

**1. Grammar symbols: Used cross reference.**

Reference of each grammar's symbol used within each rule's productions. The index uses the tripple: rule name, its subrule no, and the symbol's position within the symbol string.

**2. NS\_angled\_string::TH\_angled\_string:.**

RT\_alphabet\_filename 5.3 Remitfile\_filename 5.3 R\_fsc\_file 4.3

**3. NS\_c\_string::TH\_c\_string:.**

RT\_alphabet\_filename 1.3 Remitfile\_filename 1.3 R\_fsc\_file 1.3

**4. NS\_linker\_id::TH\_linker\_id:.**

RT\_alphabet 1.3 Remitfile 1.3 R\_preamble 1.3

**5. NS\_linker\_preamble\_code::TH\_linker\_preamble\_code:.**

R\_preamble\_code 1.3

**6. NS\_lint\_balls::TH\_lint\_balls:.**

Rlint 1.3

**7. NULL thread:.**

RT\_alphabet 2.3 RT\_alphabet\_filename 2.3 RT\_alphabet\_filename 3.3 RT\_alphabet\_filename 4.3 Remitfile 2.3 Remitfile\_filename 2.3 Remitfile\_filename 3.3 Remitfile\_filename 4.3 R\_preamble 2.3 R\_preamble\_code 2.3 R\_fsc\_file 2.3 R\_fsc\_file 3.3 R\_fsc\_file 5.3

**8. RT\_alphabet:.**

Rlinker\_pass3 1.2

**9. RT\_alphabet\_filename:.**

Rlinker\_pass3 1.4

**10. R\_fsc\_file:.**

R\_fsc\_files 1.1 R\_fsc\_files 2.2

**11. R\_fsc\_files:.**

Rlinker\_pass3 1.13 R\_fsc\_files 2.1

**12. Remitfile:.**

Rlinker\_pass3 1.6

**13. Remitfile\_filename:.**

Rlinker\_pass3 1.8

**14. Rlint:.**

Rlinker\_pass3 1.1 Rlinker\_pass3 1.3 Rlinker\_pass3 1.5 Rlinker\_pass3 1.7 Rlinker\_pass3 1.9 Rlinker\_pass3  
1.12 Rlinker\_pass3 1.14 R\_fsc\_files 1.2 R\_fsc\_files 2.3

**15. Rpreable:.**

Rlinker\_pass3 1.10

**16. Rpreable\_code:.**

Rlinker\_pass3 1.11

**17.  $\epsilon$  :.**

Rlint 2.1

**18. angled-string:.**

RT\_alphabet\_filename 5.2 Remitfile\_filename 5.2 R\_fsc\_file 4.2

**19. bad eos:.**

RT\_alphabet\_filename 2.2 Remitfile\_filename 2.2 R\_fsc\_file 2.2

**20. bad esc:.**

RT\_alphabet\_filename 3.2 Remitfile\_filename 3.2 R\_fsc\_file 3.2

**21. c-string:.**

RT\_alphabet\_filename 1.2 Remitfile\_filename 1.2 R\_fsc\_file 1.2

**22. emitfile:.**

Remitfile 1.2

**23. eog:.**

Rlinker\_pass3 1.15

**24. file-of-T-alphabet:.**

RT\_alphabet 1.2

**25. lint:.**

Rlint 1.2

**26. preamble:.**

Rpreable 1.2

**27. syntax-code:.**

Rpreamble\_code 1.2

**28. |?:.**

RT\_alphabet 2.2 RT\_alphabet 3.1 RT\_alphabet\_filename 4.2 RT\_alphabet\_filename 6.1 Remitfile 2.2 Remitfile 3.1 Remitfile\_filename 4.2 Remitfile\_filename 6.1 Rpreamble 2.2 Rpreamble 3.1 Rpreamble\_code 2.2 Rpreamble\_code 3.1 R\_fsc\_files 3.1 R\_fsc\_file 5.2

**29. |||:**

RT\_alphabet 1.1 RT\_alphabet 2.1 RT\_alphabet\_filename 1.1 RT\_alphabet\_filename 2.1 RT\_alphabet\_filename 3.1 RT\_alphabet\_filename 4.1 RT\_alphabet\_filename 5.1 Remitfile 1.1 Remitfile 2.1 Remitfile\_filename 1.1 Remitfile\_filename 2.1 Remitfile\_filename 3.1 Remitfile\_filename 4.1 Remitfile\_filename 5.1 Rpreamble 1.1 Rpreamble 2.1 Rpreamble\_code 1.1 Rpreamble\_code 2.1 R\_fsc\_file 1.1 R\_fsc\_file 2.1 R\_fsc\_file 3.1 R\_fsc\_file 4.1 R\_fsc\_file 5.1 Rlint 1.1

