

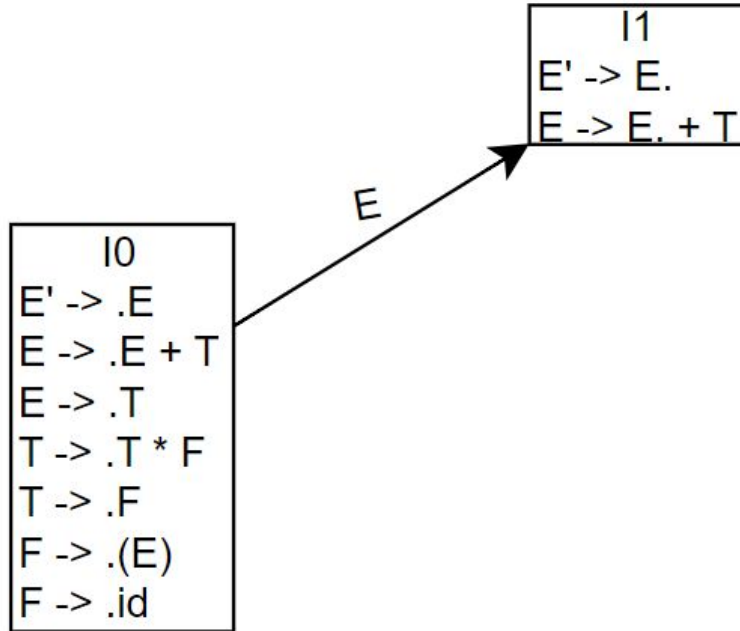
Introduction to Simple LR Parsing

In LR parsing:

1. L means Left to right scanning and R means rightmost derivation
2. k for the number of input symbols of lookahead that are used in making parsing decisions
3. When (k) is omitted, k is assumed to be 1

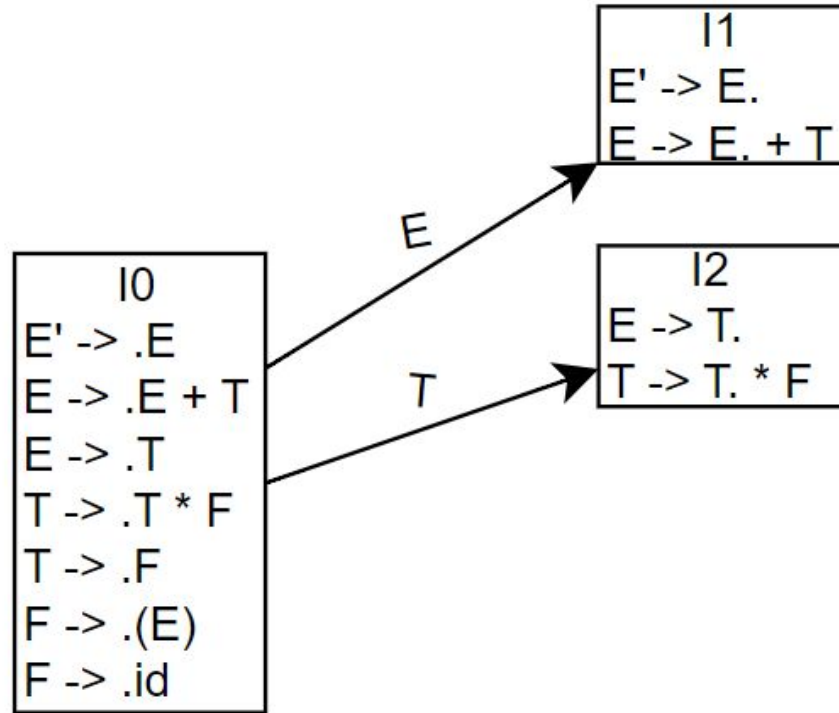
LR(0) automaton for the expression grammar(Step by step)

