

$LL(1)$

דוגמאות ניתוח

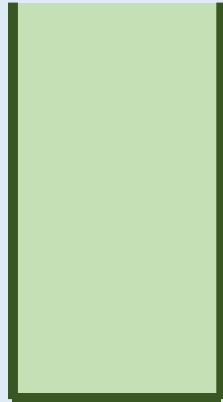
דוגמא חיובית

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

		אסימונים							
		()	not	true	false	and	or	\$
משמנים	E	2		3	1	1			
	LIT				4	5			
	OP						6	7	

- (1) $E \rightarrow \text{LIT}$
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- (7) $\text{OP} \rightarrow \text{or}$

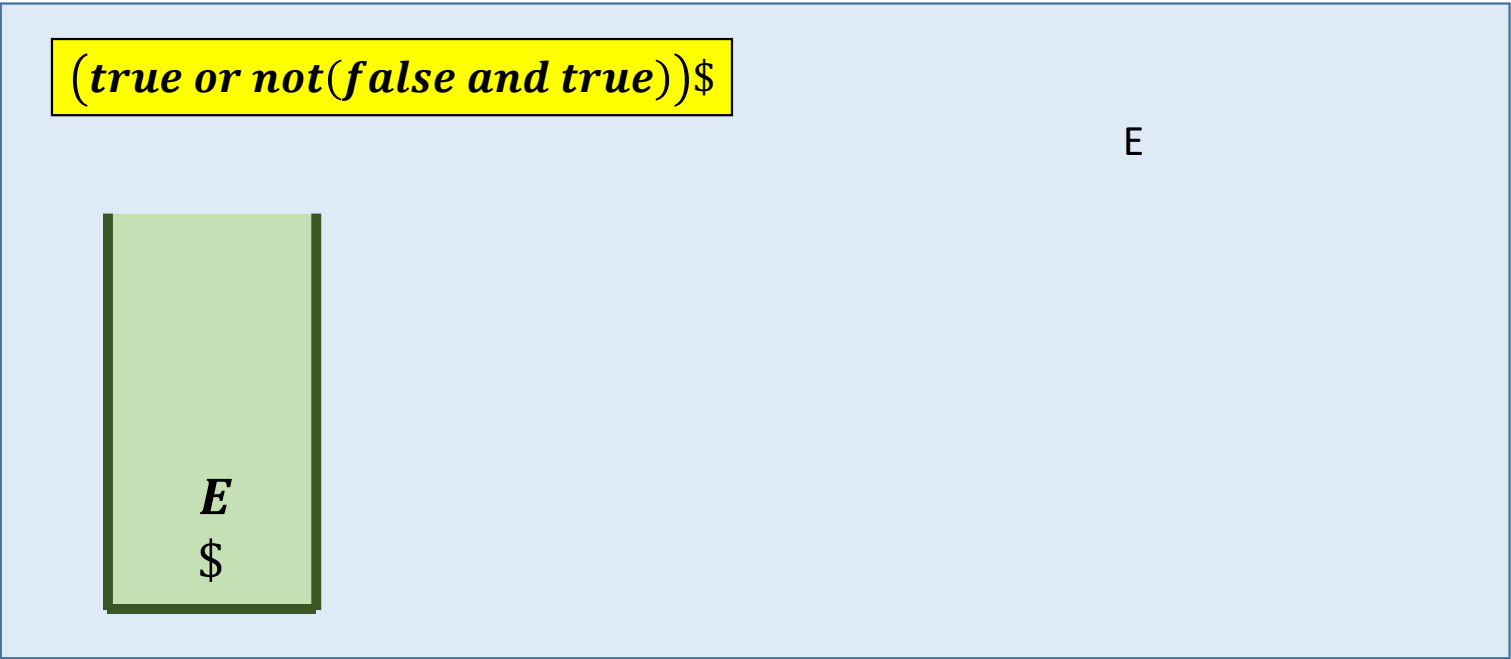
$(true \text{ or } not(false \text{ and } true))\$$



אסימונים

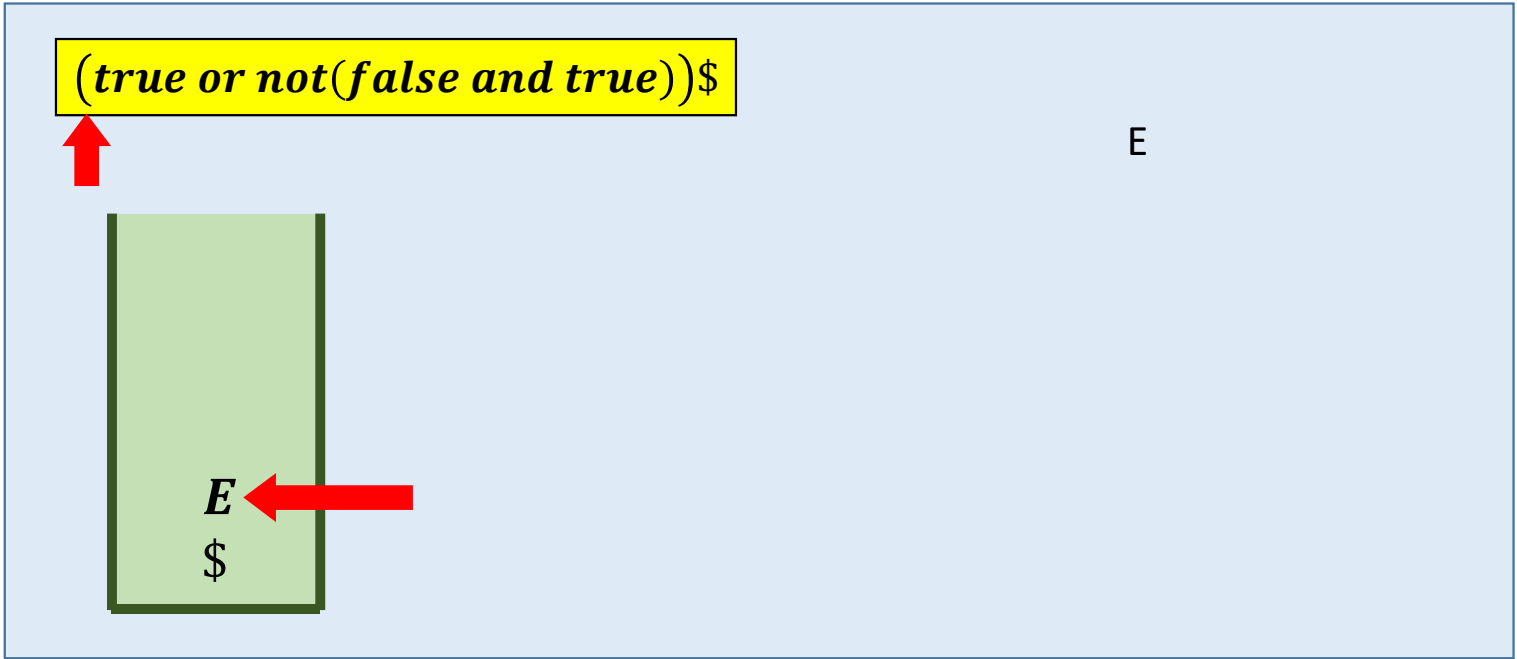
		()	not	true	false	and	or	\$
משתנים	E	2		3	1	1			
	LIT				4	5			
	OP						6	7	

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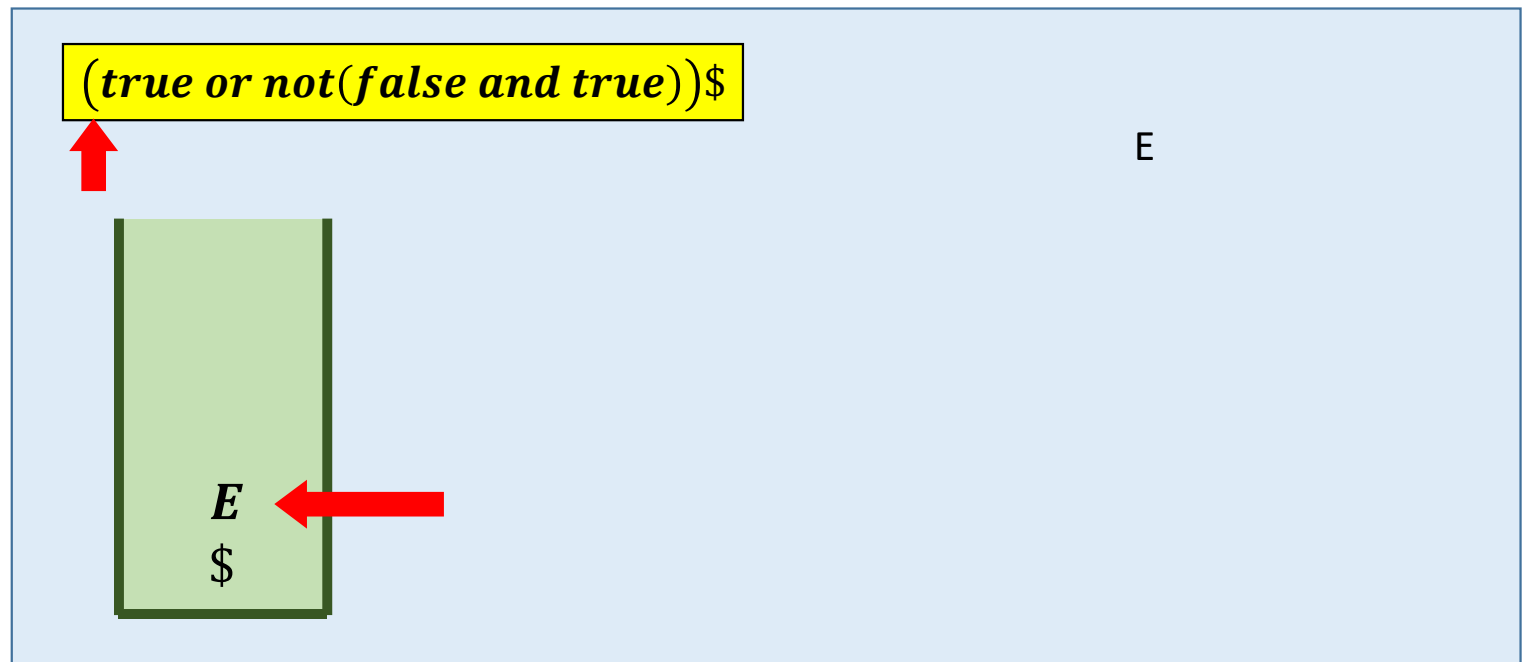
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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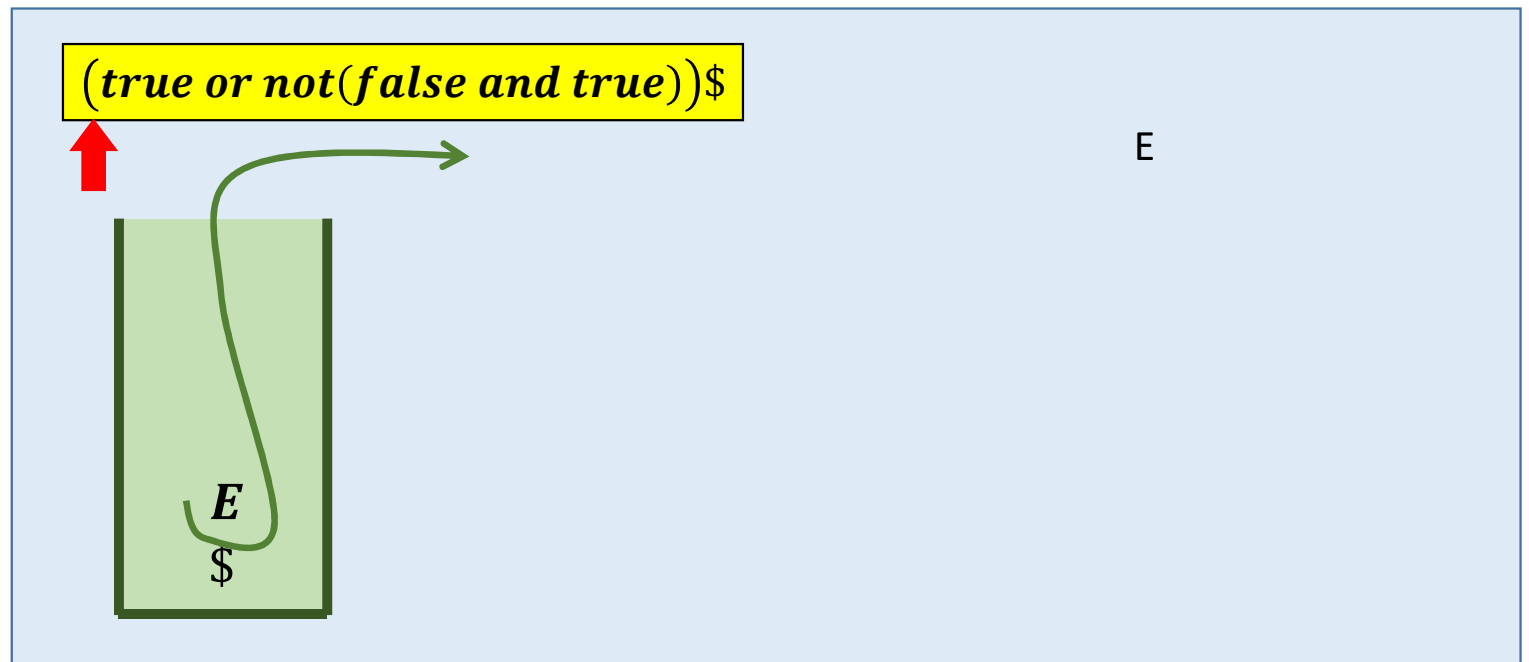
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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	()	not	true	false	and	or	\$
E	2		3	1	1			
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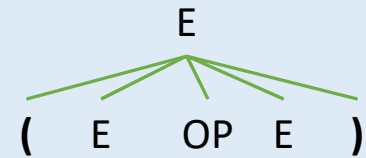


	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

(
E
OP
E
)
 \$



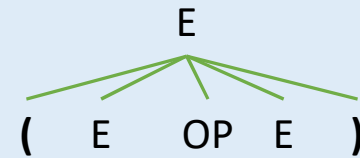
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$



***(
E
OP
E
)
\$***



	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(*true or not(false and true)*)\$

(

E

OP

E

)

\$

E

(E OP E)

	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

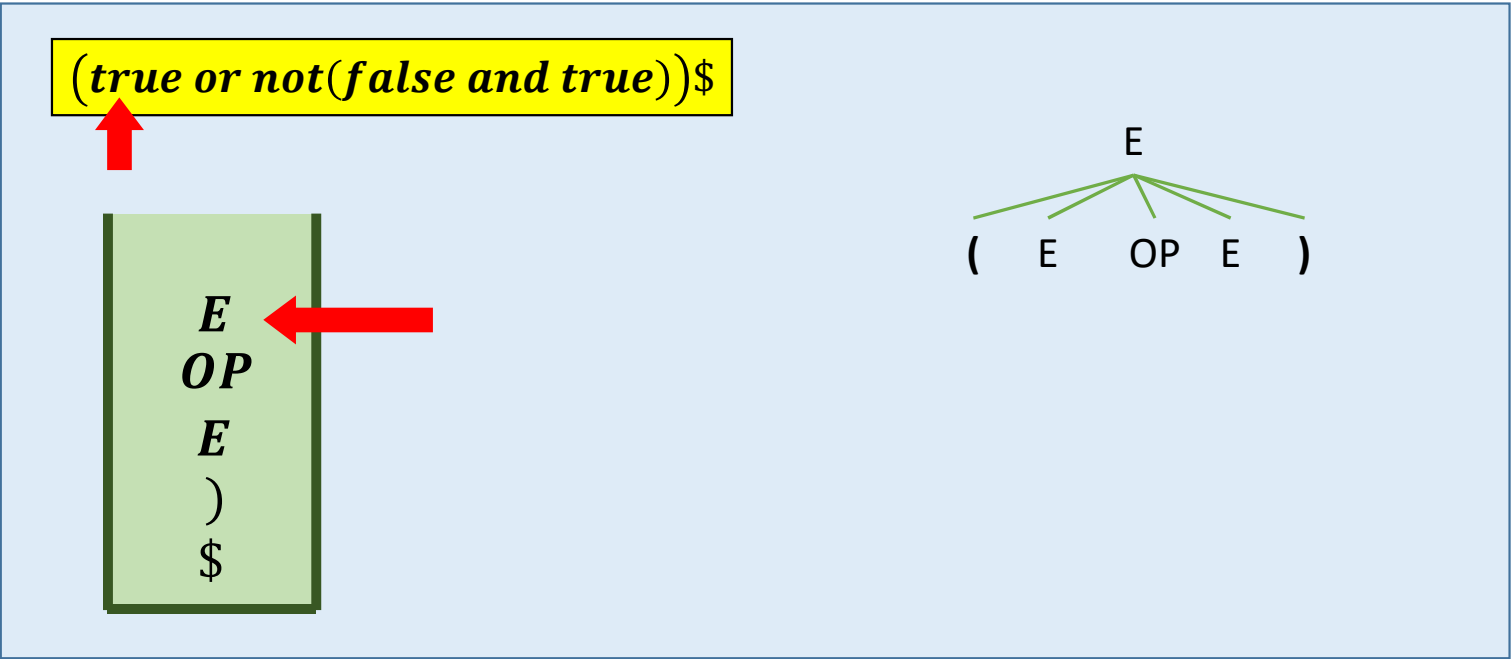
- Diagram illustrating the LR(0) item set $EOP\$$ and its corresponding LR(0) item set $EOP\$$.

