boldsymbol{b}]{\mathsf{c}(n_0)} q_5(n_0)$$

State $q_4(\boldsymbol{a},\boldsymbol{b})$

$\mathsf{B}(\boldsymbol{a},n_1) \to \mathsf{b}(\boldsymbol{a},\boldsymbol{b})\ \boldsymbol{.}\ \mathsf{B}(\boldsymbol{b},n_1)$	
$\mathsf{B}(\boldsymbol{a},\boldsymbol{b}) \to \mathsf{b}(\boldsymbol{a},\boldsymbol{b})\boldsymbol{.}$	*[b2]*
$\mathsf{B}(\boldsymbol{b},n_2) \to \boldsymbol{.}\,\mathsf{b}(\boldsymbol{b},n_2)$	
$\mathsf{B}(\boldsymbol{b},n_3) \to \boldsymbol{.}\,\mathsf{b}(\boldsymbol{b},n_4)\,\mathsf{B}(n_4,n_3)$	
$\mathsf{B}(\boldsymbol{b},n_5) \to \boldsymbol{.}\,\mathsf{c}(\boldsymbol{b})$	

$$\xrightarrow[n_0=\boldsymbol{b},n_1=?]{\mathsf{B}(n_0,n_1)} q_8(\boldsymbol{a},n_0)$$
$$\xrightarrow[n_0=\boldsymbol{b},n_1{\uparrow}]{\mathsf{B}(n_0,n_1)} q_9(\boldsymbol{a},n_1,n_0)$$
$$\xrightarrow[n_0=\boldsymbol{b},n_1{\uparrow}]{\mathsf{b}(n_0,n_1)} q_4(n_0,n_1)$$
$$\xrightarrow[n_0=\boldsymbol{b}]{\mathsf{c}(n_0)} q_5(n_0)$$

State $q_5(\boldsymbol{a})$

$\mathsf{B}(\boldsymbol{a},n_1) \to \mathsf{c}(\boldsymbol{a})\boldsymbol{.}$ *[b3]*

State $q_6(\boldsymbol{a},\boldsymbol{b})$

$\mathsf{A}(\boldsymbol{a},n_1) \to \mathsf{A}(\boldsymbol{a},n_1)\,\mathsf{b}(\boldsymbol{a},\boldsymbol{b})\,\mathsf{B}(\boldsymbol{b},n_1)\boldsymbol{.}$ *[a1]*

State $q_7(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$

$\mathsf{A}(\boldsymbol{a},\boldsymbol{b}) \to \mathsf{A}(\boldsymbol{a},\boldsymbol{b})\,\mathsf{b}(\boldsymbol{a},\boldsymbol{c})\,\mathsf{B}(\boldsymbol{c},\boldsymbol{b})\boldsymbol{.}$ *[a1]*

State $q_8(\boldsymbol{a},\boldsymbol{b})$

$\mathsf{B}(\boldsymbol{a},n_1) \to \mathsf{b}(\boldsymbol{a},\boldsymbol{b})\,\mathsf{B}(\boldsymbol{b},n_1)\boldsymbol{.}$ *[b1]*

State $q_9(\boldsymbol{a},\boldsymbol{b},\boldsymbol{c})$

$\mathsf{B}(\boldsymbol{a},\boldsymbol{b}) \to \mathsf{b}(\boldsymbol{a},\boldsymbol{c})\,\mathsf{B}(\boldsymbol{c},\boldsymbol{b})\boldsymbol{.}$ *[b1]*

State $q_{10}(\boldsymbol{a},\boldsymbol{b})$

$\mathsf{A}(\boldsymbol{a},\boldsymbol{b}) \to \mathsf{A}(\boldsymbol{a},\boldsymbol{b})\ \boldsymbol{.}\ \mathsf{b}(\boldsymbol{a},n_1)\,\mathsf{B}(n_1,\boldsymbol{b})$	
$\mathsf{S}() \to \mathsf{a}(\boldsymbol{a})\,\mathsf{A}(\boldsymbol{a},\boldsymbol{b})\boldsymbol{.}$	*[init]*

$$\xrightarrow[n_0=\boldsymbol{a},n_1{\uparrow}]{\mathsf{b}(n_0,n_1)} q_{11}(n_0,\boldsymbol{b},n_1)$$

State $q_{11}(a, b, c)$

$\mathsf{A}(a, b) \to \mathsf{A}(a, b)\, \mathsf{b}(a, c)\ \mathbf{.}\ \mathsf{B}(c, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{b}(c, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{b}(c, n_1)\, \mathsf{B}(n_1, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{c}(c)$

$$\xrightarrow[n_0 = c, n_1 =?]{\mathsf{B}(n_0, n_1)} q_{13}(a, b, n_0)$$
$$\xrightarrow[n_0 = c, n_1 = b]{\mathsf{B}(n_0, n_1)} q_{7}(a, n_1, n_0)$$
$$\xrightarrow[n_0 = c, n_1 = b]{\mathsf{b}(n_0, n_1)} q_{15}(n_0, n_1)$$
$$\xrightarrow[n_0 = c, n_1\uparrow]{\mathsf{b}(n_0, n_1)} q_{14}(n_0, b, n_1)$$
$$\xrightarrow[n_0 = c]{\mathsf{c}(n_0)} q_{12}(n_0, b)$$

State $q_{12}(a, b)$

$\mathsf{B}(a, b) \to \mathsf{c}(a)\mathbf{.}$ $[b3]$

State $q_{13}(a, b, c)$

$\mathsf{A}(a, b) \to \mathsf{A}(a, b)\, \mathsf{b}(a, c)\, \mathsf{B}(c, b)\mathbf{.}$ $[a1]$

State $q_{14}(a, b, c)$

$\mathsf{B}(a, b) \to \mathsf{b}(a, c)\ \mathbf{.}\ \mathsf{B}(c, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{b}(c, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{b}(c, n_1)\, \mathsf{B}(n_1, b)$
$\mathsf{B}(c, b) \to \mathbf{.}\mathsf{c}(c)$

$$\xrightarrow[n_0 = c, n_1 =?]{\mathsf{B}(n_0, n_1)} q_{16}(a, b, n_0)$$
$$\xrightarrow[n_0 = c, n_1 = b]{\mathsf{B}(n_0, n_1)} q_{9}(a, n_1, n_0)$$
$$\xrightarrow[n_0 = c, n_1 = b]{\mathsf{b}(n_0, n_1)} q_{15}(n_0, n_1)$$
$$\xrightarrow[n_0 = c, n_1\uparrow]{\mathsf{b}(n_0, n_1)} q_{14}(n_0, b, n_1)$$
$$\xrightarrow[n_0 = c]{\mathsf{c}(n_0)} q_{12}(n_0, b)$$

State $q_{15}(a, b)$

$\mathsf{B}(a, b) \to \mathsf{b}(a, b)\mathbf{.}$ $[b2]$

State $q_{16}(a, b, c)$

$\mathsf{B}(a, b) \to \mathsf{b}(a, c)\, \mathsf{B}(c, b)\mathbf{.}$ $[b1]$