$E' \rightarrow E$
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$



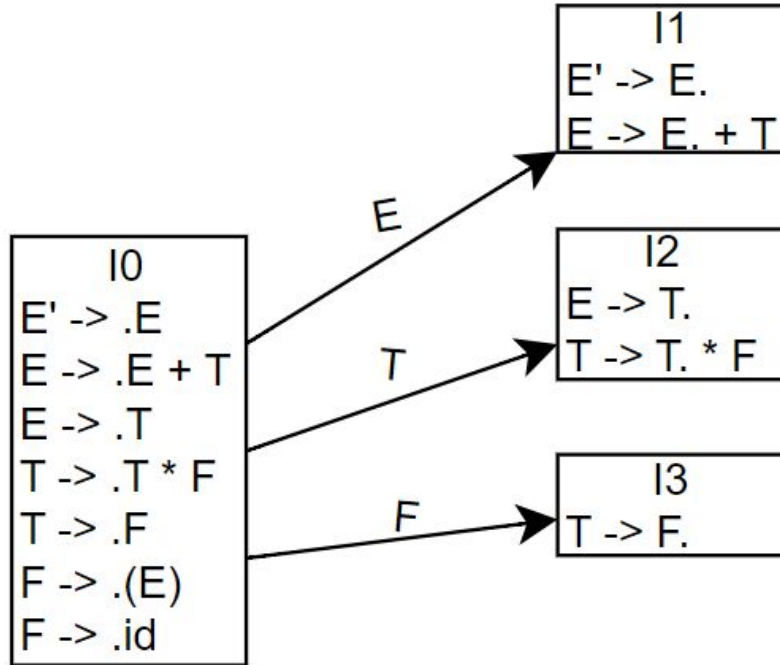
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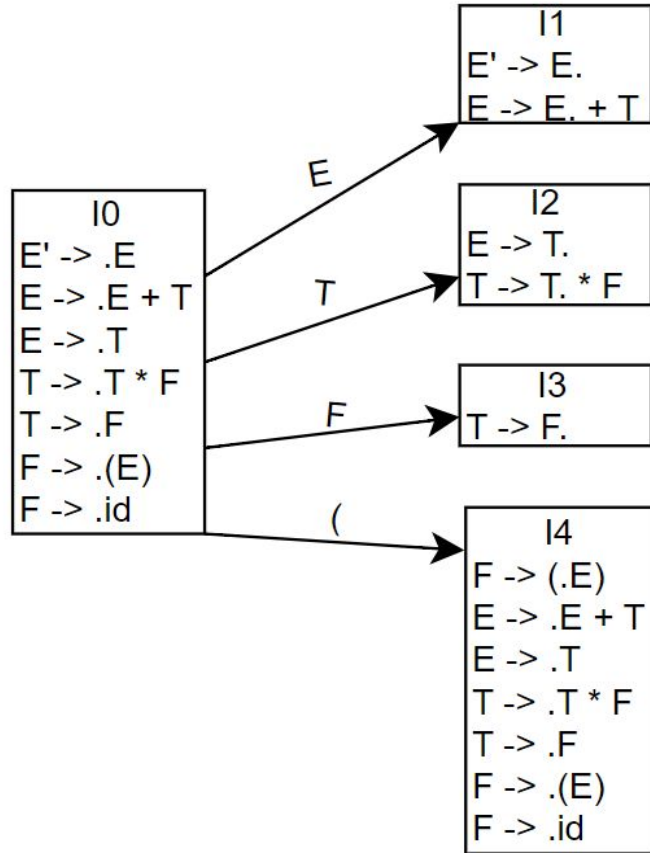
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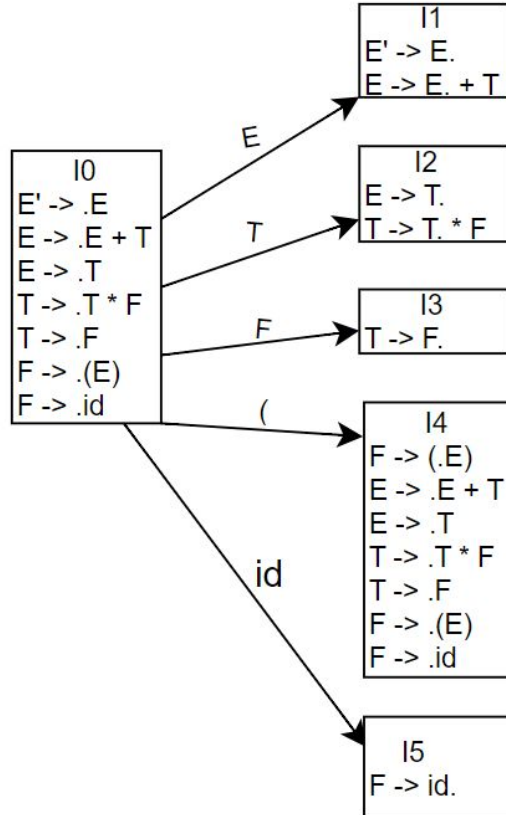