The stack content is shown as a vertical list of symbols: E , OP , E , $)$, and $\$$.

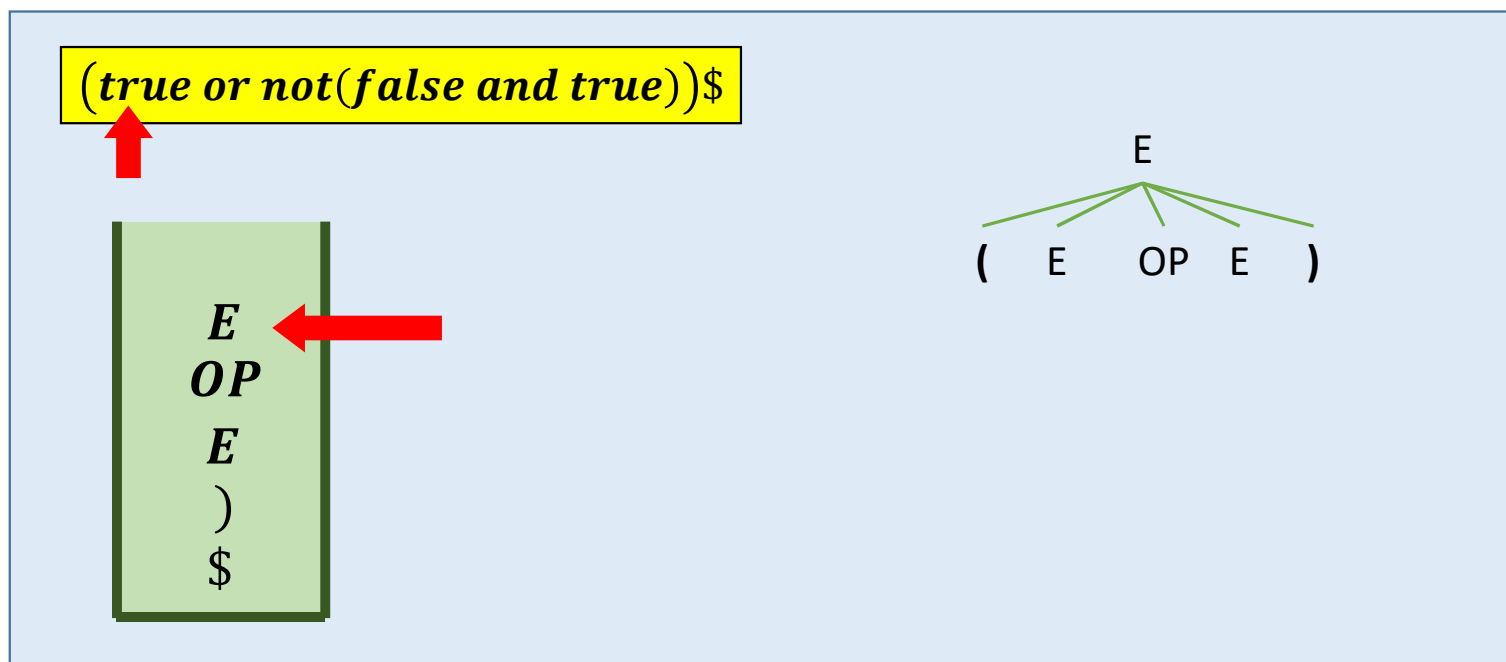
The current state is shown as a horizontal list of symbols: $($, E , OP , E , and $)$.

	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (7) $\text{OP} \rightarrow \text{or}$



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- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



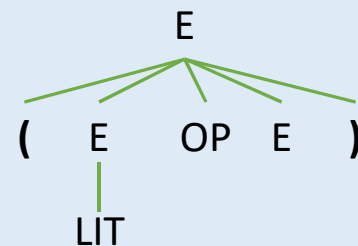
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(true or not(false and true))\$



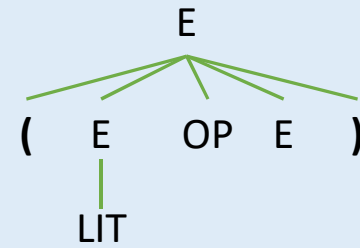
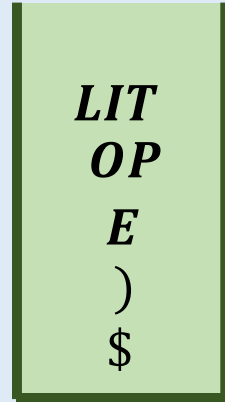
***LIT
OP
E
)
\$***



	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

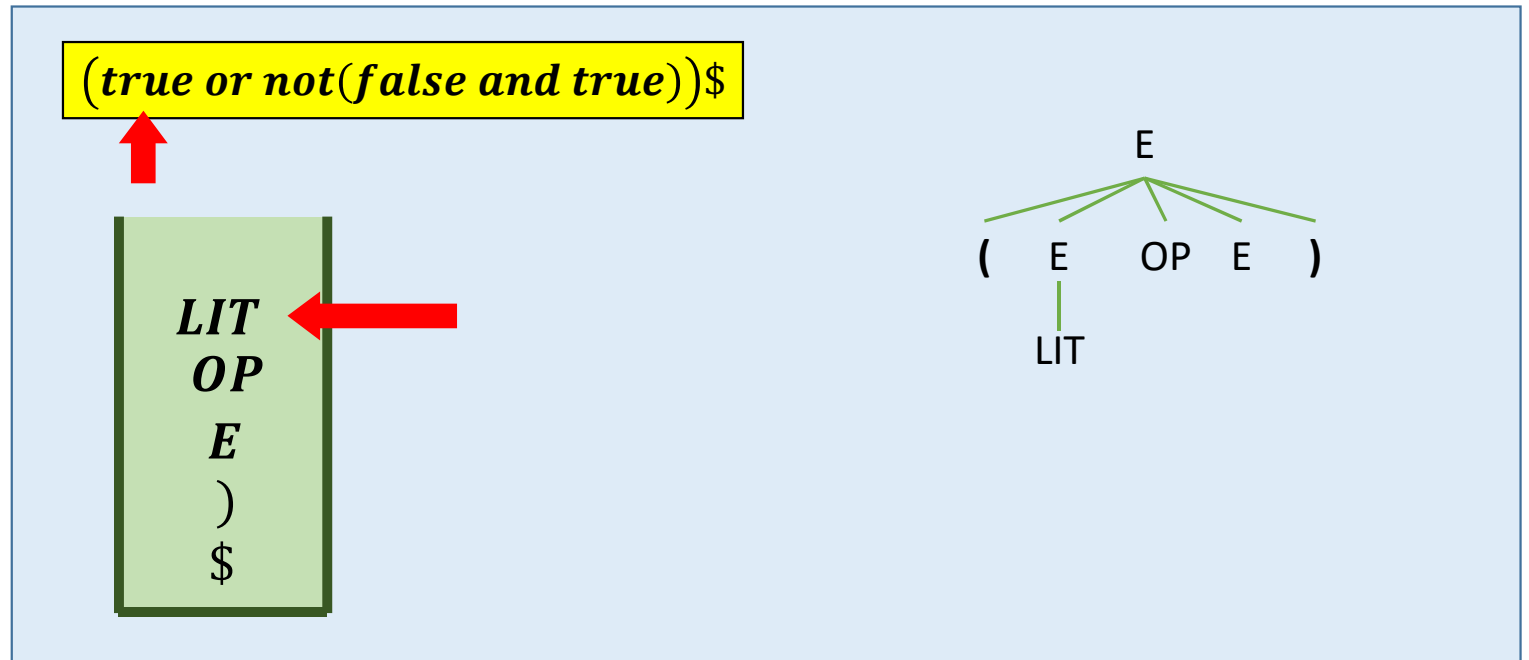
- (1) $E \rightarrow \text{LIT}$
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- (7) $\text{OP} \rightarrow \text{or}$

$(\text{true or not}(\text{false and true}))\$$



	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
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- (7) $OP \rightarrow \text{or}$



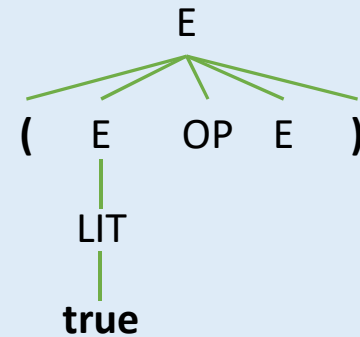
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

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- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

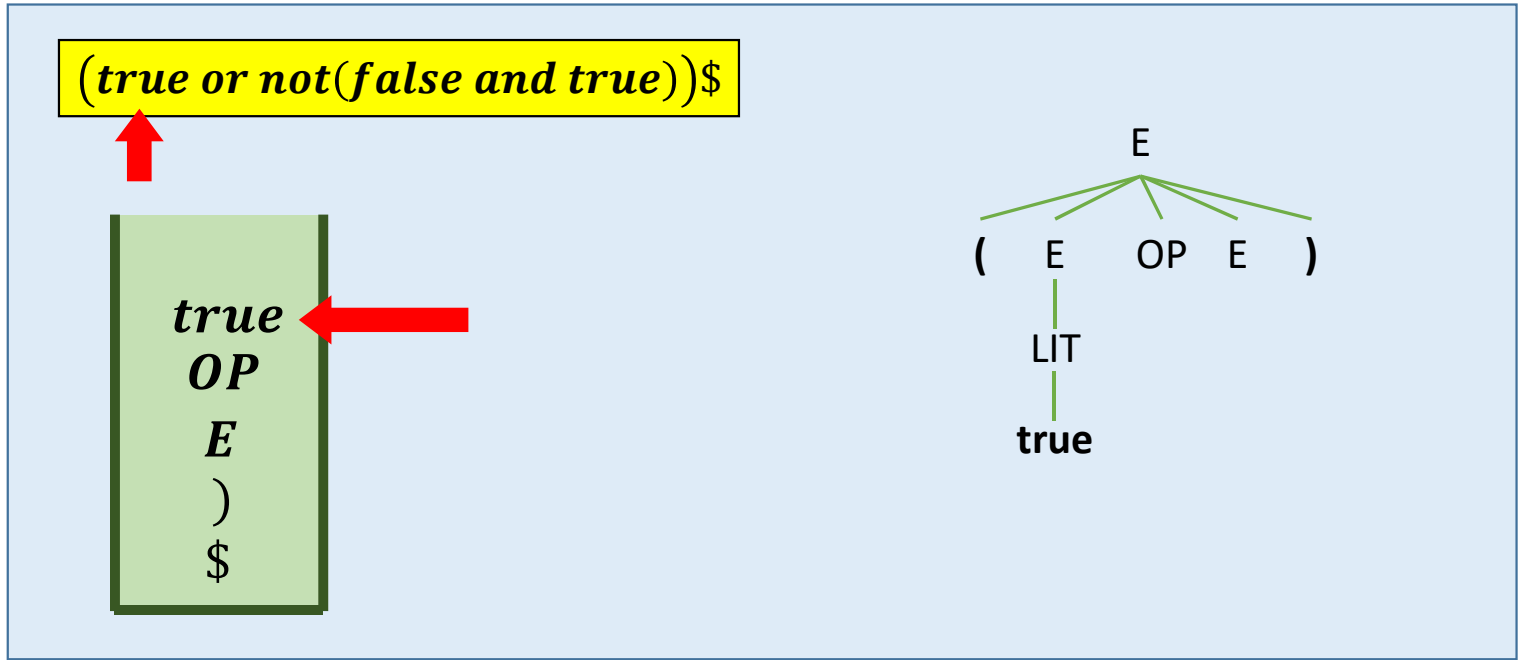


***true
OP
E
)
\$***



	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

-
- LR(0) Item Set E**
- (true or not(false and true))\$*
- Stack contents: *true*, *OP*, *E*, *)*, *\$*
- Parse Tree:
- ```
graph TD
 E1[E] --- L1["("]
 E1 --- E2[E]
 E1 --- OP1["OP"]
 E1 --- E3[E]
 E1 --- R1[")"]
 E2 --- LIT[LIT]
 LIT --- true1[true]
```

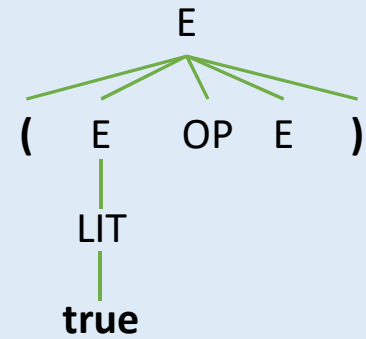


|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow \text{LIT}$
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- (5)  $\text{LIT} \rightarrow \text{false}$
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- (7)  $\text{OP} \rightarrow \text{or}$

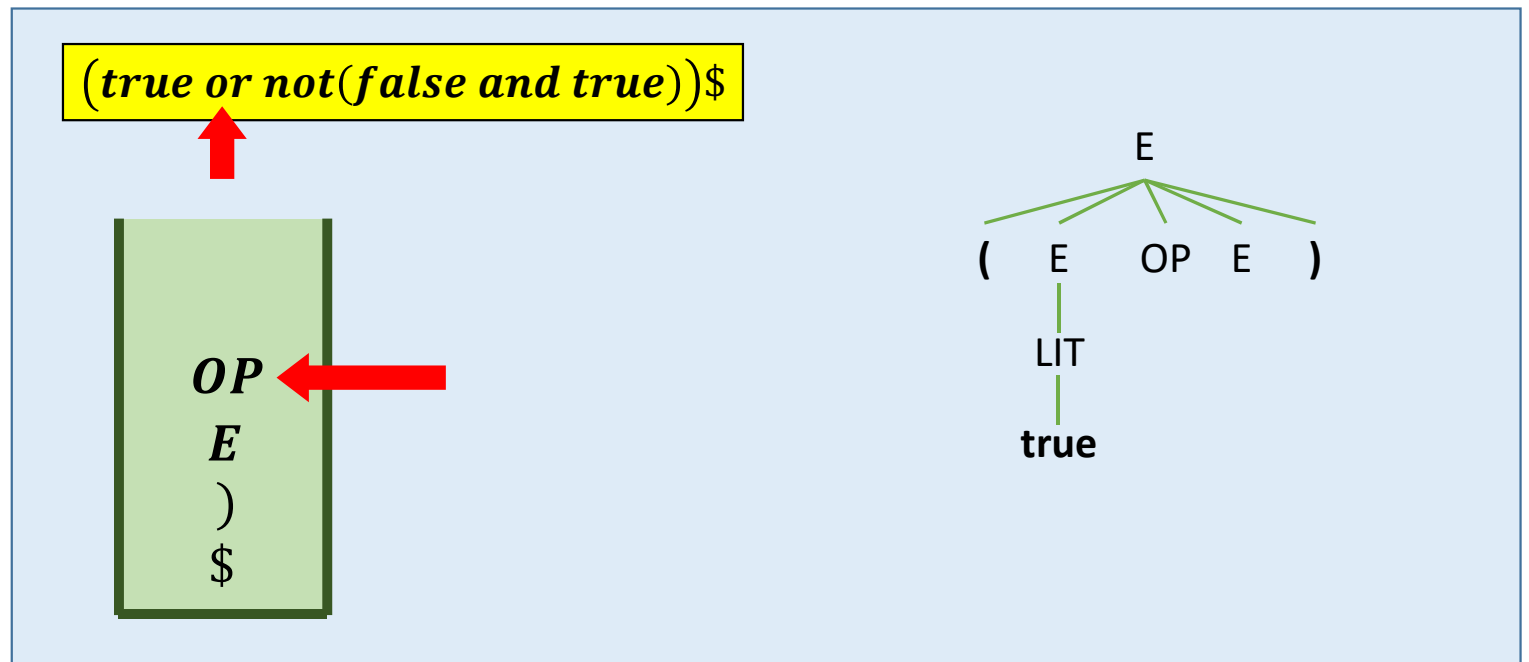
$(\text{true or not}(\text{false and true}))\$$

