

$$(2) (a+b) * (c+d) + (a+b+c)$$

(a) Quadruples:-

	<u>op</u>	<u>arg1</u>	<u>arg2</u>	<u>result</u>
$t_1 = a + b$	+	a	b	$t_1$
$t_2 = c + d$	+	c	d	$t_2$
$t_3 = t_1 * t_2$	*	$t_1$	$t_2$	$t_3$
$t_4 = a + b$	+	a	b	$t_4$
$t_5 = t_4 + c$	+	$t_4$	c	$t_5$
$t_6 = t_3 + t_5$	+	$t_3$	$t_5$	$t_6$

$$(b) (a+b) * (c+d) + (a+b+c)$$

Triples:-

	<u>op</u>	<u>arg1</u>	<u>arg2</u>
0	+	a	b
1	+	c	d
2	*	(0)	(1)
3	+	a	b
4	+	(3)	c
5	+	(2)	(4)

(3) SLR parser :-

$$\left. \begin{array}{l} S' \rightarrow S \\ S \rightarrow (L) \mid a \\ L \rightarrow L, S \mid S \end{array} \right\} \rightarrow \begin{array}{l} 0. S' \rightarrow S \\ 1. S \rightarrow (L) \\ 2. S \rightarrow a \\ 3. L \rightarrow L, S \\ 4. L \rightarrow S \end{array}$$

$$\text{Follow}(S') = \{\$ \}$$

$$\text{Follow}(S) = \{\$, ,, )\}$$

$$\text{Follow}(L) = \{ ,, )\}$$

$$\begin{aligned} \boxed{I_0} &= \text{closure}(S' \rightarrow \cdot S) \\ &= \{ S' \rightarrow \cdot S \\ &\quad S \rightarrow \cdot (L) \\ &\quad S \rightarrow \cdot a \\ &\quad \} \end{aligned}$$

$$\begin{aligned} \text{Goto}(I_0, S) &= \text{closure}(S' \rightarrow S \cdot) \\ &\Rightarrow \boxed{I_1} = \{ S' \rightarrow S \cdot \} \end{aligned}$$

$$\begin{aligned} \text{Goto}(I_0, ( ) &= \text{closure}(S \rightarrow ( \cdot L) ) \\ &\Rightarrow \boxed{I_2} = \{ S \rightarrow ( \cdot L) \\ &\quad L \rightarrow \cdot L, S \\ &\quad L \rightarrow \cdot S \\ &\quad S \rightarrow \cdot (L) \\ &\quad S \rightarrow \cdot a \\ &\quad \} \end{aligned}$$

$$\begin{aligned} \text{Goto}(I_0, a) &= \text{closure}(S \rightarrow a \cdot) \\ &\Rightarrow \boxed{I_3} = \{ S \rightarrow a \cdot \} \end{aligned}$$

$$\text{Goto}(\mathcal{I}_2, L) = \text{closure}(S \rightarrow (L \cdot), L \rightarrow L \cdot, S)$$

$$\Rightarrow \boxed{\mathcal{I}_4} = \{ S \rightarrow (L \cdot), L \rightarrow L \cdot, S \}$$

$$\text{Goto}(\mathcal{I}_2, S) = \text{closure}(L \rightarrow S \cdot)$$

$$\Rightarrow \boxed{\mathcal{I}_5} = \{ L \rightarrow S \cdot \}$$

$$\text{Goto}(\mathcal{I}_2, () = \text{closure}(S \rightarrow (\cdot L)) = \mathcal{I}_2$$

$$\text{Goto}(\mathcal{I}_2, a) = \text{closure}(S \rightarrow a \cdot) = \mathcal{I}_3$$

$$\text{Goto}(\mathcal{I}_4, () = \text{closure}(S \rightarrow (L) \cdot)$$

$$\Rightarrow \boxed{\mathcal{I}_6} = \{ S \rightarrow (L) \cdot \}$$

$$\text{Goto}(\mathcal{I}_4, S) = \text{closure}(L \rightarrow L \cdot, S)$$

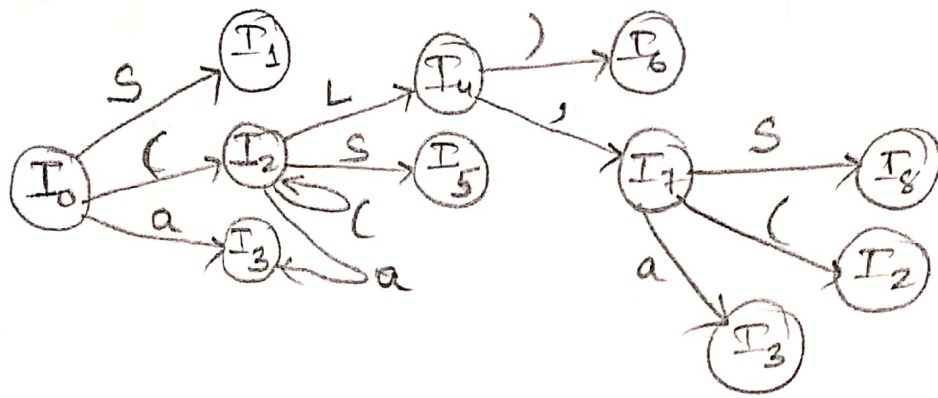
$$\Rightarrow \boxed{\mathcal{I}_7} = \{ L \rightarrow L \cdot, S \rightarrow \cdot (L), S \rightarrow \cdot a \}$$

$$\text{Goto}(\mathcal{I}_7, S) = \text{closure}(L \rightarrow L \cdot, S \cdot)$$

$$\Rightarrow \boxed{\mathcal{I}_8} = \{ L \rightarrow L \cdot, S \cdot \}$$

$$\text{Goto}(\mathcal{I}_7, () = \text{closure}(S \rightarrow (\cdot L)) = \mathcal{I}_2$$

$$\text{Goto}(\mathcal{I}_7, a) = \text{closure}(S \rightarrow a \cdot) = \mathcal{I}_3$$



State	ACTION					GOTO	
	(	)	a	,	\$	S	L
0	S2		S3			1	
1					Accept		
2	S2		S3			5	4
3		R2		R2	R2		
4		S6		S7			
5		R4		R4			
6		R1		R1	R1		
7	S2		S3			8	
8		R3		R3			