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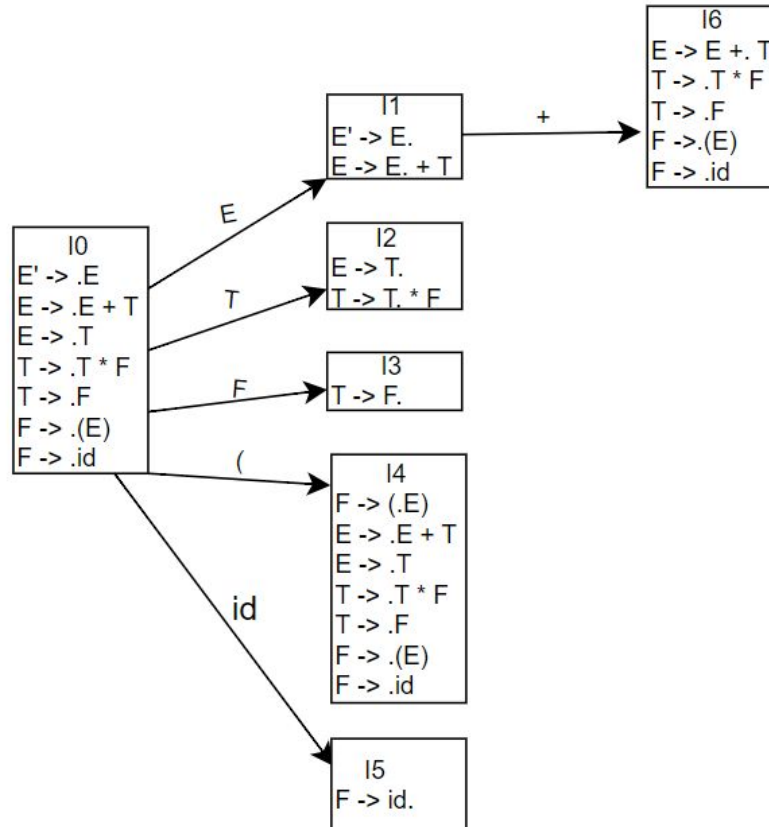
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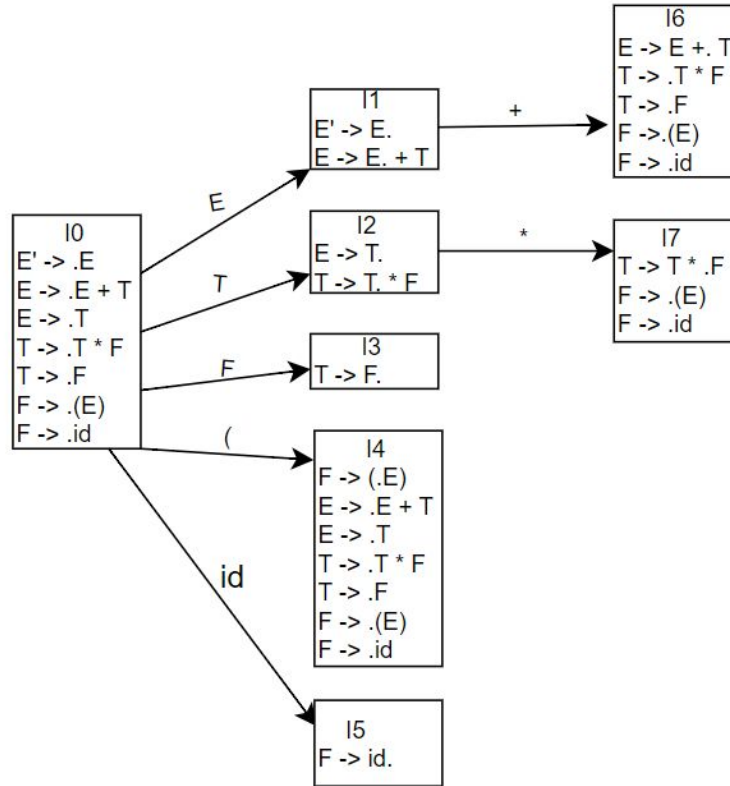
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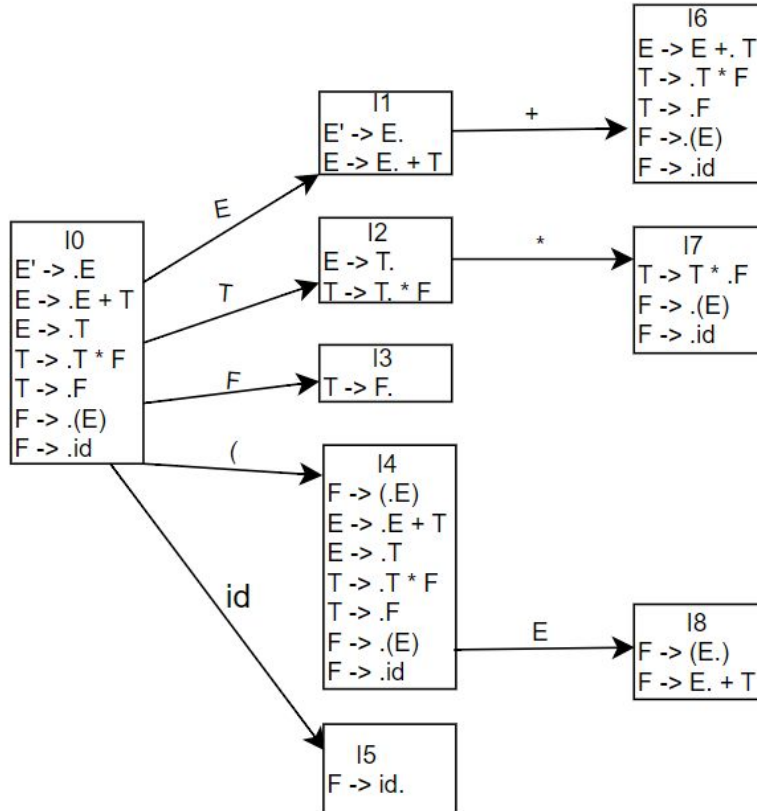
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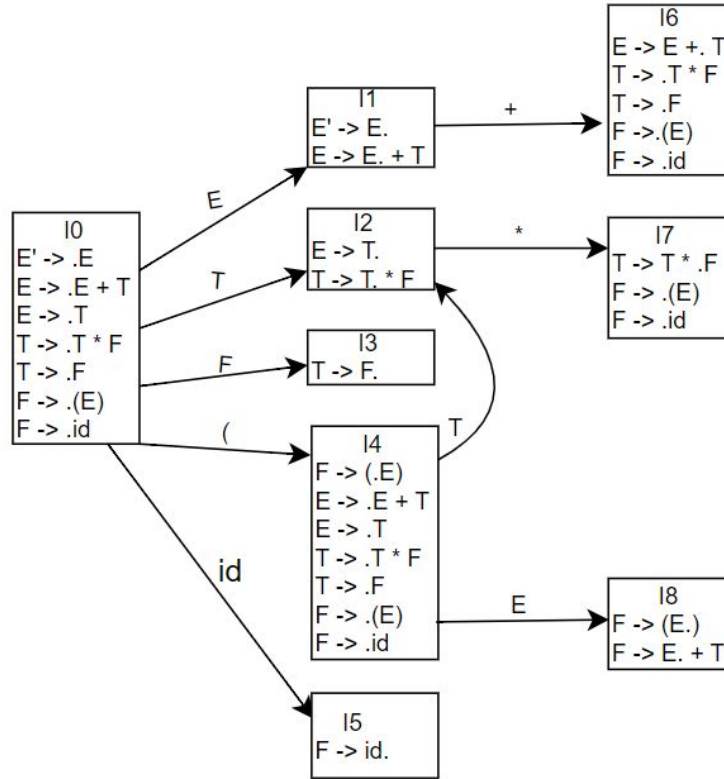