***OP***  
***E***  
**)**  
**\$**



|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow \text{LIT}$
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- (6)  $\text{OP} \rightarrow \text{and}$
- (7)  $\text{OP} \rightarrow \text{or}$



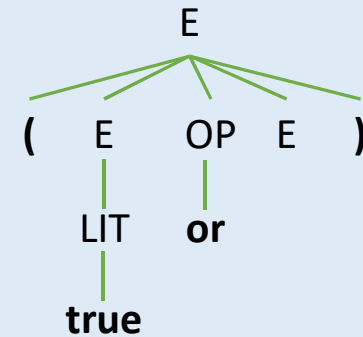
|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

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- (7)  $\text{OP} \rightarrow \text{or}$

***(true or not(false and true))\$***

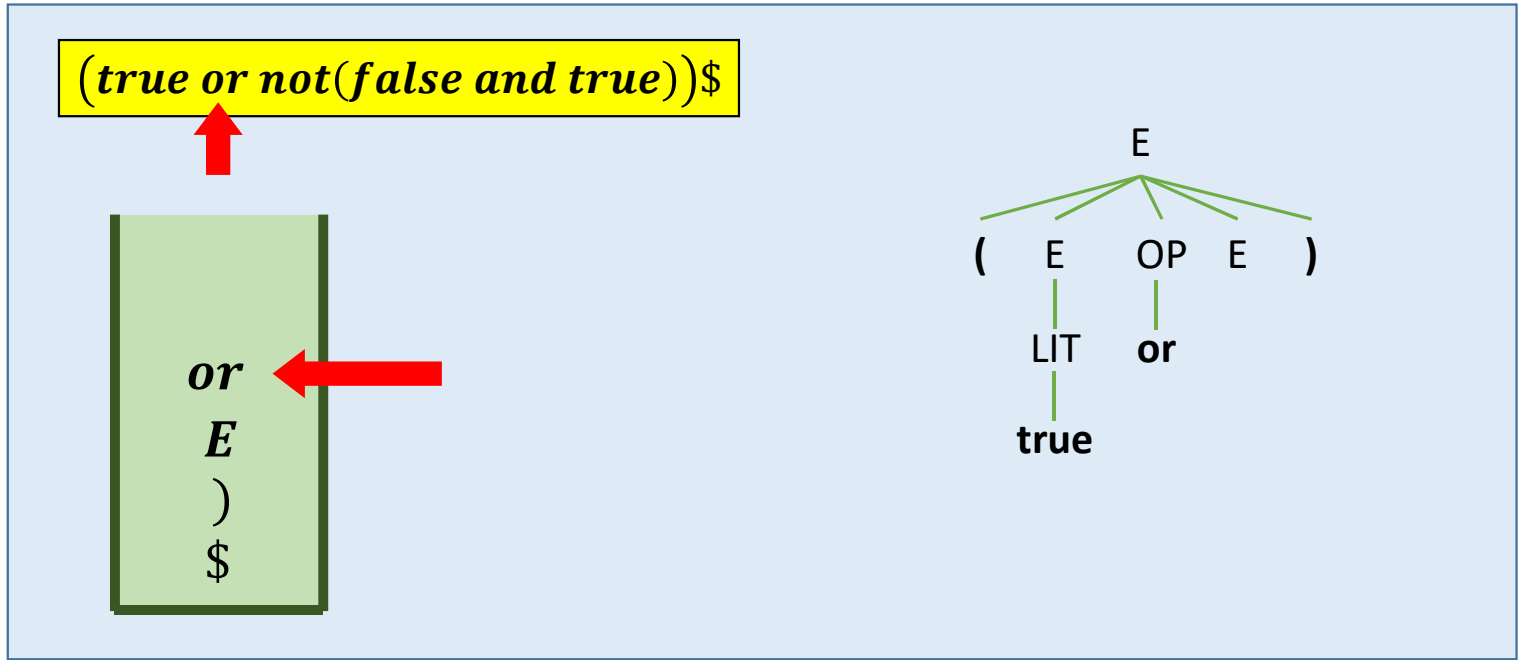


***or  
E  
)  
\$***



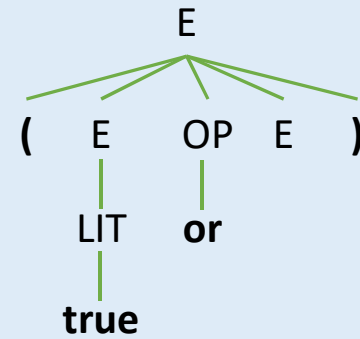
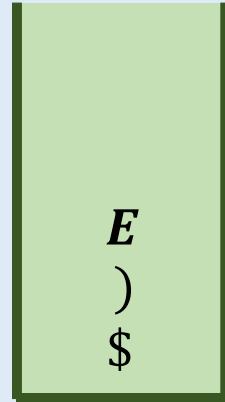
|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- 
- $(\text{true or not}(\text{false and true}))\$$
- Stack:  $\text{or}$ ,  $E$ ,  $)$ ,  $\$$
- Parse Tree:
- ```
graph TD
    E1[E] --- L1["("]
    E1 --- E2[E]
    E1 --- OP1[OP]
    E1 --- E3[E]
    E1 --- R1[")"]
    E2 --- LIT[LIT]
    LIT --- true[true]
    OP1 --- or[or]
```



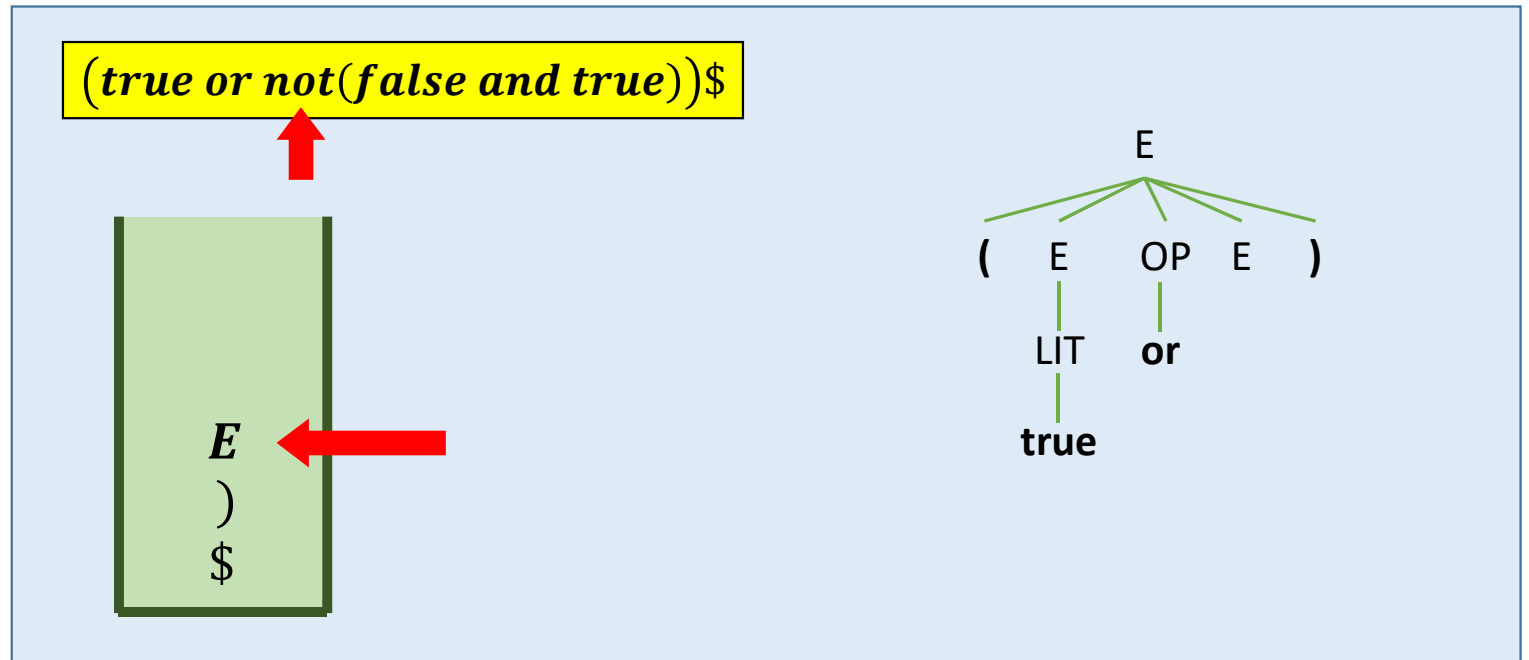
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- $(true \text{ or } not(false \text{ and } true))\$$



	()	not	true	false	and	or	\$
E	2		3	1	1			
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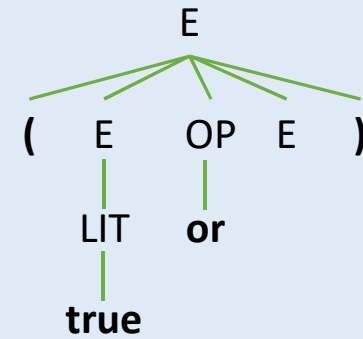
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(true or not(false and true))\$



E
)
\$



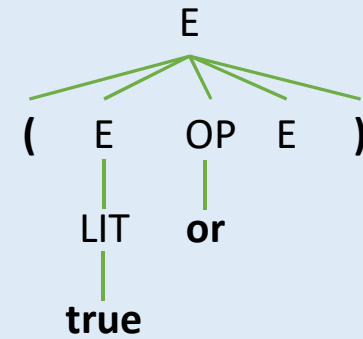
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- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$



)
\$



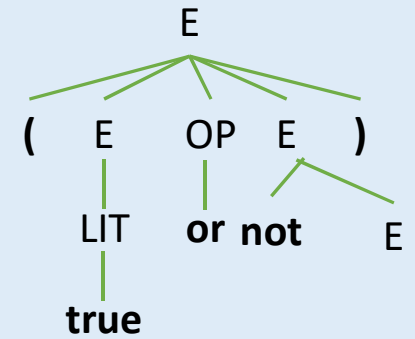
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(true or not(false and true))\$

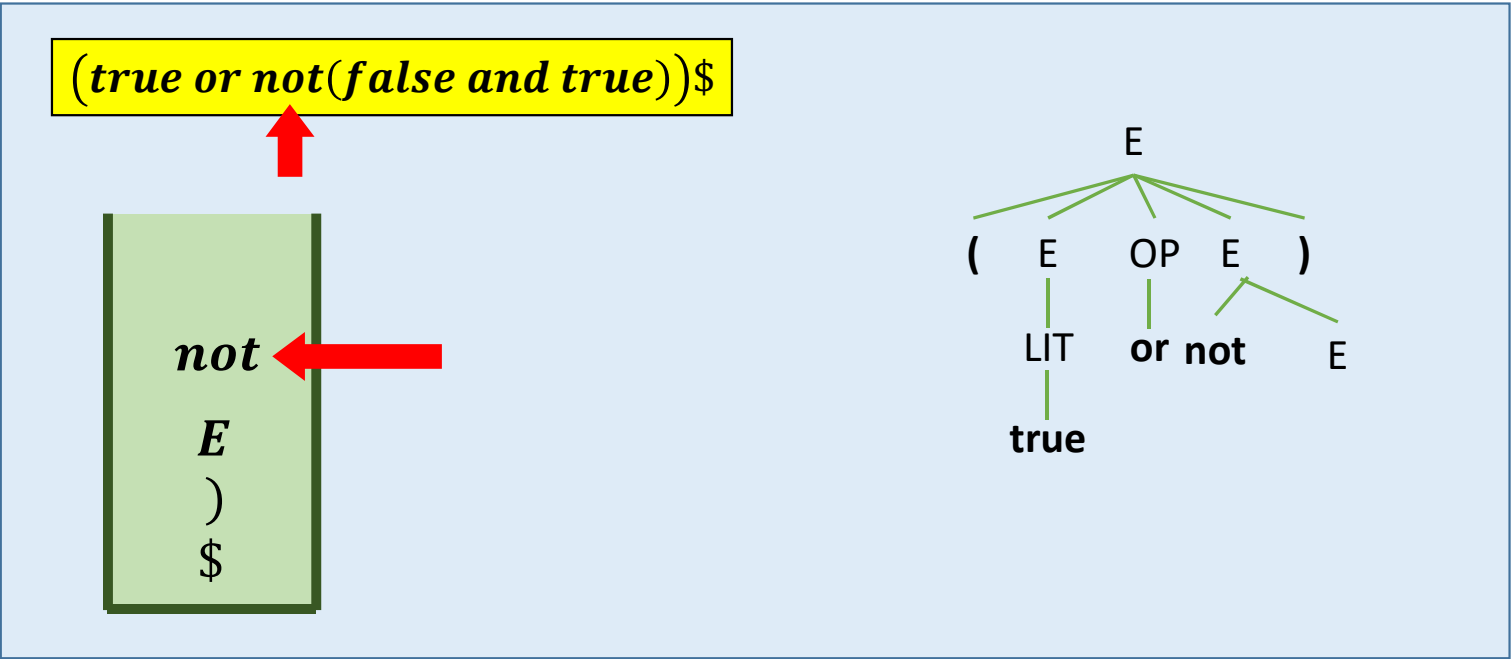


not
E
)
\$



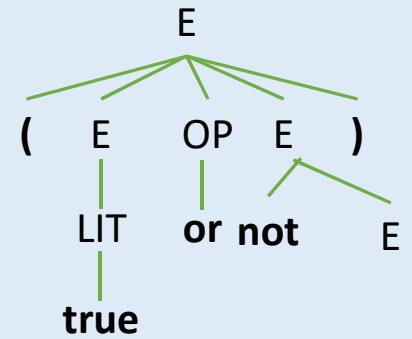
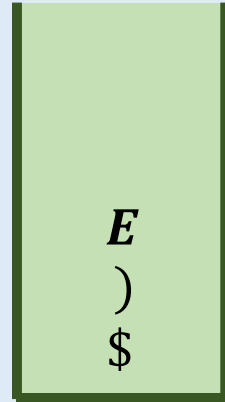
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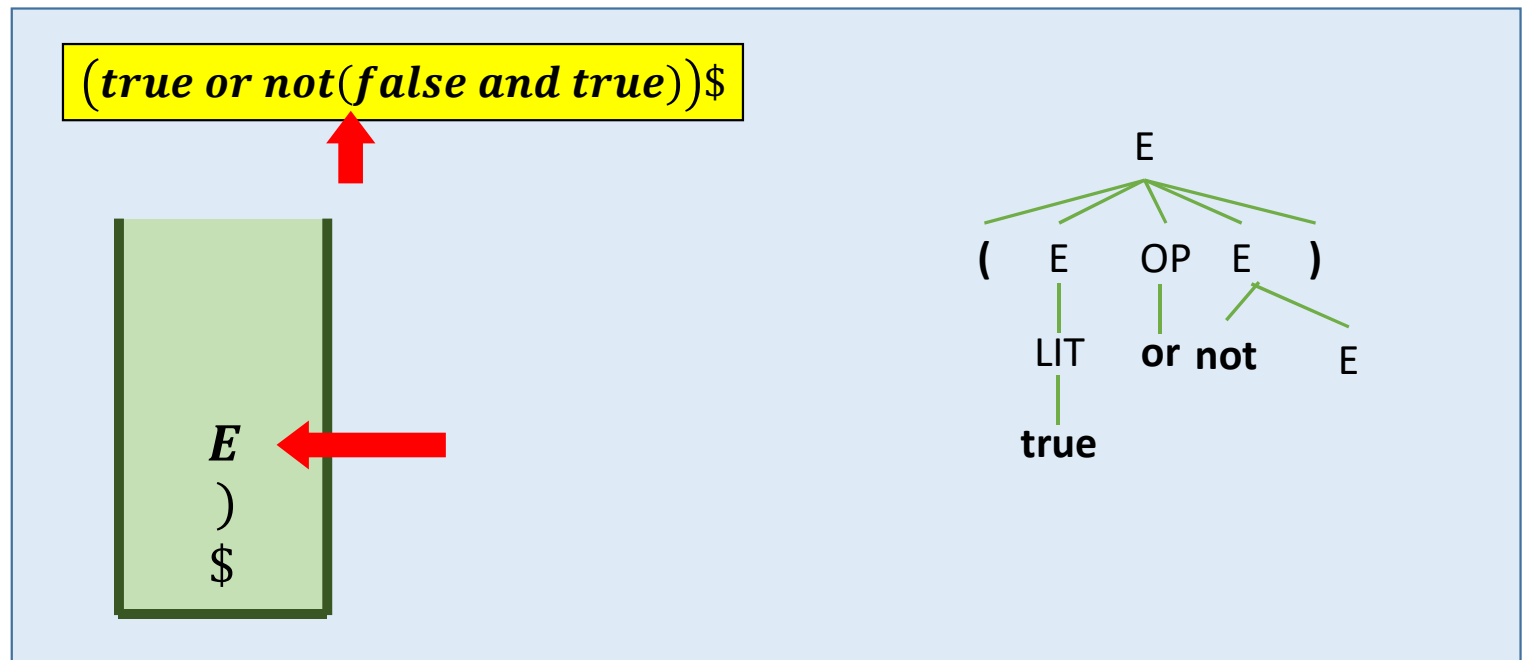
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
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- $(\text{true or not}(\text{false and true}))\$$



