

Concepts of Programming Languages, CSCI 305, Fall 2021
Predict Sets EPS, FIRST, & FOLLOW and Creating Parsing Table for LL Parsing,
pages 88-89, Oct. 18

Grammar:

1. $\text{program} \rightarrow \text{stmt_list } \$\$$
2. $\text{stmt_list} \rightarrow \text{stmt stmt_list}$
3. $\text{stmt_list} \rightarrow \epsilon$
4. $\text{stmt} \rightarrow \text{id} := \text{expr}$
5. $\text{stmt} \rightarrow \text{read id}$
6. $\text{stmt} \rightarrow \text{write expr}$
7. $\text{expr} \rightarrow \text{term term_tail}$
8. $\text{term_tail} \rightarrow \text{add_op term term_tail}$
9. $\text{term_tail} \rightarrow \epsilon$
10. $\text{term} \rightarrow \text{factor factor_tail}$
11. $\text{factor_tail} \rightarrow \text{mult_op factor factor_tail}$
12. $\text{factor_tail} \rightarrow \epsilon$
13. $\text{factor} \rightarrow (\text{expr})$
14. $\text{factor} \rightarrow \text{id}$
15. $\text{factor} \rightarrow \text{number}$
16. $\text{add_op} \rightarrow +$
17. $\text{add_op} \rightarrow -$
18. $\text{mult_op} \rightarrow *$
19. $\text{mult_op} \rightarrow /$

Step 1: Complete an EPS, FIRST and FOLLOW table

	EPS	FIRST	FOLLOW
program			
stmt_list			
stmt			
expr			
term tail			
term			
factor tail			
factor			
add op			
mult op			
SS			
id			
:=			
read			
write			
(
)			
number			
+			
-			
*			
/			

Step 2: Using the EPS, FIRST and FOLLOW tables, create the predict sets for the grammar.

$$\text{PREDICT}(A \rightarrow \alpha) \equiv \text{FIRST}(\alpha) \cup (\text{if } \text{EPS}(\alpha) \text{ then } \text{FOLLOW}(A) \text{ else } \Phi)$$

Predict Sets

1. $\text{program} \rightarrow \text{stmt_list } \$\$$ { }
2. $\text{stmt_list} \rightarrow \text{stmt stmt_list}$ { }
3. $\text{stmt_list} \rightarrow \epsilon$ { }
4. $\text{stmt} \rightarrow \text{id} := \text{expr}$ { }
5. $\text{stmt} \rightarrow \text{read id}$ { }
6. $\text{stmt} \rightarrow \text{write expr}$ { }
7. $\text{expr} \rightarrow \text{term term_tail}$ { }
8. $\text{term_tail} \rightarrow \text{add_op term term_tail}$ { }
9. $\text{term_tail} \rightarrow \epsilon$ { }
10. $\text{term} \rightarrow \text{factor factor_tail}$ { }
11. $\text{factor_tail} \rightarrow \text{mult_op factor factor_tail}$ { }
12. $\text{factor_tail} \rightarrow \epsilon$ { }
13. $\text{factor} \rightarrow (\text{expr})$ { }
14. $\text{factor} \rightarrow \text{id}$ { }
15. $\text{factor} \rightarrow \text{number}$ { }
16. $\text{add_op} \rightarrow +$ { }
17. $\text{add_op} \rightarrow -$ { }
18. $\text{mult_op} \rightarrow *$ { }
19. $\text{mult_op} \rightarrow /$ { }

Step 3: Create the parsing table from the predict sets.

Create the parsing table:

	id	:=	read	write	()	number	+	-	*	/	\$\$
program												
stmt_list												
stmt												
expr												
term_tail												
term												
factor_tail												
factor												
add_op												
mult_op												