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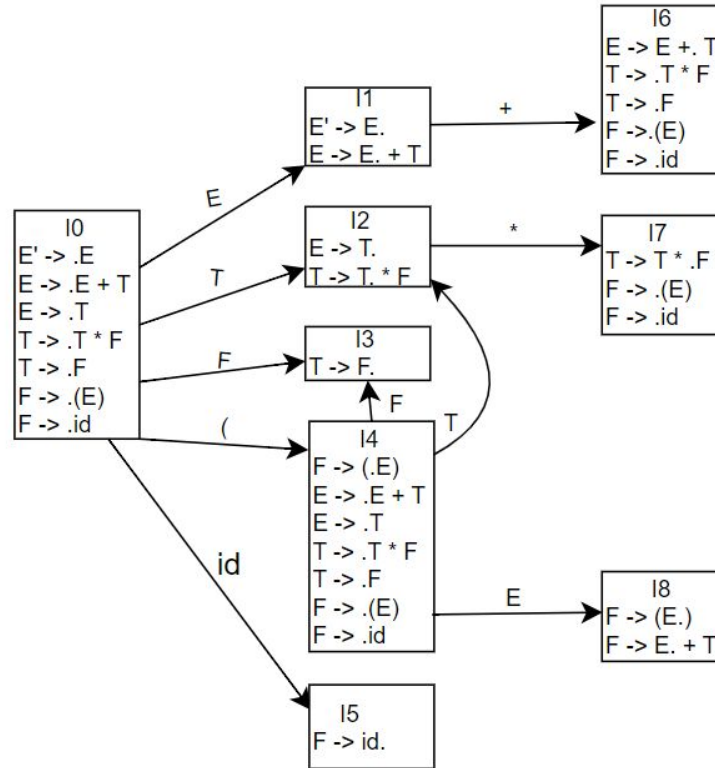
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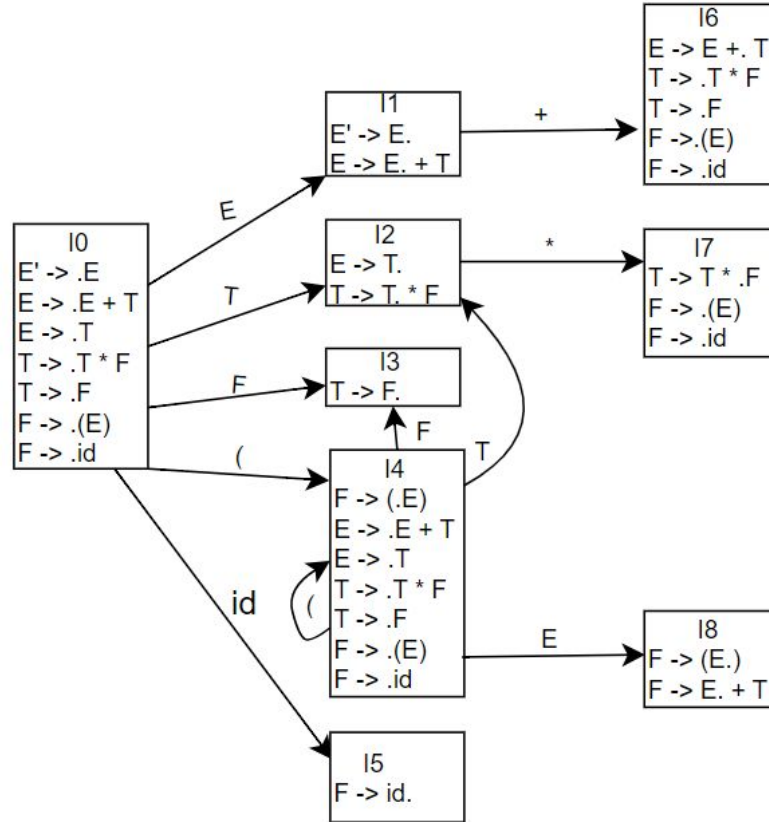
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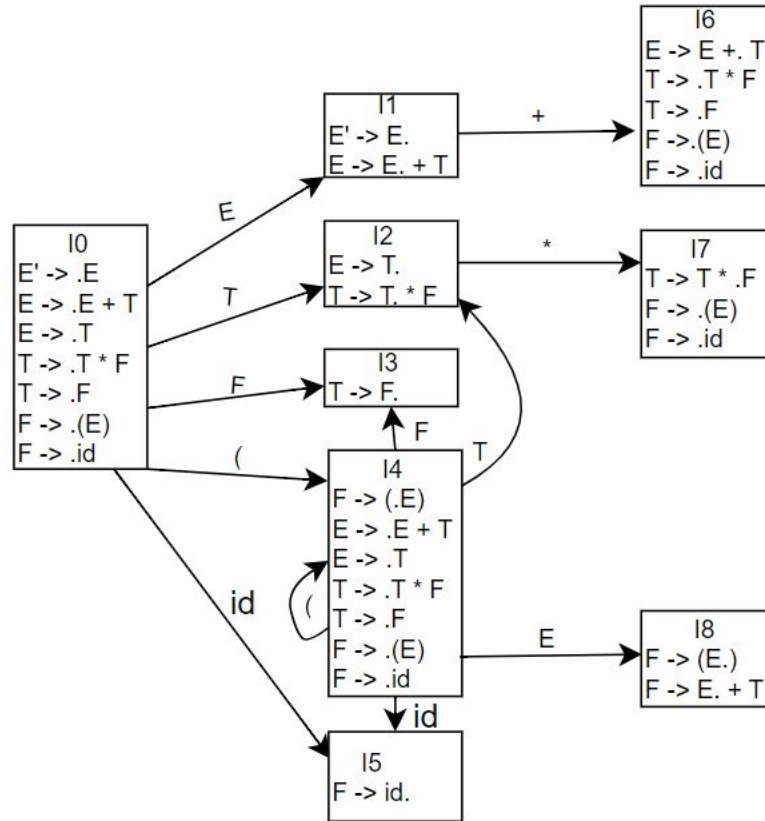