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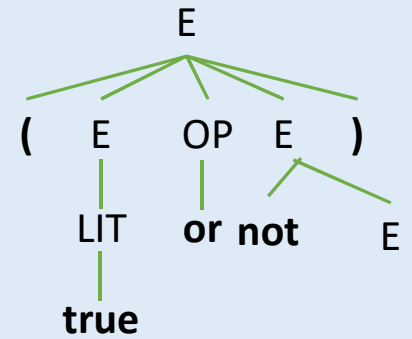
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- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$



)
\$

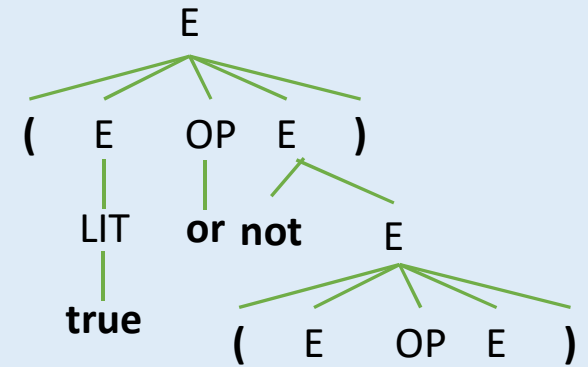


	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

(
E
OP
E
)
)
 \$

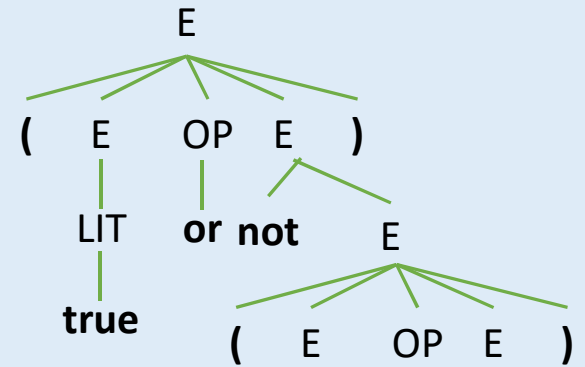


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

$(true \text{ or } not(false \text{ and } true))\$$

(
E
OP
E
)
)
\$

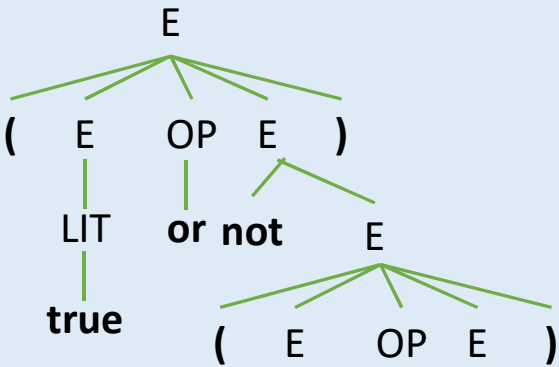


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

E
OP
E
)
)
\$

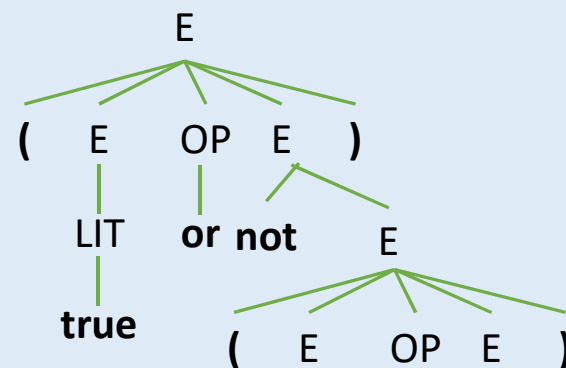


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

E
OP
E
)
)
\$



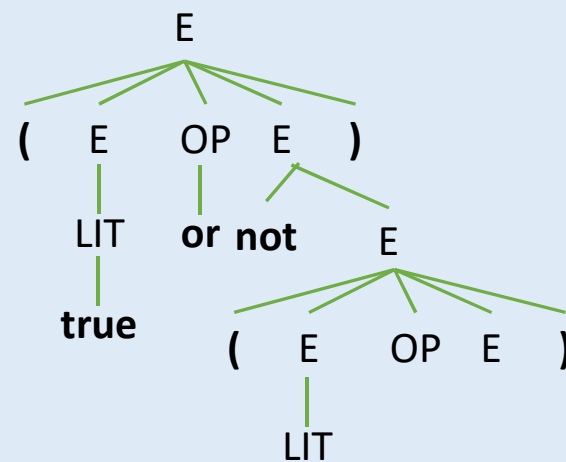
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(true or not(false and true))\$



LIT
OP
E
)
)
\$

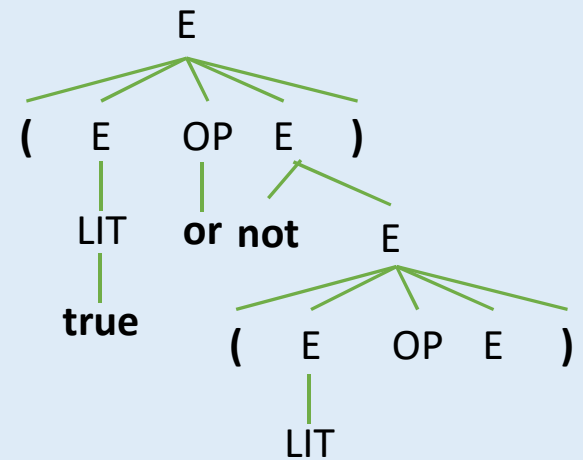


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(true or not(false and true))\$

LIT
OP
E
)
)
\$

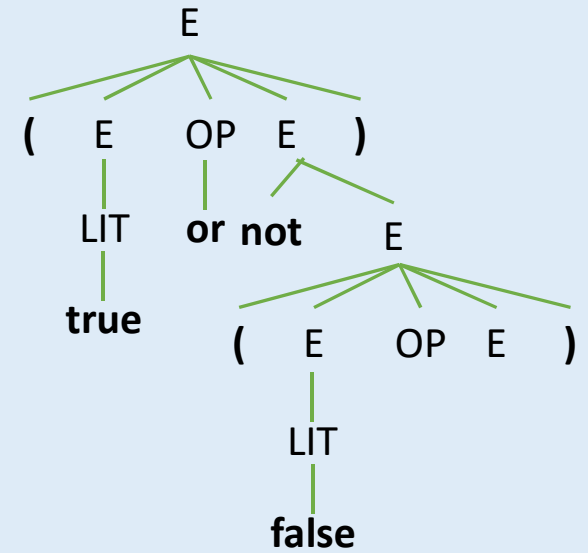


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

false
OP
E
)
)
\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

$(true \text{ or } not(false \text{ and } true))\$$

false

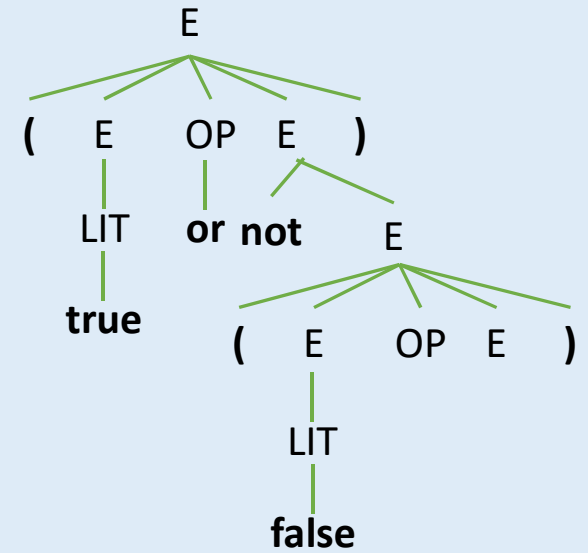
OP

E

)

)

\$



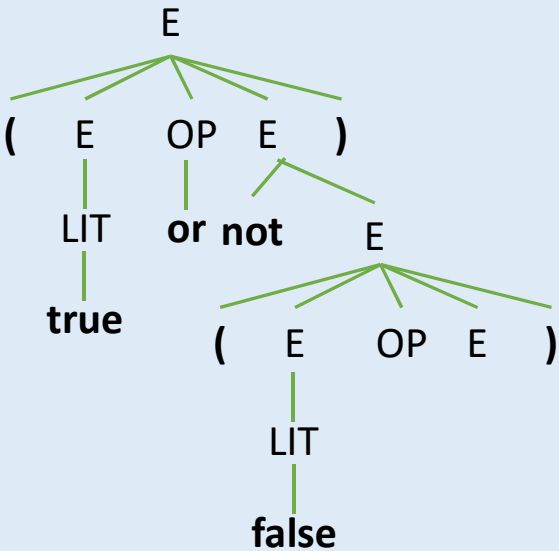
אסימונים

		(	)	not	true	false	and	or	\$
משתנים	E	2		3	1	1			
	LIT				4	5			
	OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

OP
E
)
)
\$

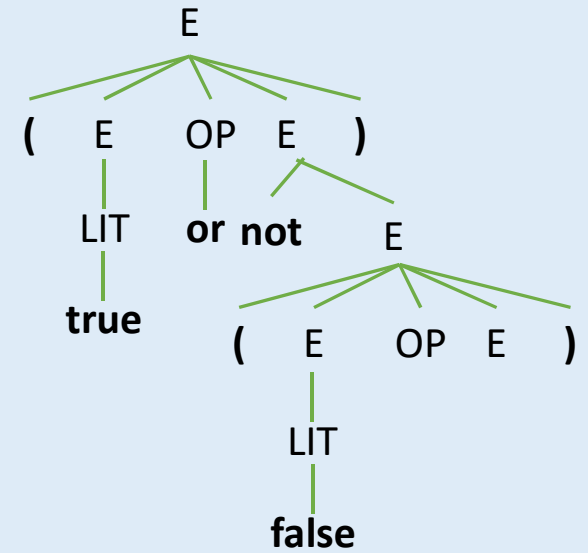


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

OP
E
)
)
\$



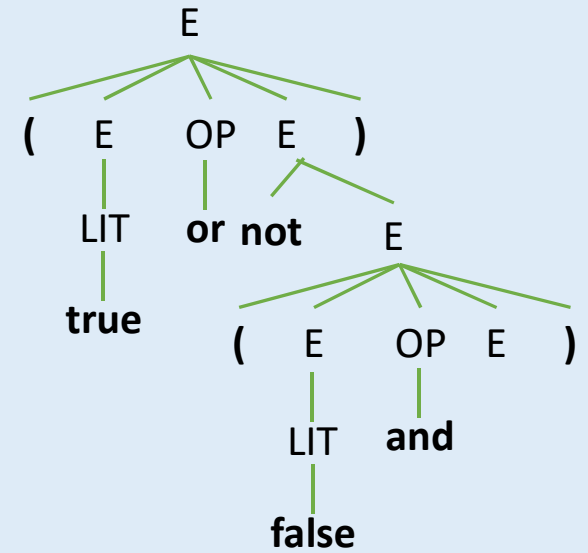
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

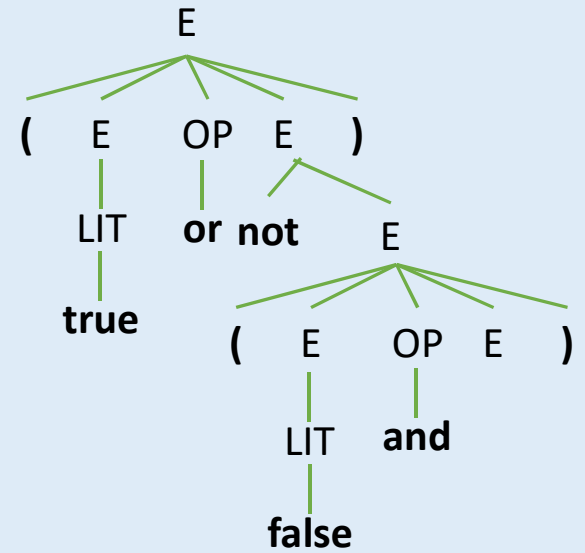
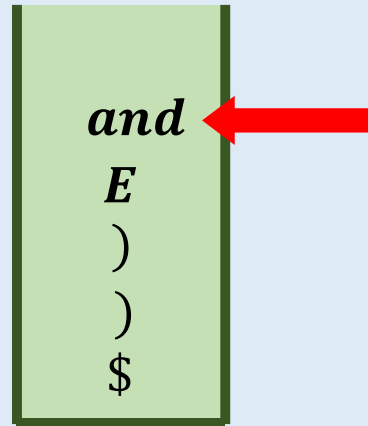


and
E
)
)
\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (true or not(false and true))\$***



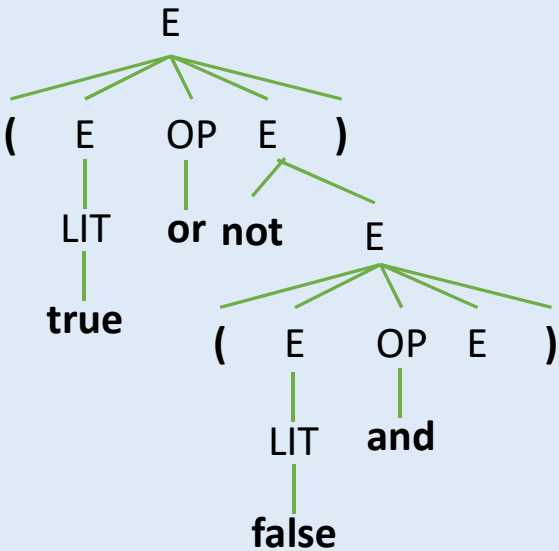
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$



E
)
)
\$

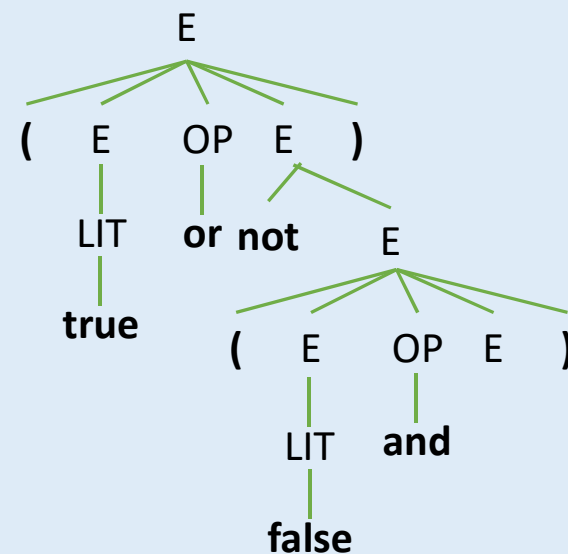


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- 1) $E \rightarrow \text{LIT}$
- 2) $E \rightarrow (E \text{ OP } E)$
- 3) $E \rightarrow \text{not } E$
- 4) $\text{LIT} \rightarrow \text{true}$
- 5) $\text{LIT} \rightarrow \text{false}$
- 6) $\text{OP} \rightarrow \text{and}$
- 7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