**30. Grammar Rules's First Sets.**

**31.** *Rlinker\_pass3* # in set: 2.  
|?| |||

**32.** *RT\_alphabet* # in set: 2.  
|?| |||

**33.** *RT\_alphabet\_filename* # in set: 2.  
|?| |||

**34.** *Remitfile* # in set: 2.  
|?| |||

**35.** *Remitfile\_filename* # in set: 2.  
|?| |||

**36.** *Rpreamble* # in set: 2.  
|?| |||

**37.** *Rpreamble\_code* # in set: 2.  
|?| |||

**38.** *R\_fsc\_files* # in set: 2.  
|?| |||

**39.** *R\_fsc\_file* # in set: 1.  
|||

**40.** *Rlint*<sup>ε</sup> # in set: 1.  
|||

**41. LR State Network.**

List of productions with their derived LR state lists. Their subrule number and symbol string indicates the specific production being derived. The “▷” symbol indicates the production’s list of derived states from its closed state. Multiple lists within a production indicate 1 of 2 things:

- 1) derived string that could not be merged due to a lr(1) conflict
- 2) partially derived string merged into another derived lr states

A partially derived string is indicated by the “merged into” symbol  $\nearrow$  used as a superscript along with the merged into state number.

**42. Rlinker\_pass3.**

1 Rlint RT\_alphabet Rlint RT\_alphabet\_filename Rlint Remitfile Rlint Remitfile\_filename Rlint  
Rpreamble Rpreamble\_code Rlint R\_fsc\_files Rlint eog  
▷ 1 4 5 6 7 8 9 10 11 12 13 14 15 16 23 24

**43. RT\_alphabet.**

```
1 ||| file-of-T-alphabet NS_linker_id::TH_linker_id
  ▷ 4 26 28
2 ||| |?| NULL
  ▷ 4 26 27
3 |?|
  ▷ 4 25
```

**44. RT\_alphabet\_filename.**

```
1 ||| c-string NS_c_string::TH_c_string
  ▷ 6 30 33
2 ||| bad eos NULL
  ▷ 6 30 34
3 ||| bad esc NULL
  ▷ 6 30 35
4 ||| |?| NULL
  ▷ 6 30 31
5 ||| angled-string NS_angled_string::TH_angled_string
  ▷ 6 30 32
6 |?|
  ▷ 6 29
```

**45. Remitfile.**

```
1 ||| emitfile NS_linker_id::TH_linker_id
  ▷ 8 37 39
2 ||| |?| NULL
  ▷ 8 37 38
3 |?|
  ▷ 8 36
```

**46. Remitfile\_filename.**

```
1 ||| c-string NS_c_string::TH_c_string
  ▷ 10 41 44
2 ||| bad eos NULL
  ▷ 10 41 45
3 ||| bad esc NULL
  ▷ 10 41 46
4 ||| |?| NULL
  ▷ 10 41 42
5 ||| angled-string NS_angled_string::TH_angled_string
  ▷ 10 41 43
6 |?|
  ▷ 10 40
```

**47. R\_preamble.**

```
1 ||| preamble NS_linker_id::TH_linker_id
  ▷ 12 48 50
2 ||| |?| NULL
  ▷ 12 48 49
3 |?|
  ▷ 12 47
```

**48. R\_preamble\_code.**

```
1 ||| syntax-code NS_linker_preamble_code::TH_linker_preamble_code
  ▷ 13 52 54
2 ||| |?| NULL
  ▷ 13 52 53
3 |?|
  ▷ 13 51
```

**49. R\_fsc\_files.**

```
1 R_fsc_file Rlint
  ▷ 15 59 60
2 R_fsc_files R_fsc_file Rlint
  ▷ 15 16 57 58
3 |?|
  ▷ 15 55
```

**50. R\_fsc\_file.**

```
1 ||| c-string NS_c_string::TH_c_string
  ▷ 15 56 20
  ▷ 16 17↗20
2 ||| bad eos NULL
  ▷ 15 56 21
  ▷ 16 17↗21
3 ||| bad esc NULL
  ▷ 15 56 22
  ▷ 16 17↗22
4 ||| angled-string NS_angled_string::TH_angled_string
  ▷ 15 56 19
  ▷ 16 17↗19
5 ||| |?| NULL
  ▷ 15 56 18
  ▷ 16 17↗18
```

**51. Rlint.**

```

1 ||| lint NS_lint_balls::TH_lint_balls
  ▷ 1 2 3
  ▷ 5↗2
  ▷ 7↗2
  ▷ 9↗2
  ▷ 11↗2
  ▷ 14↗2
  ▷ 16 17↗3
  ▷ 57↗2
  ▷ 59↗2
2 ε
  ▷ 1
  ▷ 5
  ▷ 7
  ▷ 9
  ▷ 11
  ▷ 14
  ▷ 16
  ▷ 57
  ▷ 59

```

**52. List of reducing states.**

The following legend indicates the type of reducing state.