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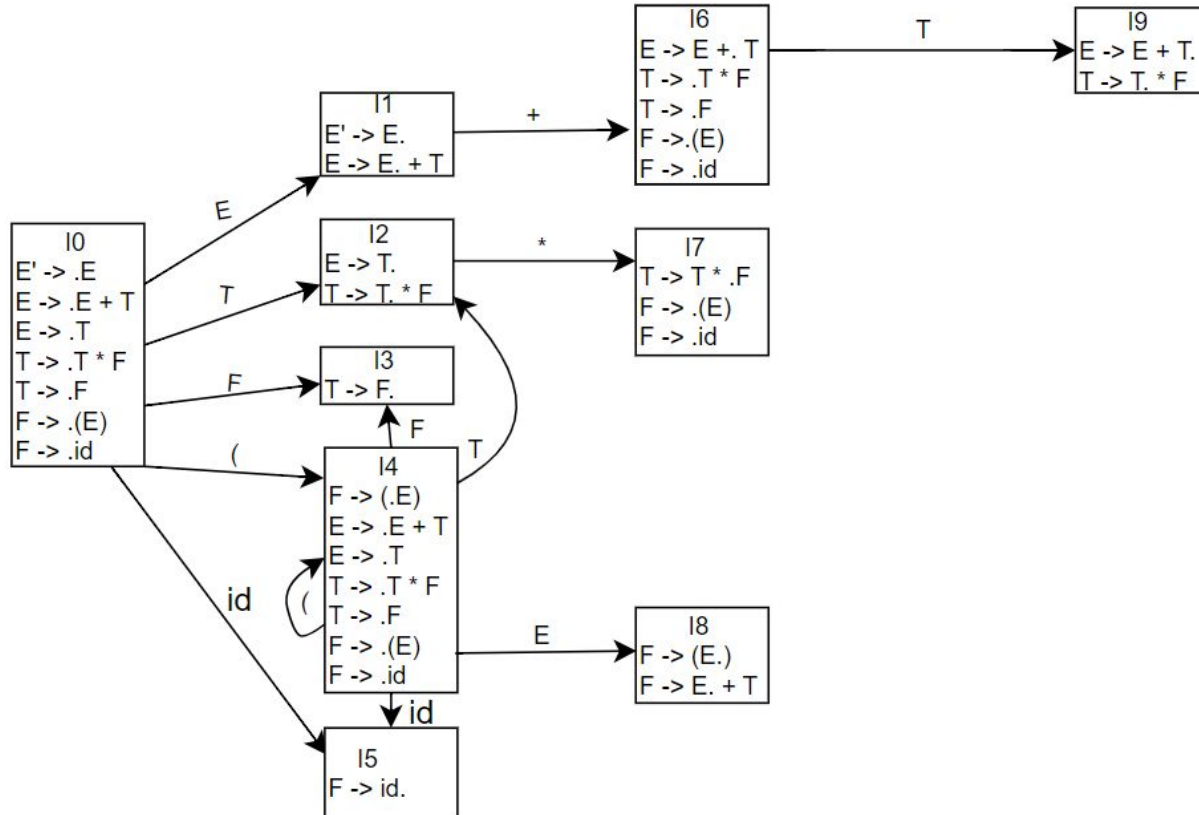
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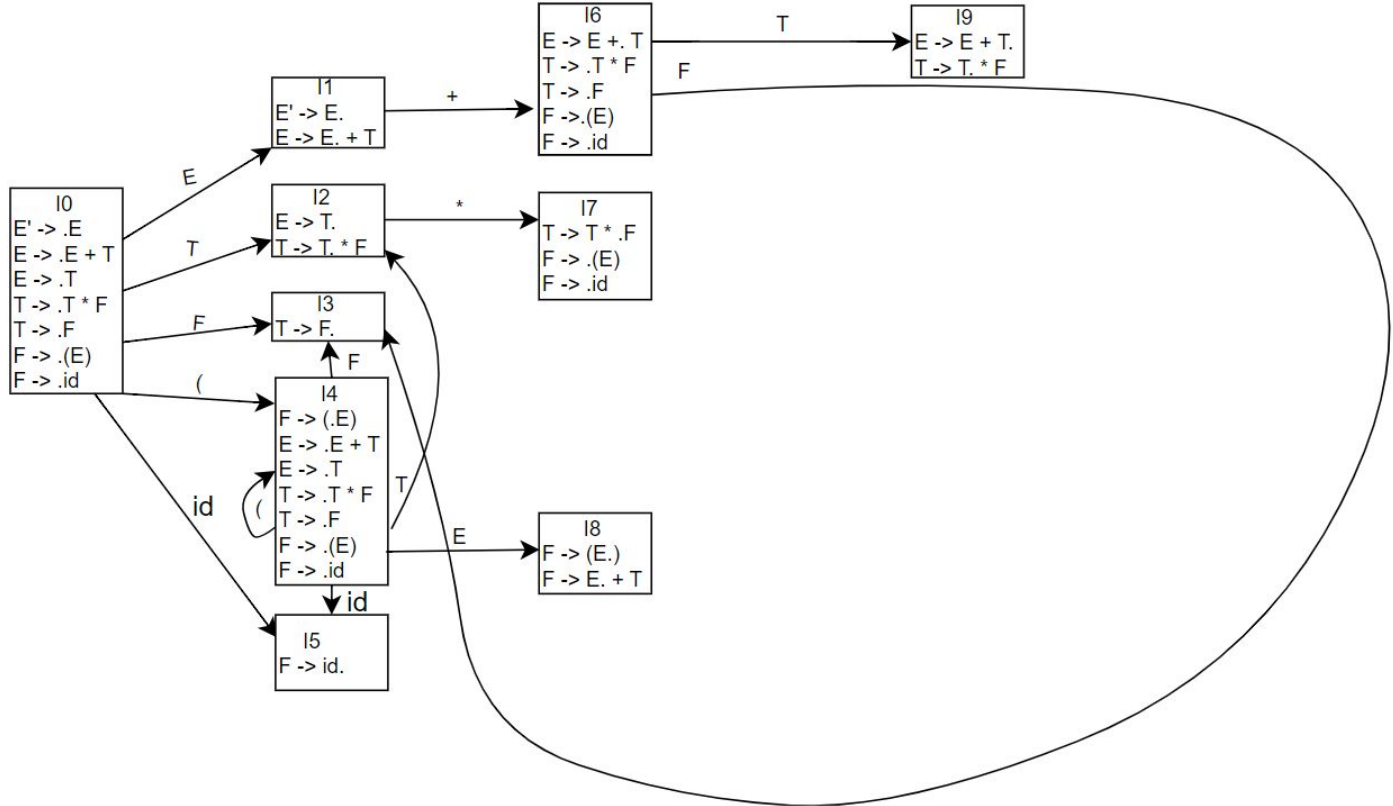
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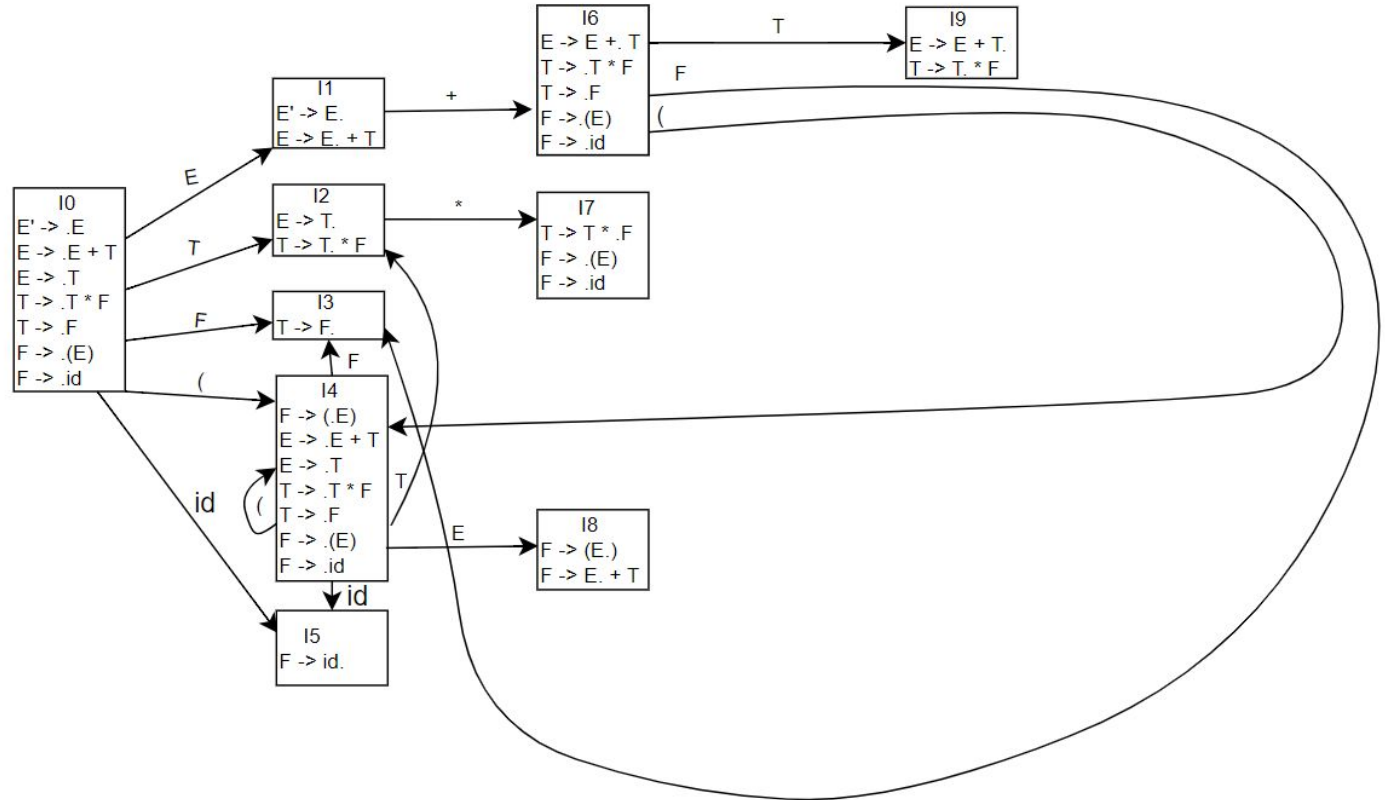
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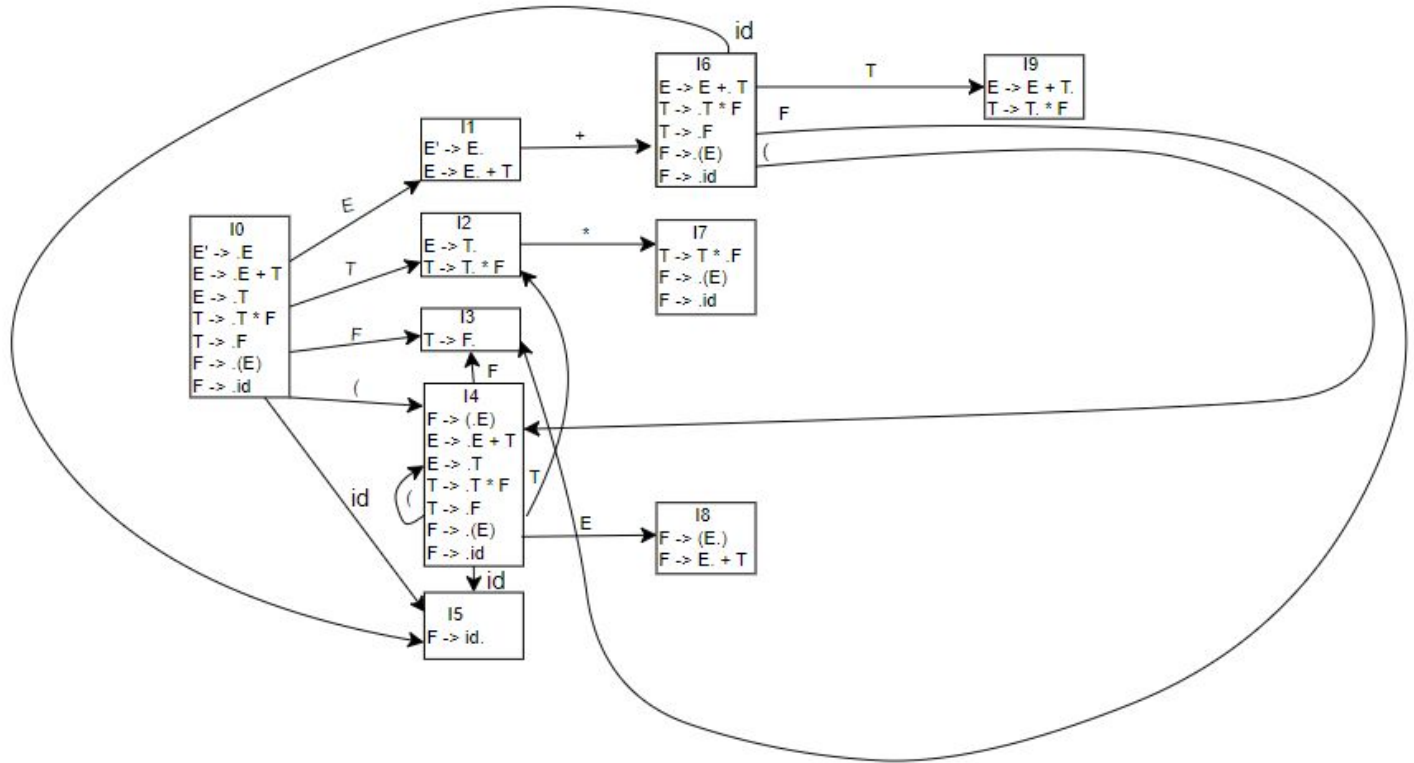