E
)
)
\$



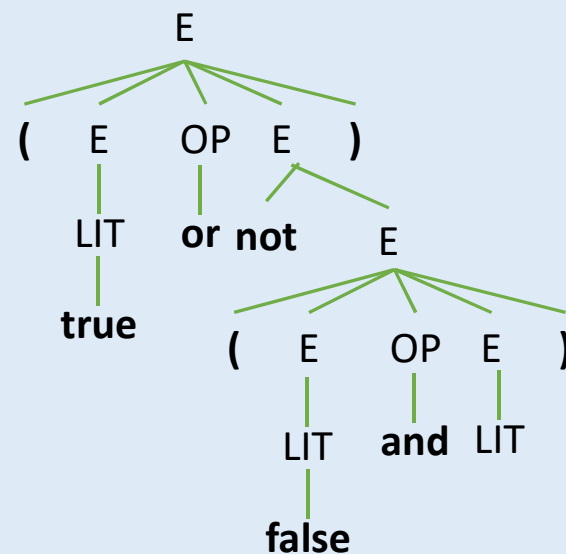
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- ❶ $E \rightarrow LIT$
- ❷ $E \rightarrow (E \text{ OP } E)$
- ❸ $E \rightarrow \text{not } E$
- ❹ $LIT \rightarrow \text{true}$
- ❺ $LIT \rightarrow \text{false}$
- ❻ $OP \rightarrow \text{and}$
- ❼ $OP \rightarrow \text{or}$

(true or not(false and true))\$



LIT
)
)
 \$

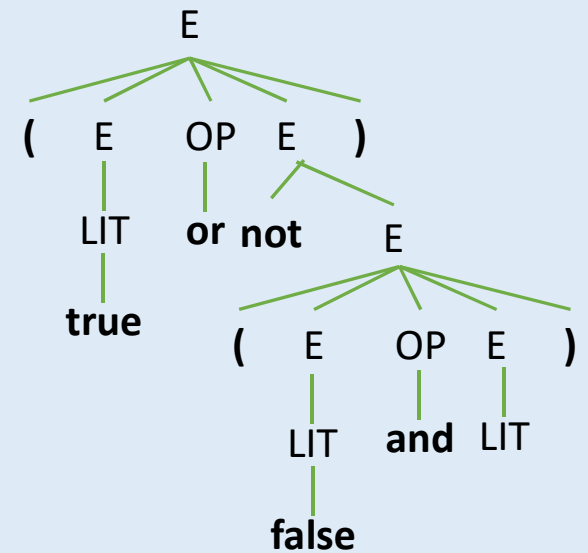


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(true or not(false and true))\$

LIT
)
)
 \$



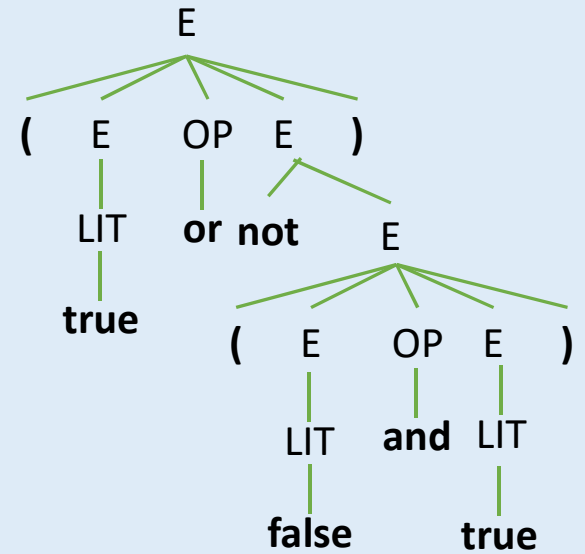
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$

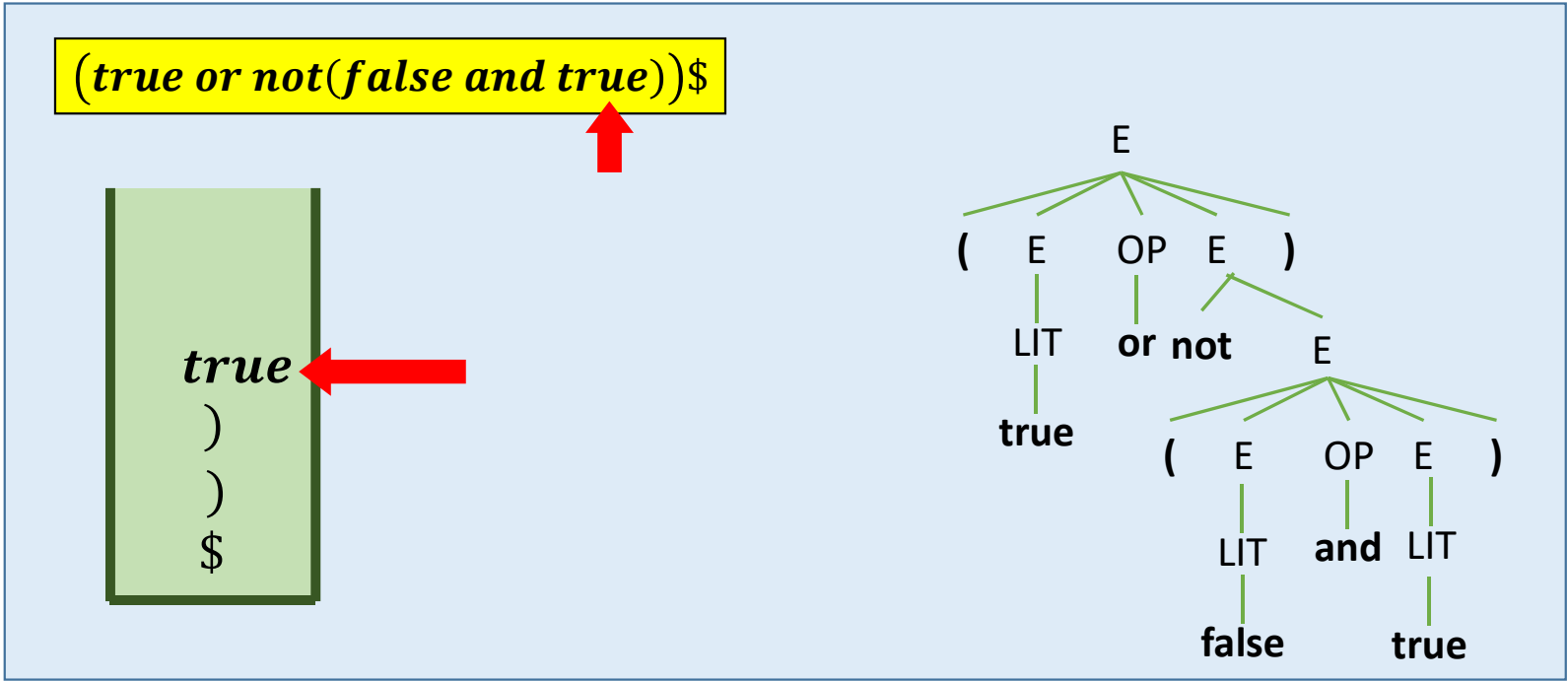


true
)
)
\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



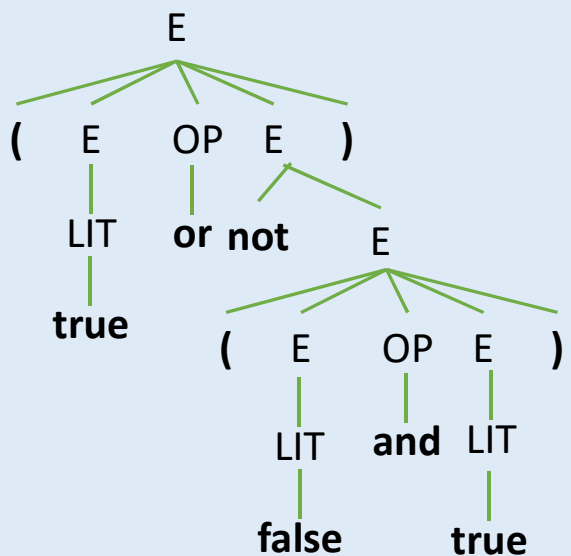
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(true or not(false and true))\$

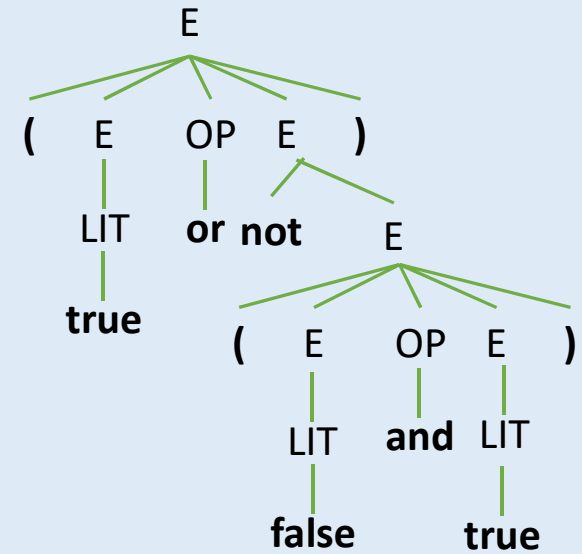
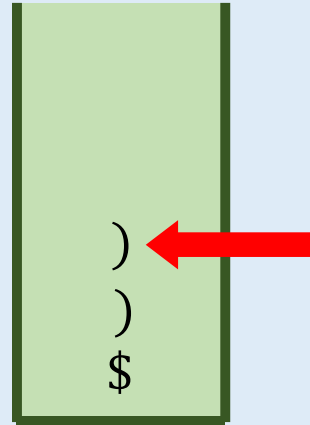


)
)
\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

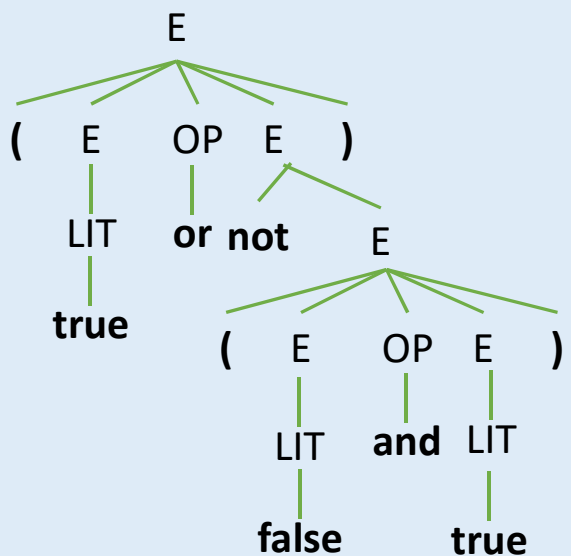
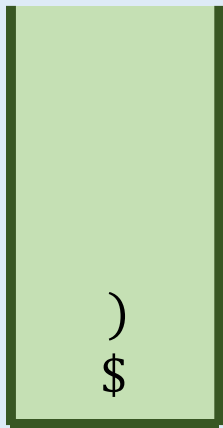
- $(\text{true or not}(\text{false and true}))\$$**



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

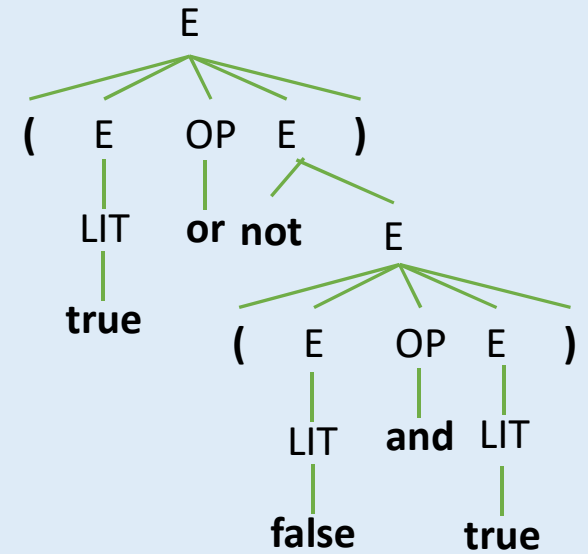
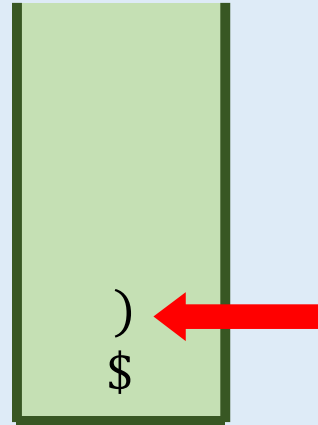
- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or not(false and true))\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

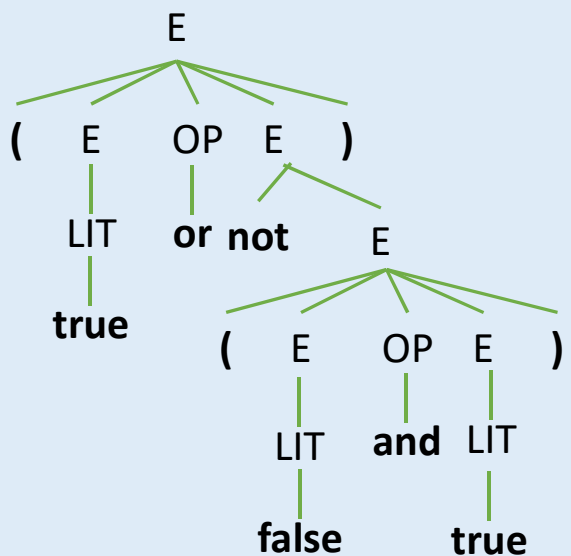
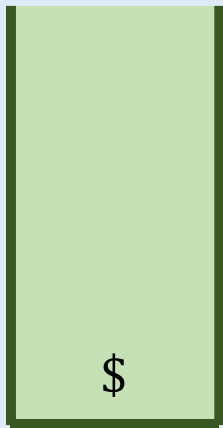
- (true or not(false and true))\$***



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

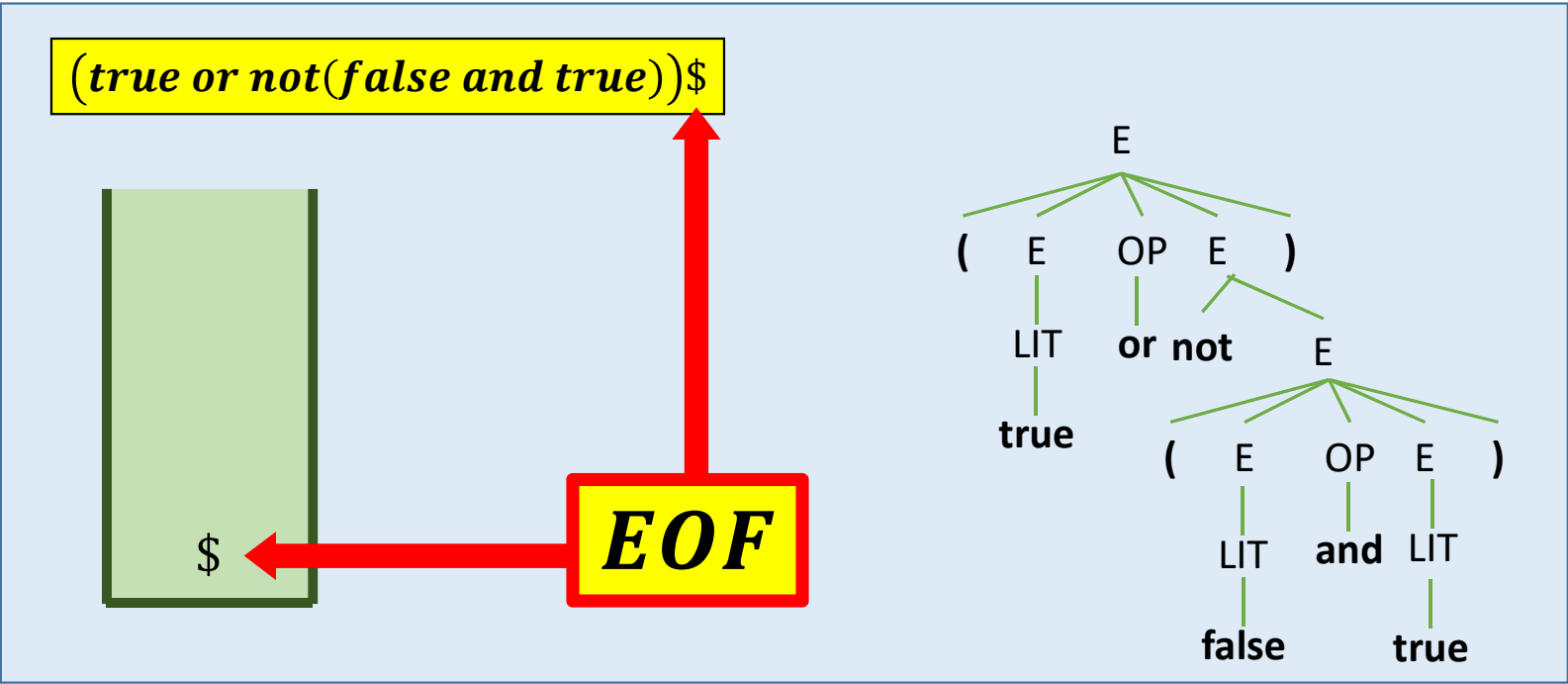
- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(*true or not(false and true)*)\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