Points 2–4 are states that must meet the lr(1) condition:

- 1) r — only 1 production reducing
- 2) r<sup>2</sup> — 2 or more reducing productions
- 3) s/r — shift and 1 reducing production
- 4) s/r<sup>2</sup> — shift and multiple reducing productions

```

⊂ 1s/r 3r 5s/r 7s/r 9s/r 11s/r 14s/r 16s/r 18r 19r 20r 21r 22r 24r 25r 27r 28r
29r 31r 32r 33r 34r 35r 36r 38r 39r 40r 42r 43r 44r 45r 46r 47r 49r 50r 51r
53r 54r 55r 57s/r 58r 59s/r 60r

```

**53. Lr1 State's Follow sets and reducing lookahead sets.**

Notes on Follow set expressions:

1) The “follow set” for rule uses its literal name and tags its grammar rule rank number as a superscript. Due to space limitations, part of the follow set information uses the rule's literal name while the follow set expressions refers to the rule's rank number. This  $\langle \text{rule name, rule rank number} \rangle$  tuple allows you the reader to decipher the expressions. Transitions are represented by  $S_xR_z$  whereby S is the LR1 state identified by its “x” subscript where other transient calculations occur within the LR1 state network. R indicates the follow set rule with the subscript “z” as its grammar rank number that contributes to the follow set.

The  $\nearrow^x$  symbol indicates that a merge into state “x” has taken place. That is, the reduced subrule that depends on this follow set finds its follow set in 2 places: its birthing state that generated the sequence up to the merged into state, and the birthing state that generated the “merged into” state. So the rule's “follow set” calculation must also continue its calculation within the birth state generating the “x merged into” state.

State: 1 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlinker\_pass3<sup>1</sup>

Local follow set yield:  
 eolr.

$\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.1} \nearrow^{59} \nearrow^{57} \nearrow^{14} \nearrow^{11} \nearrow^9 \nearrow^7 \nearrow^5 \nearrow^{16}$

Local follow set yield:  
 |?|, |||.

State: 4 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 RT\_alphabet<sup>2</sup>  $R_{1.1.2} R_{1.1.3}$

Local follow set yield:  
 |?|, |||.

State: 5 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.3}$

Local follow set yield:  
 |?|, |||.

State: 6 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 RT\_alphabet\_filename<sup>3</sup>  $R_{1.1.4} R_{1.1.5}$

Local follow set yield:  
 |?|, |||.

State: 7 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.5}$

Local follow set yield:  
 |?|, |||.

State: 8 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$



Remitfile<sup>4</sup>  $R_{1.1.6} R_{1.1.7}$   
 Local follow set yield:  
 |?|, |||.

State: 9 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.7}$   
 Local follow set yield:  
 |?|, |||.

State: 10 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Remitfile\_filename<sup>5</sup>  $R_{1.1.8} R_{1.1.9}$   
 Local follow set yield:  
 |?|, |||.

State: 11 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.9}$   
 Local follow set yield:  
 |?|, |||.

State: 12 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rpreamble<sup>6</sup>  $R_{1.1.10}$   
 Local follow set yield:  
 |?|, |||.

State: 13 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rpreamble\_code<sup>7</sup>  $R_{1.1.11} R_{1.1.12}$   
 Local follow set yield:  
 |?|, |||.

State: 14 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 Rlint<sup>10</sup>  $R_{1.1.12}$   
 Local follow set yield:  
 |?|, |||.

State: 15 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 R\_fsc\_files<sup>8</sup>  $R_{8.2.1} R_{1.1.13} R_{1.1.14}$   
 Local follow set yield:  
 eog, |||.

$\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$   
 R\_fsc\_file<sup>9</sup>  $R_{8.1.1} R_{8.1.2} S_{15} R_8$   
 Local follow set yield:  
 |||.

State: 16 Follow Set contributors, merges, and transitions  
 $\leftarrow$  Follow set Rule  $\rightarrow \leftarrow$  follow set symbols contributors  $\rightarrow$

R<sub>fsc</sub>.file<sup>9</sup>                    R<sub>8.2.2</sub> R<sub>8.2.3</sub>  $\nearrow^{15}$  S<sub>15</sub>R<sub>8</sub>

Local follow set yield:

|||.

← Follow set Rule    → ←                    follow set symbols contributors                    →

R<sub>lint</sub><sup>10</sup>                    R<sub>1.1.14</sub>

Local follow set yield:

eog.

State: 57            Follow Set contributors, merges, and transitions

← Follow set Rule    → ←                    follow set symbols contributors                    →

R<sub>lint</sub><sup>10</sup>                    R<sub>8.2.3</sub> S<sub>15</sub>R<sub>8</sub>

Local follow set yield:

State: 59            Follow Set contributors, merges, and transitions

← Follow set Rule    → ←                    follow set symbols contributors                    →

R<sub>lint</sub><sup>10</sup>                    R<sub>8.1.2</sub> S<sub>15</sub>R<sub>8</sub>

Local follow set yield:

**54. Common Follow sets.**

**55. LA set: 1.**

|?|, eog, |r|.

**56. LA set: 2.**

|?|, |r|.

**57. LA set: 3.**

eog.

**58. LA set: 4.**

eog, |r|.

**59. LA set: 5.**

eolr.

**60. Index.**

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## linker\_pass3\_idx.w

Date: January 14, 2015 at 15:39

File: linker\_pass3\_idx.w

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