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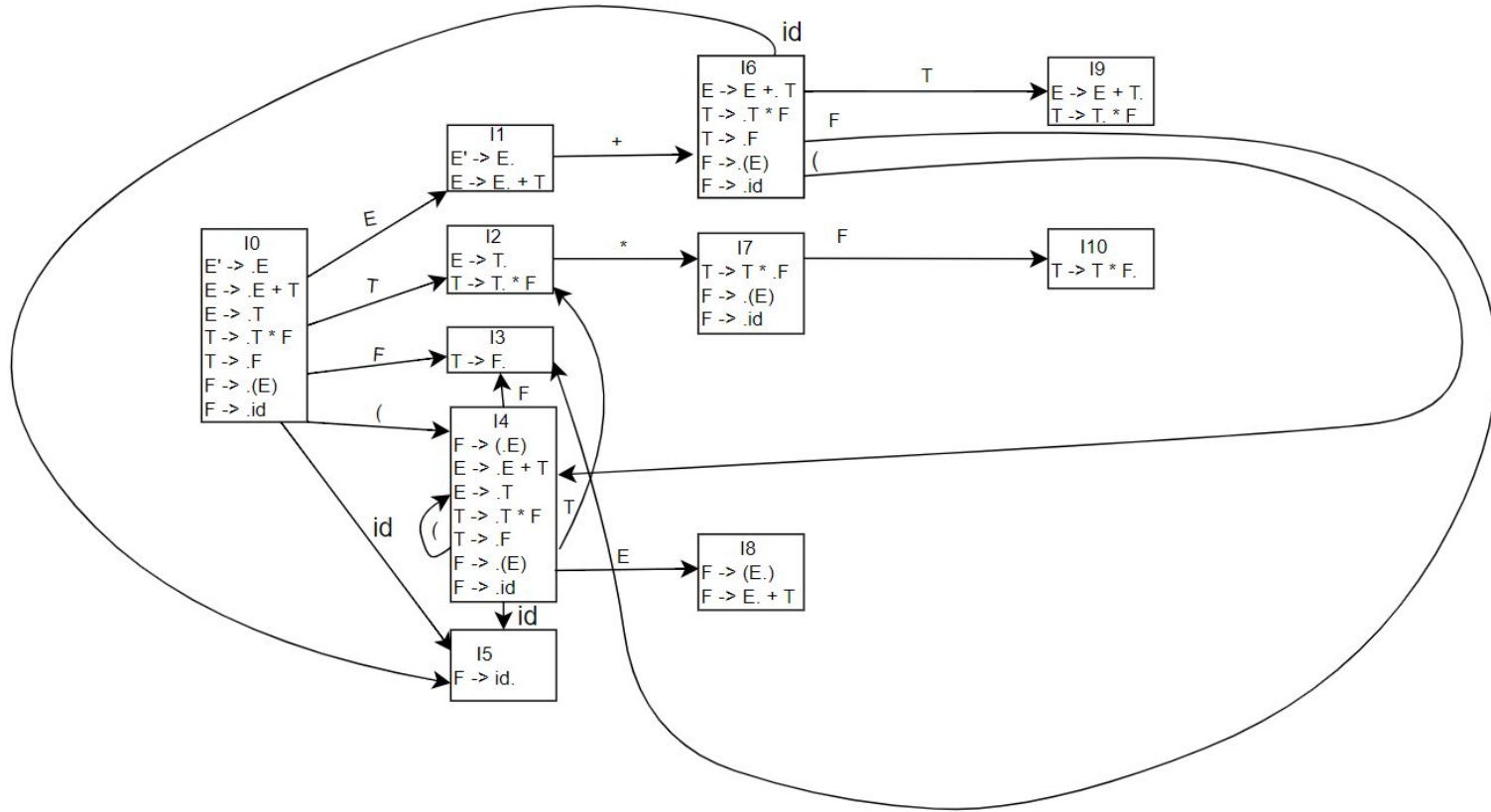
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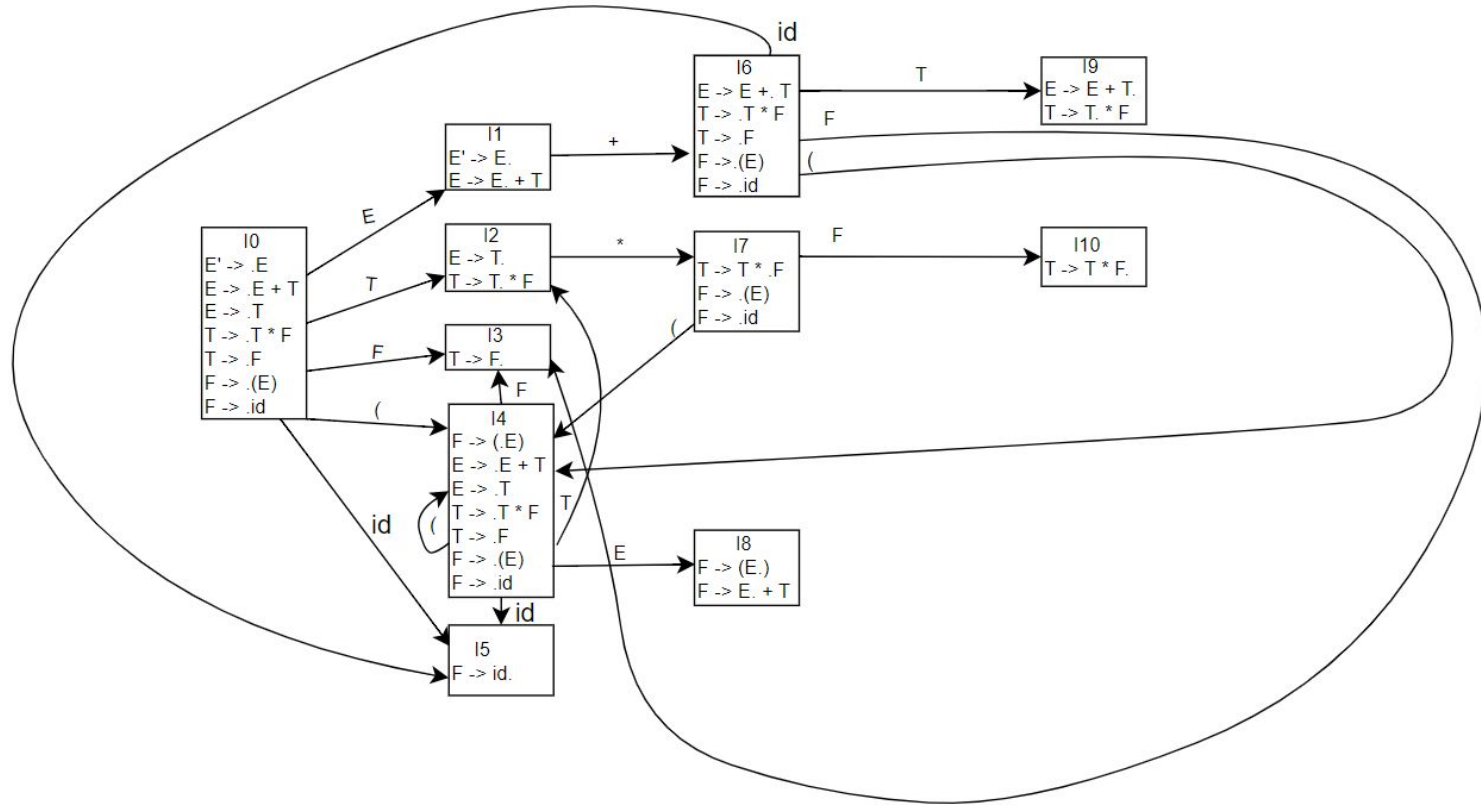
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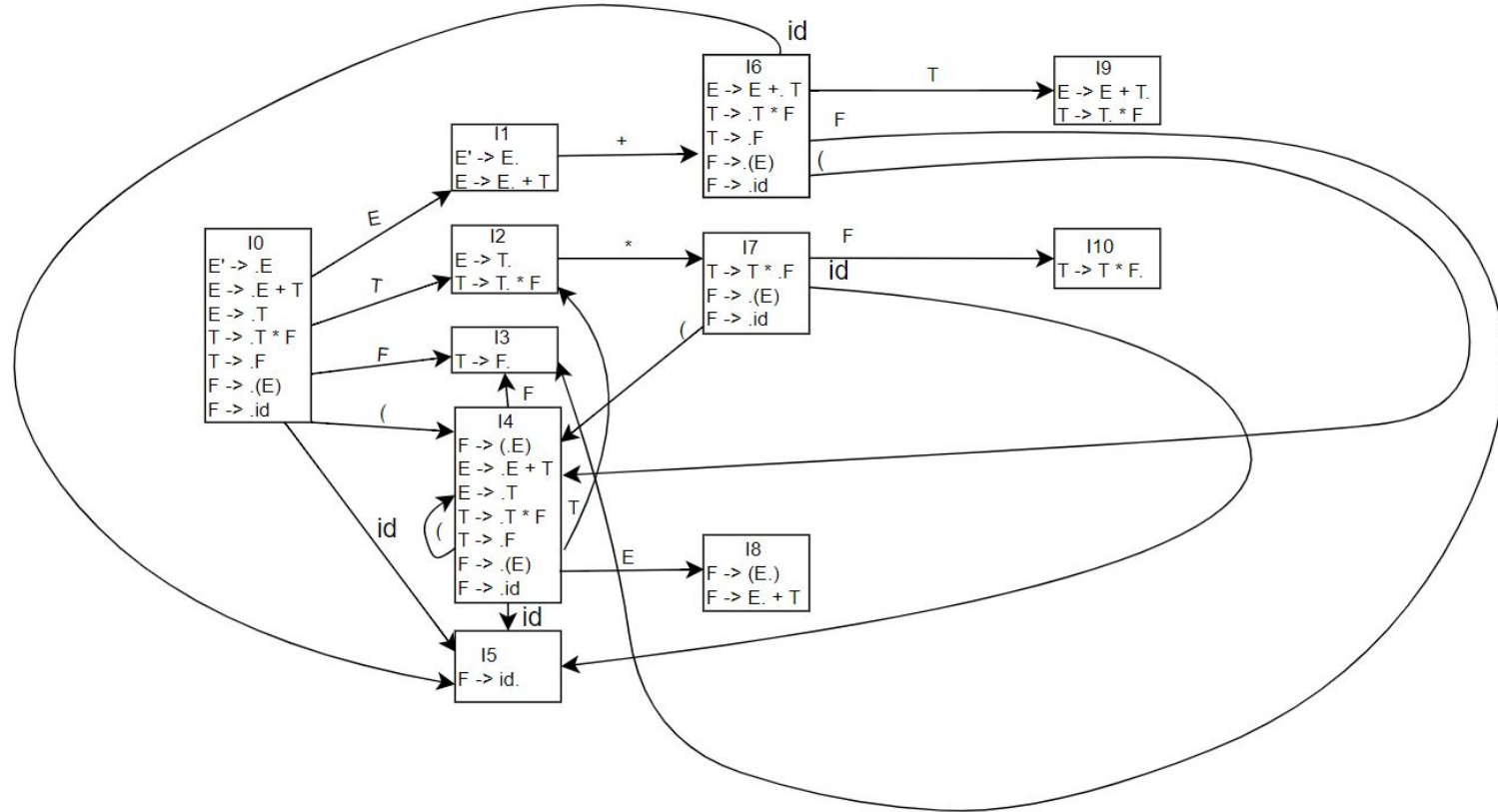
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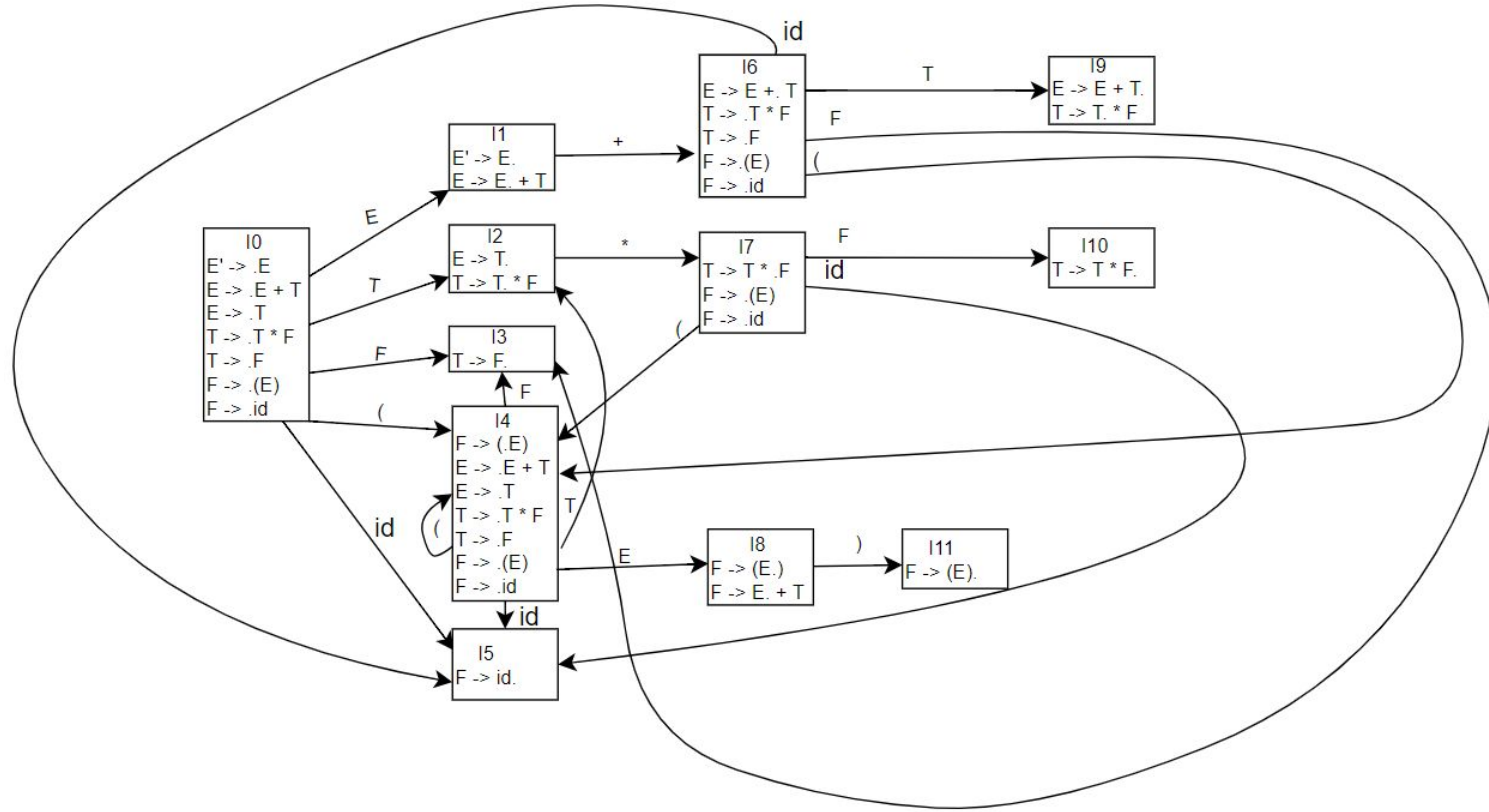