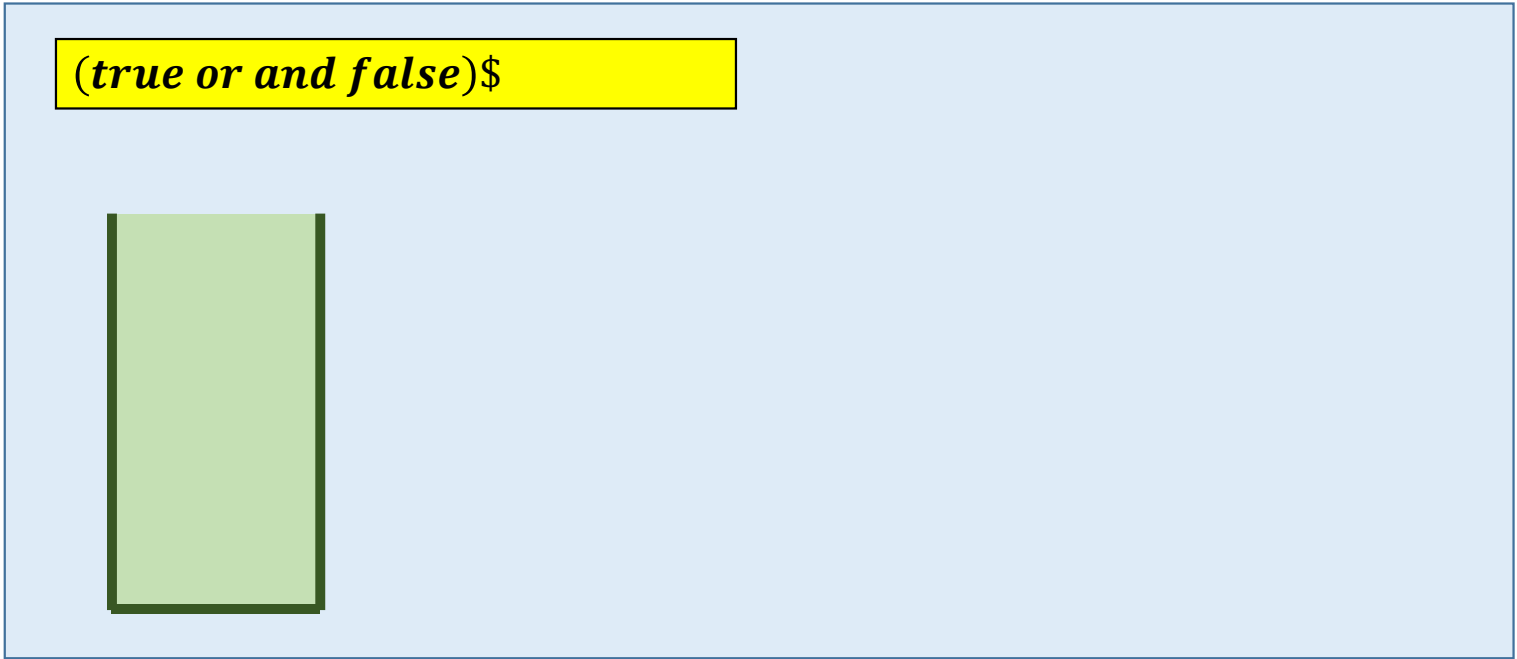
- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

דוגמא שלילית

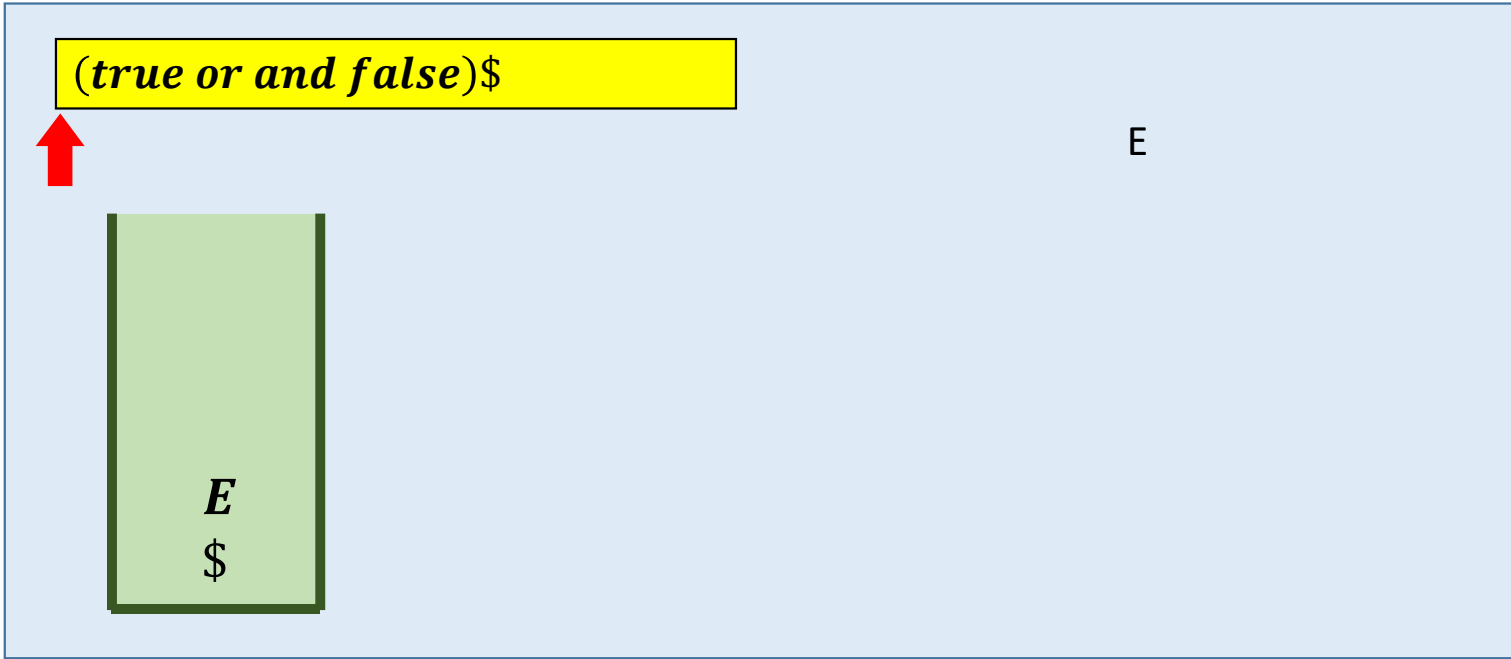
- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$



אסימונים

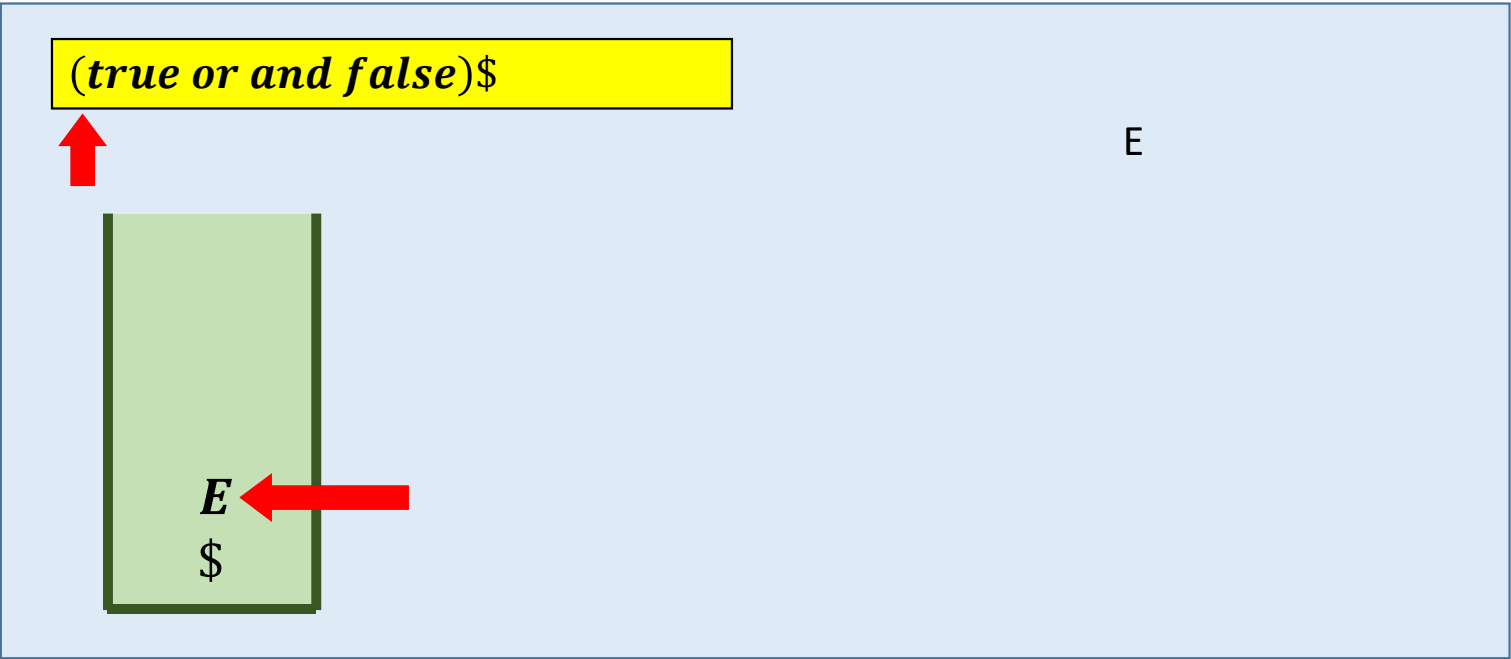
	(	)	not	true	false	and	or	\$
משמנים	E	2	3	1	1			
	LIT			4	5			
	OP					6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



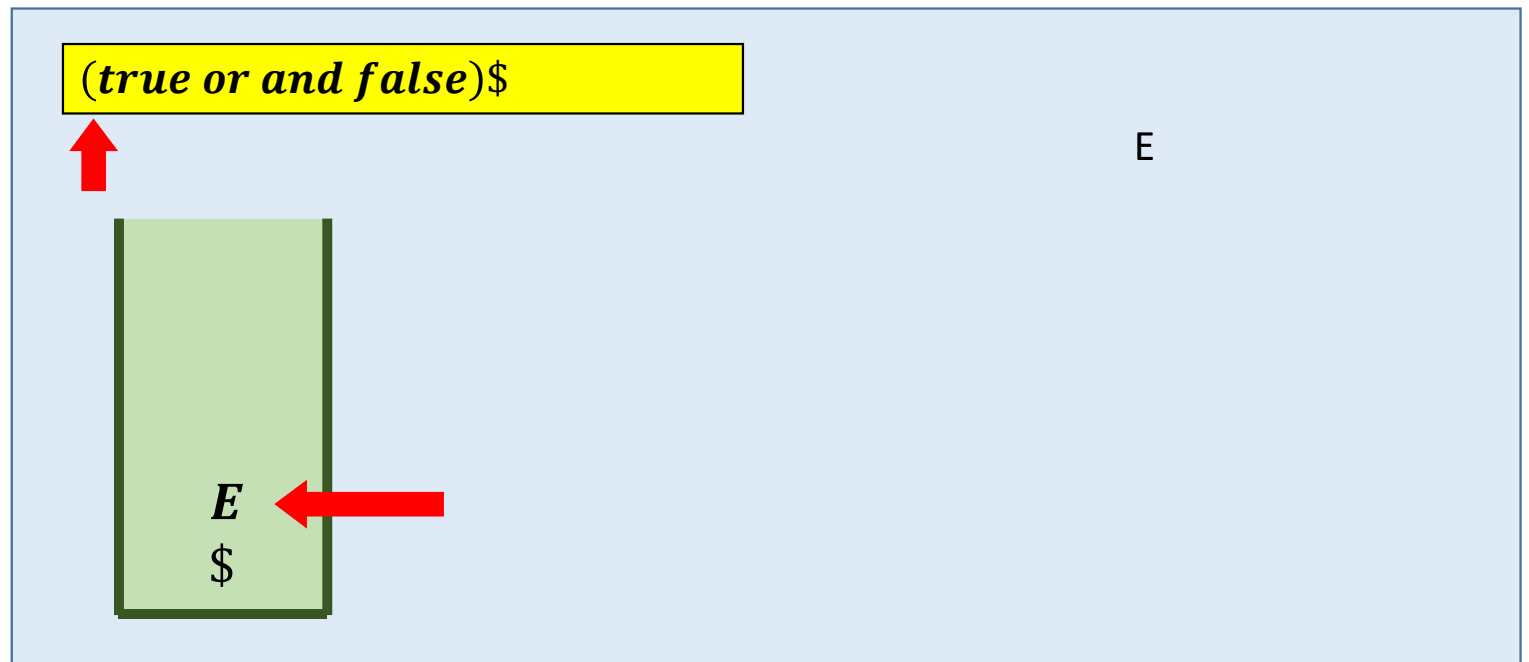
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



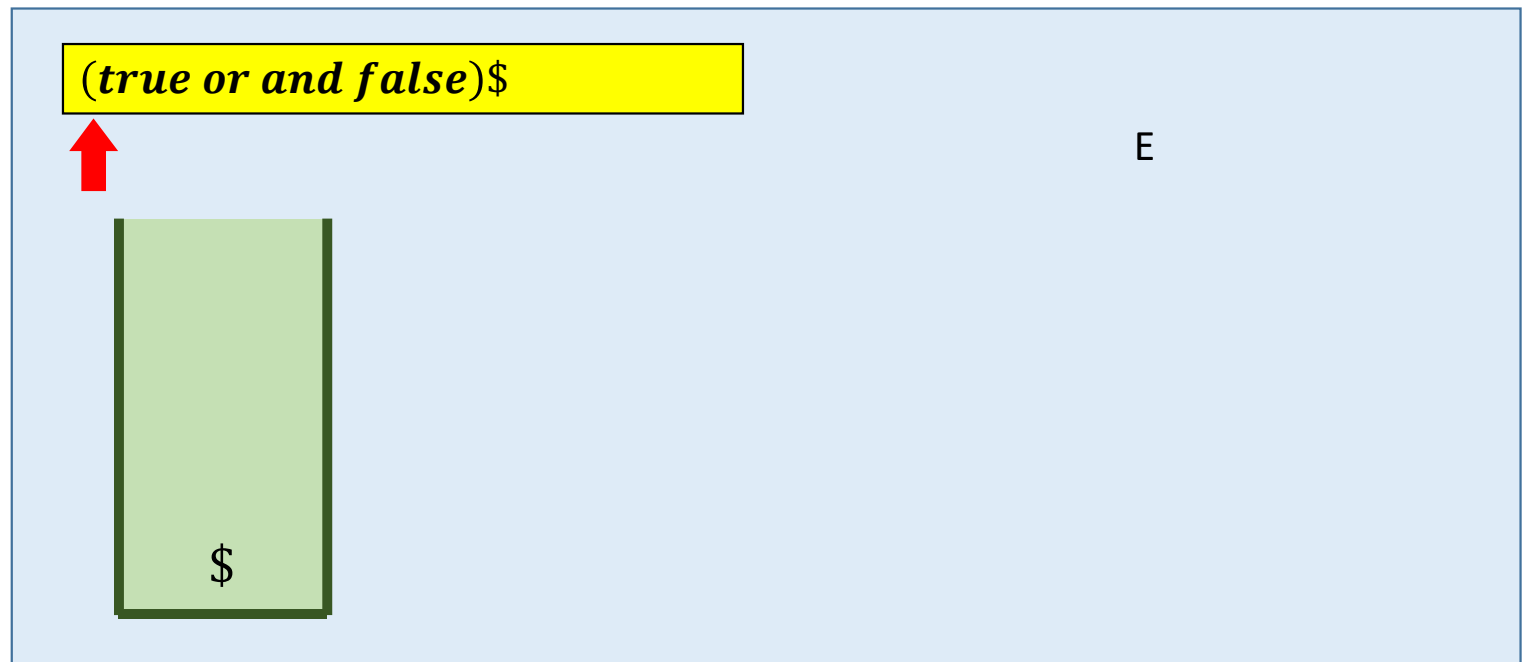
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



