

1

syntax\_pipe(char \*\*cmd\_line, int \*token, int \*i, t\_cmd \*\*node)

Index            0   1   2   3   4  
param(1) \*\*cmd\_line   ls -la | cat -e  
param(2) \*token:      W   W   P   W   W  
param(3) \*i            \*i = (0, 5)

2

find\_index\_pipe(token, i)      tmp = i[1]: 5  
pipe\_index: 2

3  
generate\_new\_tree(N\_CMD, pipe\_index)

TREE[2]

12

update\_pipe\_index(i, pipe\_index, tmp)

\*i = (0, 2), pipe\_index = 2, tmp = i[1] = 5

Update \*i = (pipe\_index(= 2) + 1, tmp(= 5))  
\*i = (3, 5)

4

syntax\_cmds(l\_child)

13

syntax\_pipe(r\_child);

14

find\_index\_pipe(token, i) == NULL  
pipe\_index = -1;

15

generate\_new\_tree(N\_CMD, -1)

5

generate\_new\_tree(N\_CMD, -1)

6

find\_index\_redirc(token, i) == NULL  
redirc\_index == -1;

7

syntax\_simple\_cmd(r\_child)

8

token\_length(token) == 5  
find\_index\_pipe(token, pipe\_check) == NULL  
pipe\_index == -1

9

generate\_new\_tree(N\_SIMPLE\_CMD, -1)

16

syntax\_cmds(r\_child)

17

generate\_new\_tree(N\_CMD, -1)

10

generate\_end\_tree(N\_FILE\_PATH, i[0], i[0] + 1)

0   1

11

generate\_end\_tree(N\_ARGV, i[0], i[1])

0   2

cpy\_substring  
cmdstr[0]: "ls"  
cmdstr[1]: "\0"

"ls"

"ls" "-la"

TREE[0] + TREE[1]

18

find\_index\_redirc(token, i) == NULL  
redirc\_index == -1;

19

syntax\_simple\_cmd(r\_child)

20

token\_length(token) == 5  
find\_index\_pipe(token, pipe\_check) == NULL  
pipe\_index == -1

21

generate\_new\_tree(N\_SIMPLE\_CMD, -1)

22

generate\_end\_tree(N\_FILE\_PATH, i[0], i[0] + 1)

3   4

23

generate\_end\_tree(N\_ARGV, i[0], i[1])

3   5

cpy\_substring  
cmdstr[3]: "cat"  
cmdstr[4]: "\0"

"cat"

"cat" "-e"

TREE[3] + TREE[4]

cpy\_substring  
cmdstr[0]: "cat"  
cmdstr[1]: "-e"  
cmdstr[2]: "\0"