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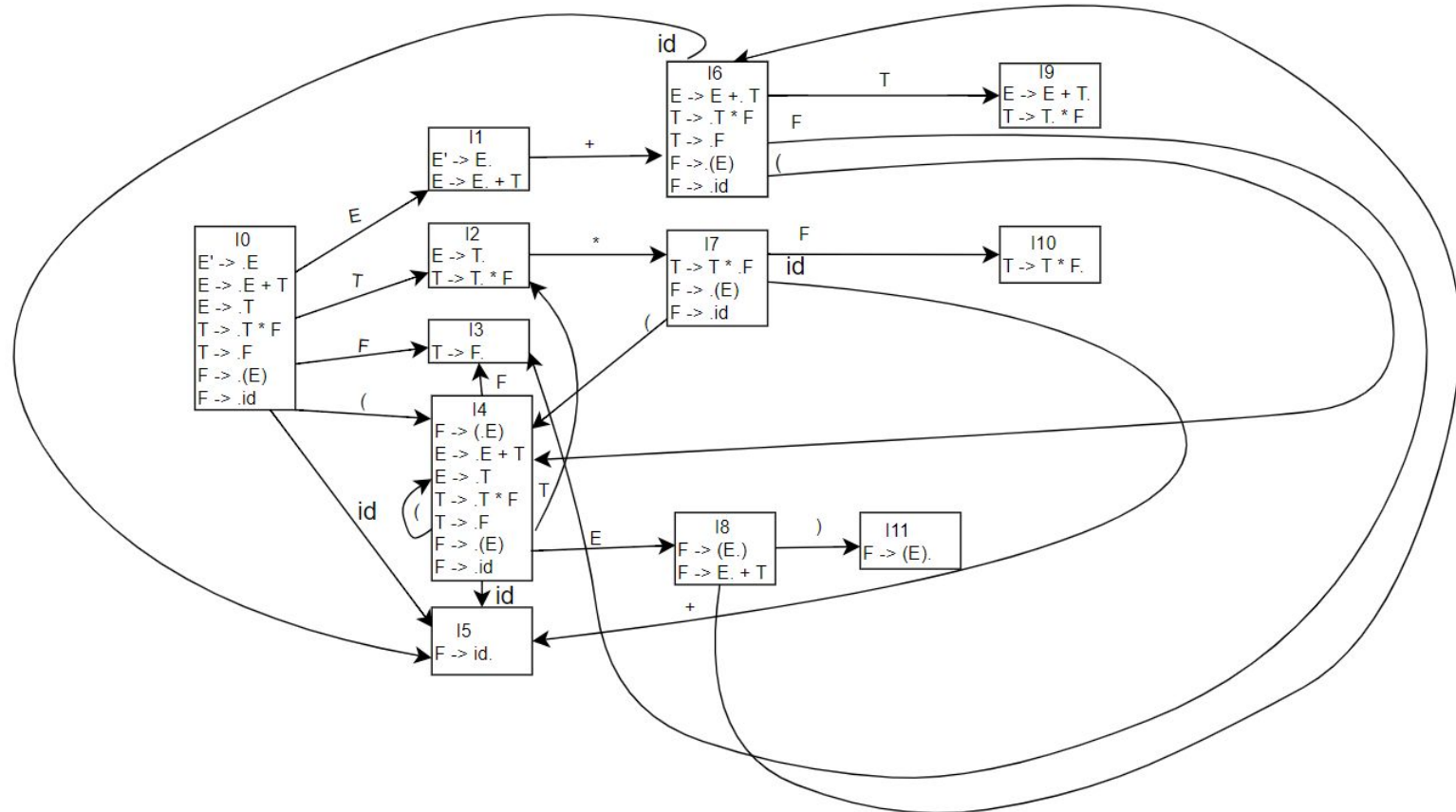
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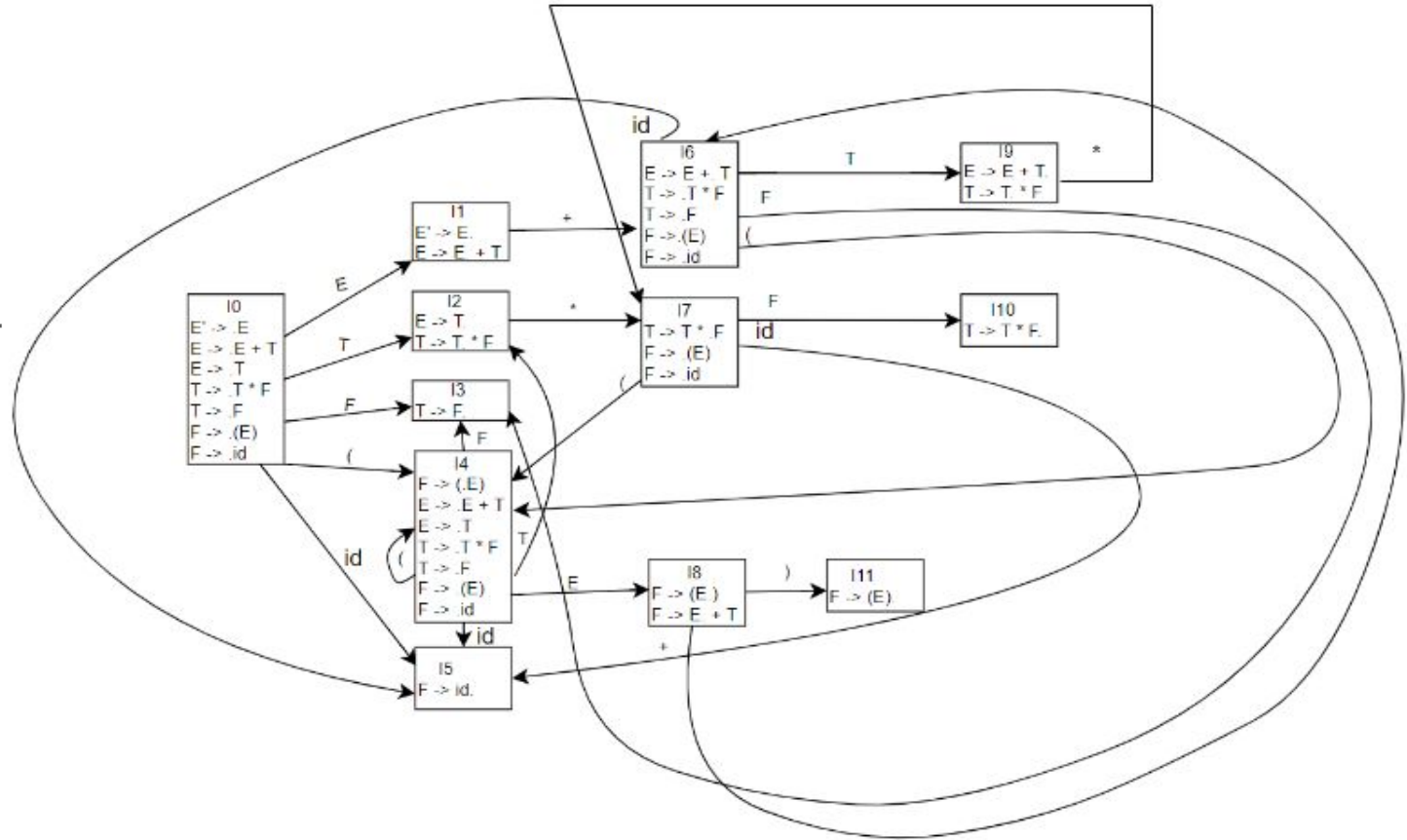
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LR(0) automaton for the expression grammar(Step by step)