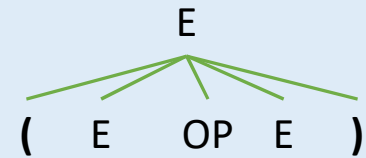
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(*true or and false*)\$

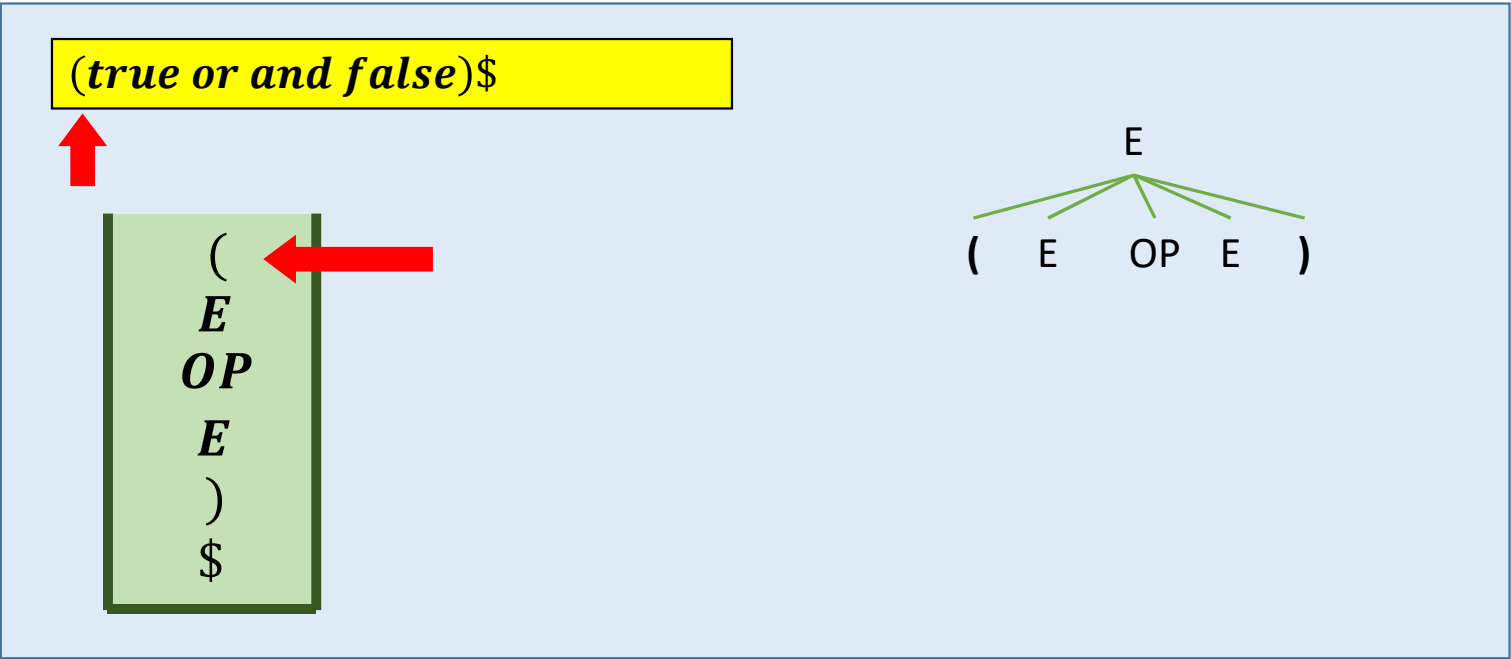


**(
E
OP
E
)
\$**



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
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- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(*true or and false*)\$

E

OP

E

)

\$

E

(

E

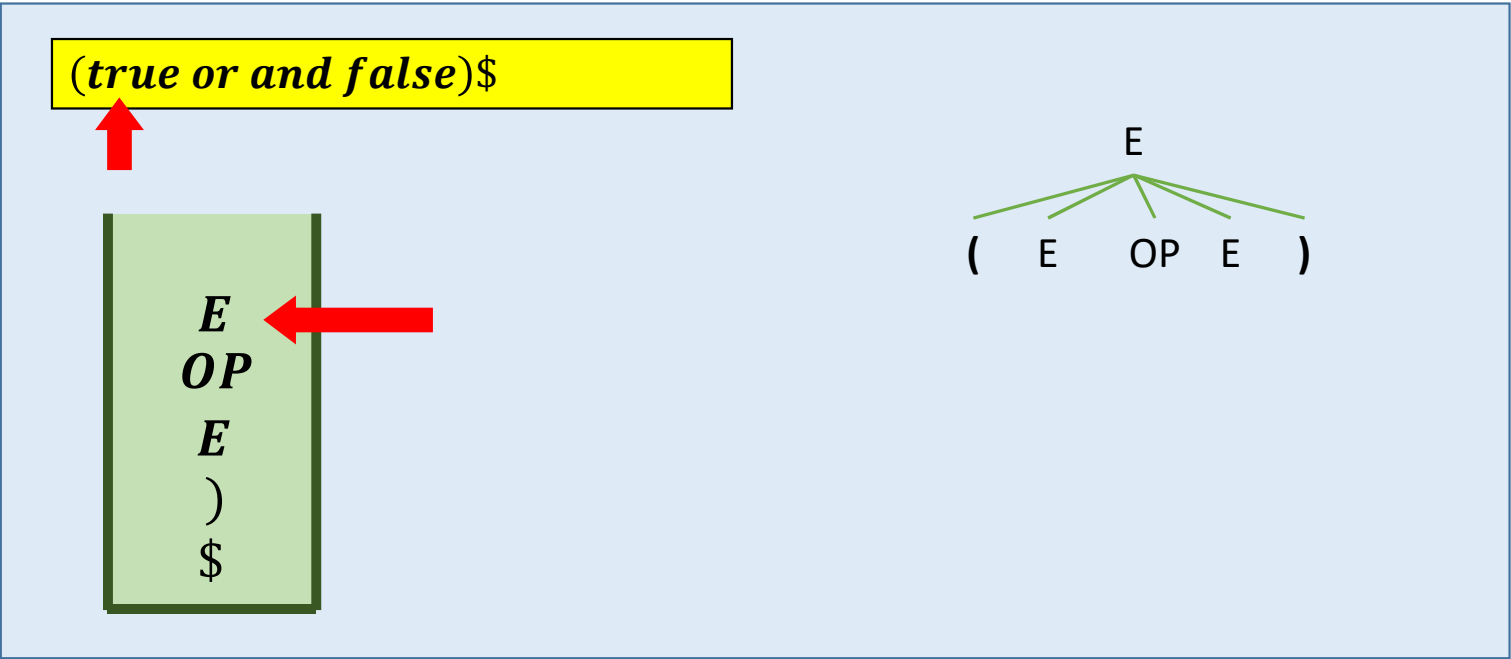
OP

E

)

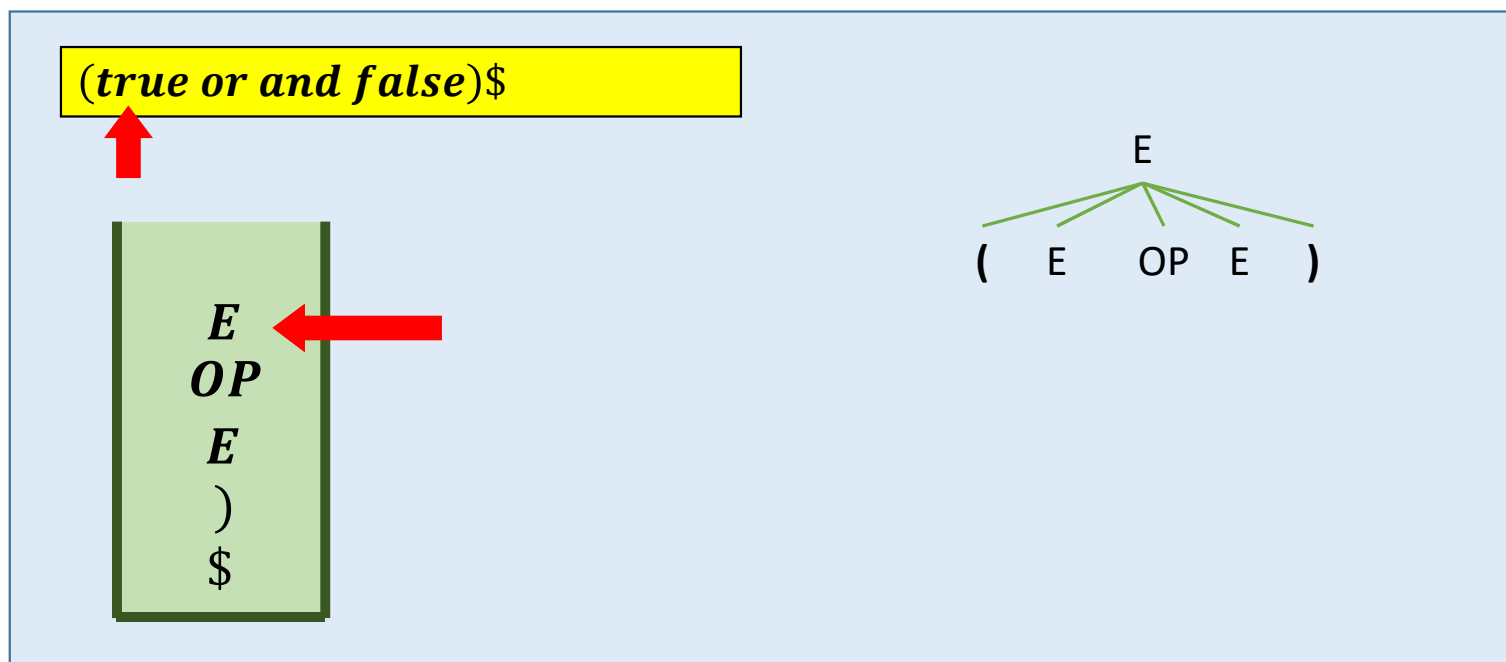
	()	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$



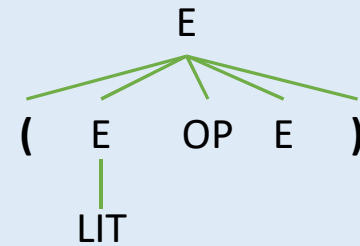
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(*true or and false*)\$



LIT
OP
E
)
\$



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

(*true or and false*)\$

LIT

OP

E

)

\$

E

(

E

OP

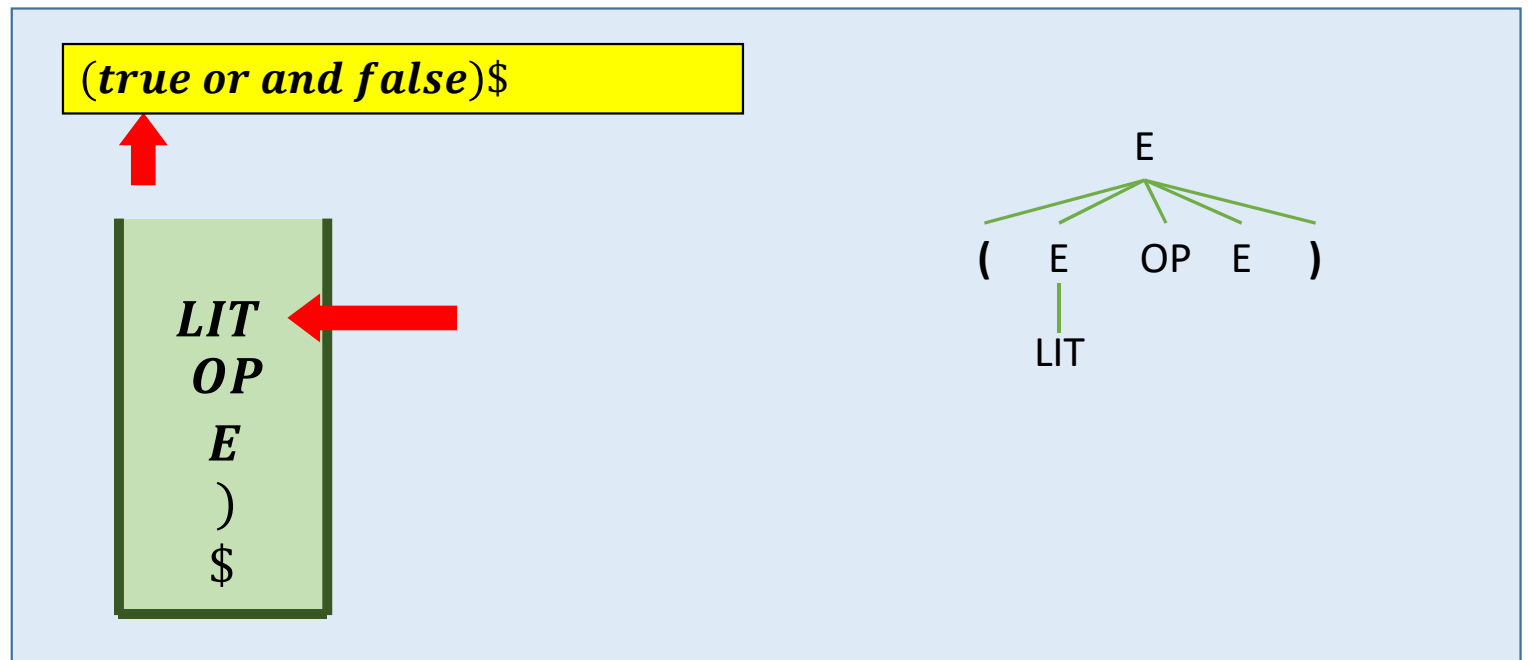
E

)

LIT

	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$



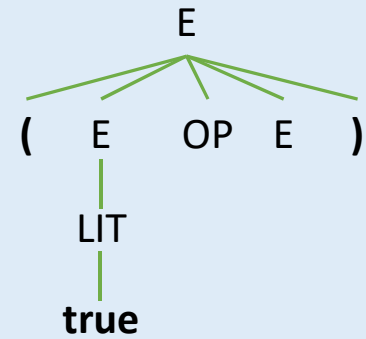
	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow \text{LIT}$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $\text{LIT} \rightarrow \text{true}$
- (5) $\text{LIT} \rightarrow \text{false}$
- (6) $\text{OP} \rightarrow \text{and}$
- (7) $\text{OP} \rightarrow \text{or}$

(true or and false)\$

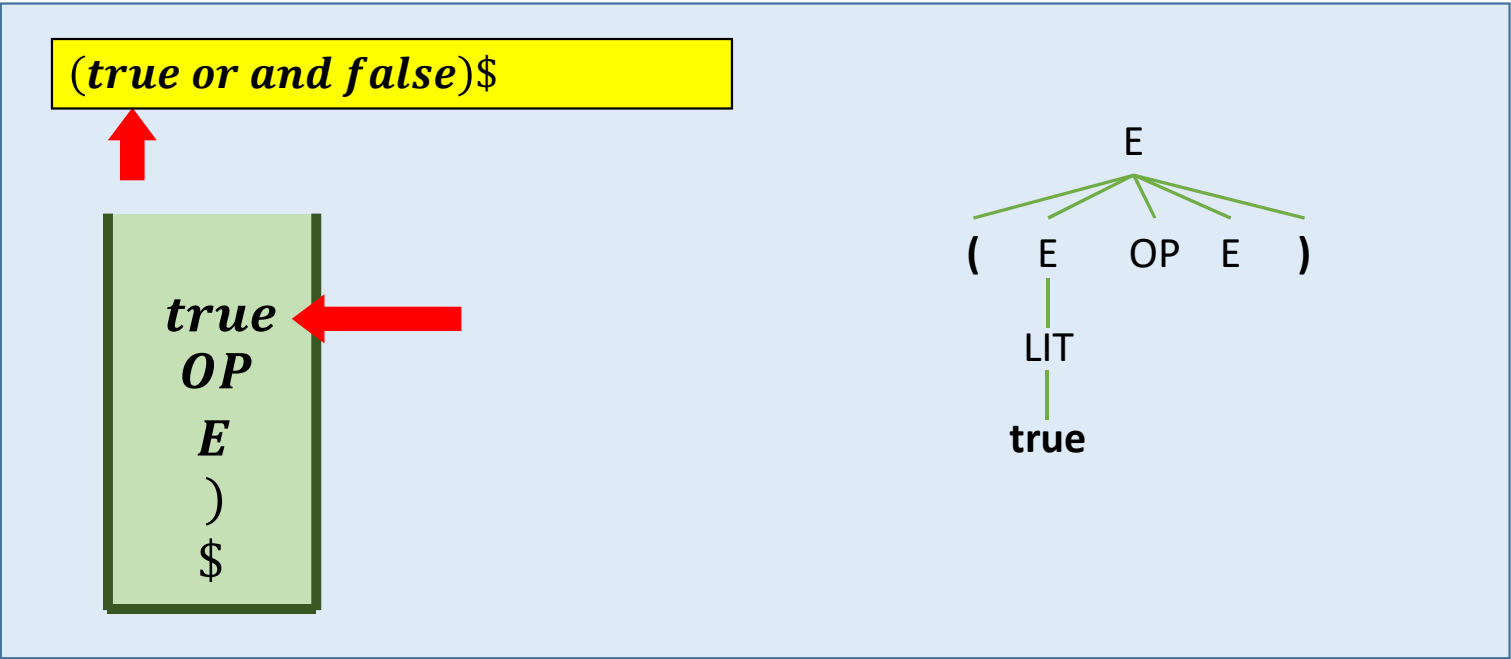


***true
OP
E
)
\$***



	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

- (1) $E \rightarrow LIT$
- (2) $E \rightarrow (E \text{ OP } E)$
- (3) $E \rightarrow \text{not } E$
- (4) $LIT \rightarrow \text{true}$
- (5) $LIT \rightarrow \text{false}$
- (6) $OP \rightarrow \text{and}$
- (7) $OP \rightarrow \text{or}$