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 $E \rightarrow E + T \mid T$
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LR(0) Parsing table for expression grammar

State	Action						Go - To		
	id	+	*	()	\$	E	T	F
0	S5			S4			1	2	3
1		S6				Accept			
2	R2	R2	S7 R2	R2	R2	R2			
3	R4	R4	R4	R4	R4	R4			
4	S5			S4			8	2	3
5	R6	R6	R6	R6	R6	R6			
6	S5			S4				9	3
7	S5			S4					10
8		S6			S11				
9	R1	R1	R1 S7	R1	R1	R1			
10	R3	R3	R3	R3	R3	R3			
11	R5	R5	R5	R5	R5	R5			

- (1) $E \rightarrow E + T$
- (2) $E \rightarrow T$
- (3) $T \rightarrow T * F$
- (4) $T \rightarrow F$
- (5) $F \rightarrow (E)$
- (6) $F \rightarrow id$

First and Follow

Line	First	Follow
E -> E + T	First(E) = { (, id }	Follow(E) = { \$, + ,) }
E -> T		
T -> T * F	First(T) = { (, id }	Follow(T) = { * , \$, + ,) }
T -> F		
F -> (E)	First(F) = { (, id }	Follow(F) = { * , \$, + ,) }
F -> id		

SLR(1) Parsing table for expression grammar

State	Action						Go - To		
	id	+	*	()	\$	E	T	F
0	S5			S4			1	2	3
1		S6				Accept			
2		R2	S7		R2	R2			
3		R4	R4		R4	R4			
4	S5			S4			8	2	3
5		R6	R6		R6	R6			
6	S5			S4				9	3
7	S5			S4					10
8		S6			S11				
9		R1	S7		R1	R1			
10		R3	R3		R3	R3			
11		R5	R5		R5	R5			

- (1) $E \rightarrow E + T$
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- (3) $T \rightarrow T * F$
- (4) $T \rightarrow F$
- (5) $F \rightarrow (E)$
- (6) $F \rightarrow id$

Moves of an SLR(1) parser on $id * id$

Line	Stack	Symbol	Input	Action
1	0	\$	$id * id\$$	Shift to 5
2	0 5	$\$id$	$* id\$$	Reduce by $F \rightarrow id$
3	0 3	$\$F$	$* id\$$	Reduce by $T \rightarrow F$
4	0 2	$\$T$	$* id\$$	Shift to 7
5	0 2 7	$\$T *$	$id\$$	Shift to 5
6	0 2 7 5	$\$T * id$	$\$$	Reduce by $F \rightarrow id$
7	0 2 7 10	$\$T * F$	$\$$	Reduce by $T \rightarrow T * F$
8	0 2	$\$T$	$\$$	Reduce by $E \rightarrow T$
9	0 1	$\$E$	$\$$	Accept

- (1) $E \rightarrow E + T$
- (2) $E \rightarrow T$
- (3) $T \rightarrow T * F$
- (4) $T \rightarrow F$
- (5) $F \rightarrow (E)$
- (6) $F \rightarrow id$