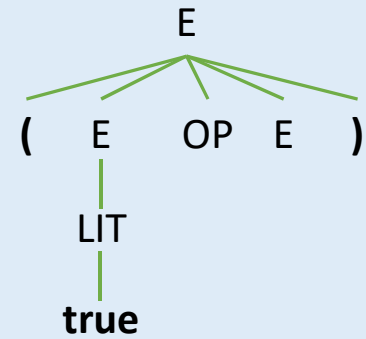


	(	)	not	true	false	and	or	\$
E	2		3	1	1			
LIT				4	5			
OP						6	7	

-
- Diagram illustrating the shift-reduce parsing process for the expression $(true\ or\ and\ false)\$$.
- The stack contains the symbols OP , E , and $)$. The input buffer contains the symbols $($, E , OP , E , and $)$. A red arrow points to the input buffer.
- The parse tree structure is shown on the right:
- ```

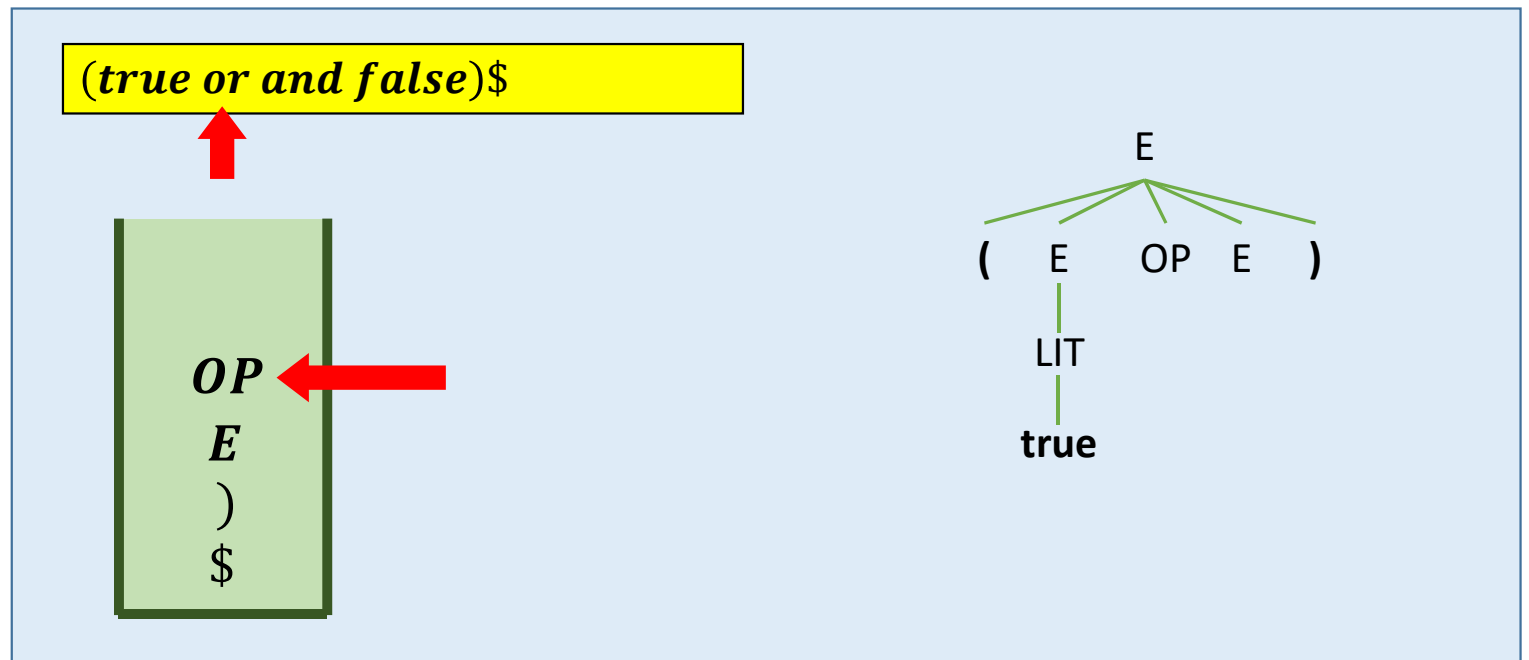
graph TD
 E1[E] --- L1["("]
 E1 --- E2[E]
 E1 --- OP1[OP]
 E1 --- E3[E]
 E1 --- R1[")"]
 E2 --- LIT[LIT]
 LIT --- true[true]

```



|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow \text{LIT}$
- (2)  $E \rightarrow ( E \text{ OP } E )$
- (3)  $E \rightarrow \text{not } E$
- (4)  $\text{LIT} \rightarrow \text{true}$
- (5)  $\text{LIT} \rightarrow \text{false}$
- (6)  $\text{OP} \rightarrow \text{and}$
- (7)  $\text{OP} \rightarrow \text{or}$



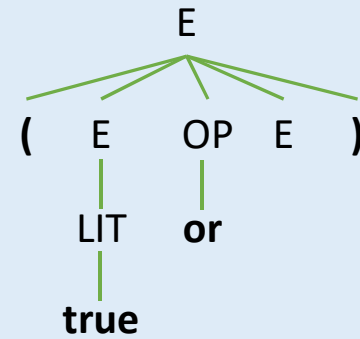
|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow \text{LIT}$
- (2)  $E \rightarrow ( E \text{ OP } E )$
- (3)  $E \rightarrow \text{not } E$
- (4)  $\text{LIT} \rightarrow \text{true}$
- (5)  $\text{LIT} \rightarrow \text{false}$
- (6)  $\text{OP} \rightarrow \text{and}$
- (7)  $\text{OP} \rightarrow \text{or}$

***(true or and false)\$***

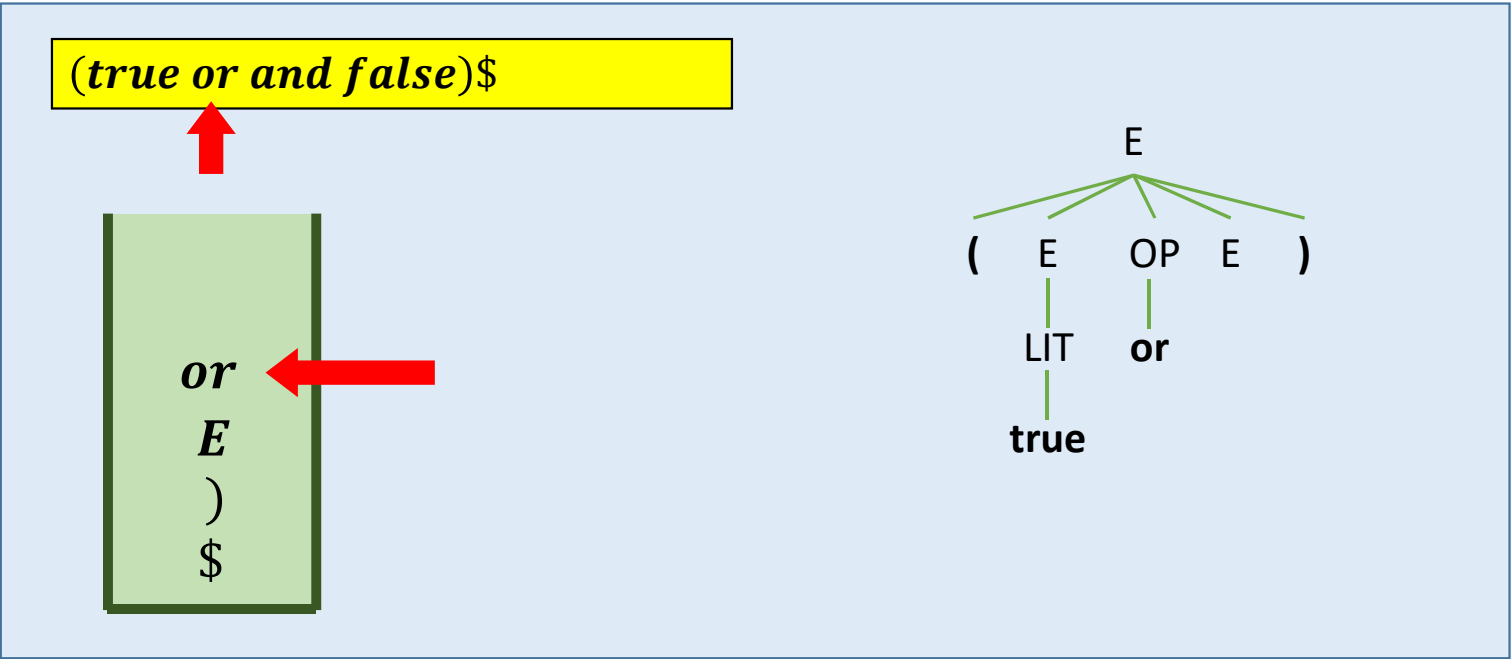


***or  
E  
)  
\$***



|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow LIT$
- (2)  $E \rightarrow ( E \text{ OP } E )$
- (3)  $E \rightarrow \text{not } E$
- (4)  $LIT \rightarrow \text{true}$
- (5)  $LIT \rightarrow \text{false}$
- (6)  $OP \rightarrow \text{and}$
- (7)  $OP \rightarrow \text{or}$



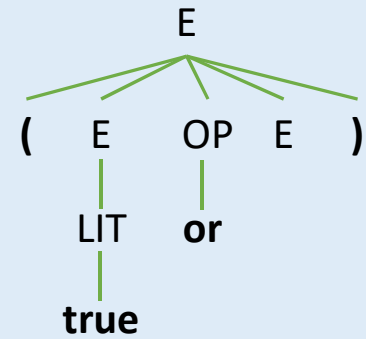
|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- $(\text{true or and false})\$$

Stack:  $E$ ,  $)$ ,  $\$$

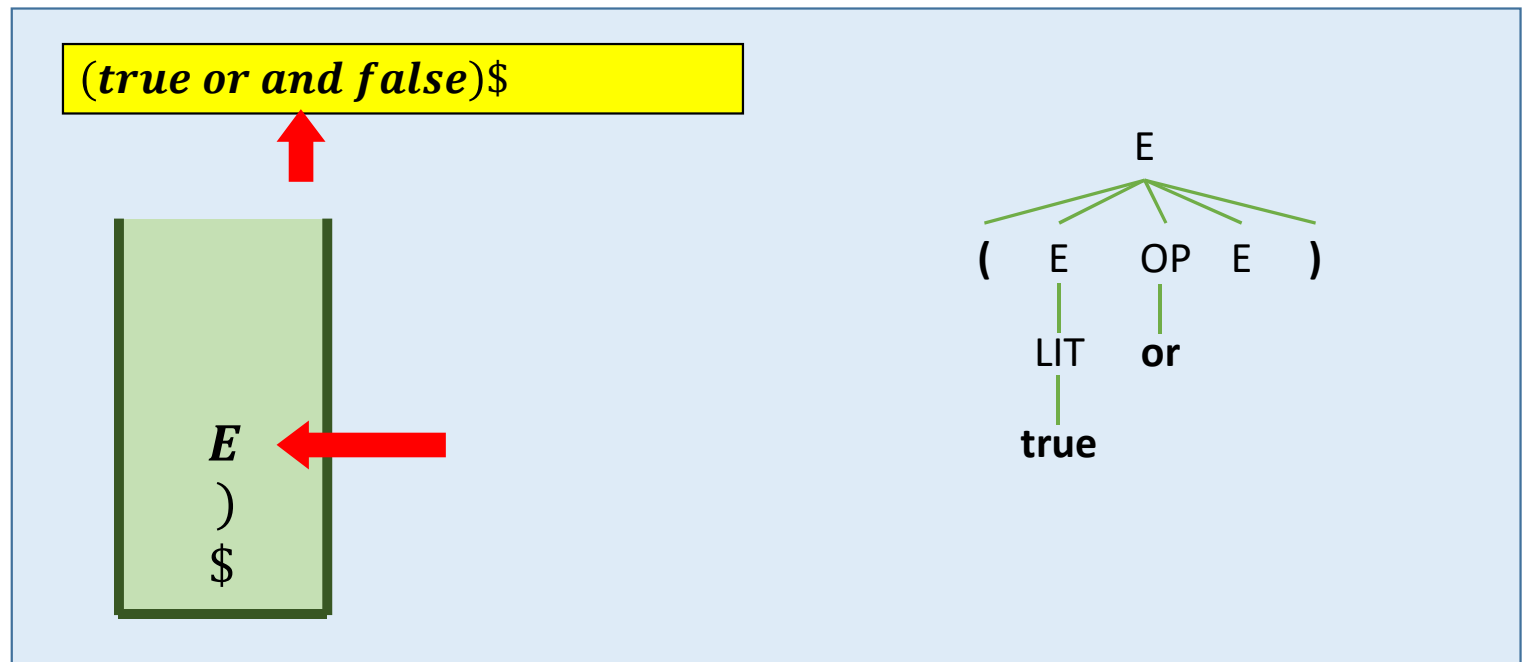
Parse Tree:

```
graph TD
 E1[E] --- L1["("]
 E1 --- E2[E]
 E1 --- OP1[OP]
 E1 --- E3[E]
 E1 --- R1[")"]
 E2 --- LIT[LIT]
 LIT --- true[true]
 OP1 --- or[or]
```



|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

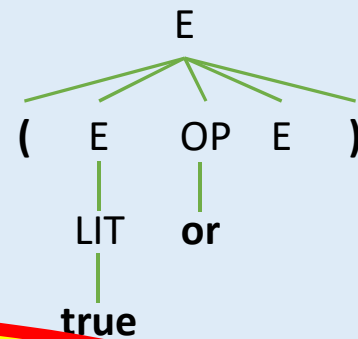
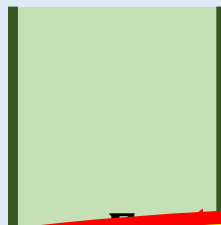
- (1)  $E \rightarrow \text{LIT}$
- (2)  $E \rightarrow ( E \text{ OP } E )$
- (3)  $E \rightarrow \text{not } E$
- (4)  $\text{LIT} \rightarrow \text{true}$
- (5)  $\text{LIT} \rightarrow \text{false}$
- (6)  $\text{OP} \rightarrow \text{and}$
- (7)  $\text{OP} \rightarrow \text{or}$



|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |

- (1)  $E \rightarrow \text{LIT}$
- (2)  $E \rightarrow ( E \text{ OP } E )$
- (3)  $E \rightarrow \text{not } E$
- (4)  $\text{LIT} \rightarrow \text{true}$
- (5)  $\text{LIT} \rightarrow \text{false}$
- (6)  $\text{OP} \rightarrow \text{and}$
- (7)  $\text{OP} \rightarrow \text{or}$

*(true or and false)\$*



**ERROR**

|     | ( | ) | not | true | false | and | or | \$ |
|-----|---|---|-----|------|-------|-----|----|----|
| E   | 2 |   | 3   | 1    | 1     |     |    |    |
| LIT |   |   |     | 4    | 5     |     |    |    |
| OP  |   |   |     |      |       | 6   | 7  |    |