Compiler Design Name Jesse Shaihor, Jay Vang Cristian Salinas ……row…….

Assignment No. 5

1. (14 points) Given two languages **L1=(a+b)*a** and **L2=b(a+b)***. Find
   a. L1 union L2

   b. (10 points) L1L2 (concatenation of L1 and L2)

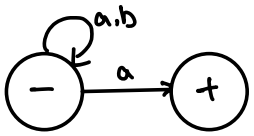
2. (16 points) Given **L1 = ab* and L2= a*b** , find L1 ∩ L2. Show all steps for full credit

3. (10 points) Given **L=ab* +b*a**. Find the complement of L

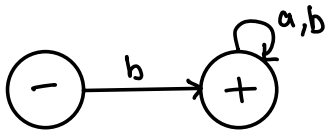
① $L1 = (a+b)^* a$ $\quad L2 = b(a+b)^*$

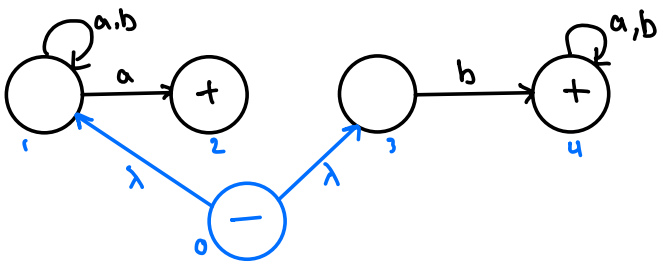
② $L1 \cup L2$

FA1:

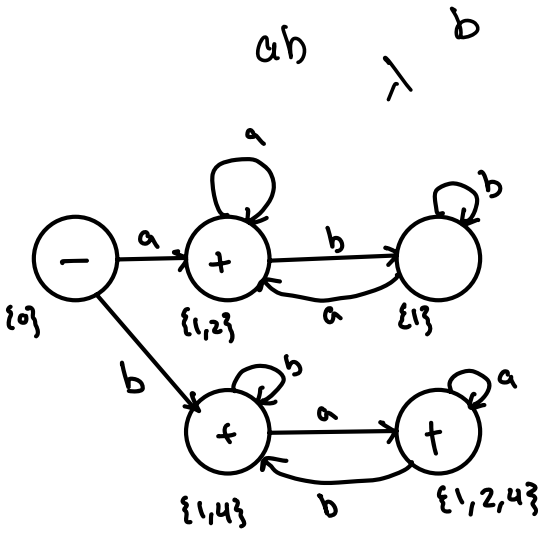


FA2





state \ input	a	b
{0}	{1,2}	{1,4}
{1}	{1,2}	{1}
{2}	{ }	{ }
{3}	{ }	{4}
{4}	{4}	{4}
{1,2}	{1,2}	{1}
{1,4}	{1,2,4}	{1,4}
{1,24}	{1,2,4}	{1,4}



$L = a^* b^* a + b^* a^* b$ $\quad a^* b^* + b^* a^* = (a+b)^*$

$= (a+b)^* (a+b)$

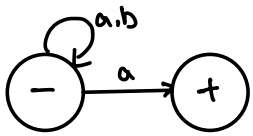
$= (a+b)^* a + (a+b)^* b$ $\quad (a+b)^* b = b(a+b)^*$

$\boxed{= (a+b)^* a + b(a+b)^*}$

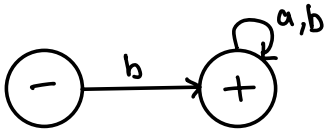
① $L1 = (a+b)^* a$ $\quad L2 = b(a+b)^*$

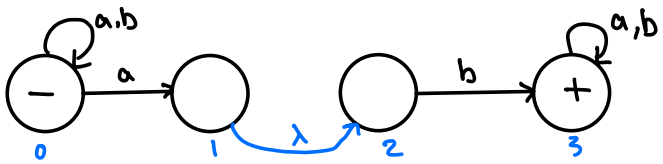
② (L1)(L2)

FA1:



FA2





state \ input	a	b
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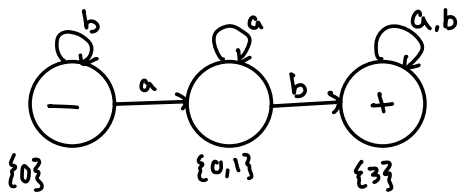
{2}	{ }	{3}
{3}	{3}	{3}
{0,1}	{0,1}	{3}



$L = b^* a a^* b(a+b)^*$

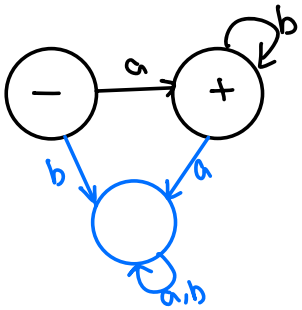
$= b^* a a^* b (a+b)^*$ $\quad aa^* = a^* a$

$= b^* a^* a b (a+b)^*$ $\quad b^* a^* (a+b)^* = (a+b)^*$

$= ab(a+b)^*$

② $L1 = ab^*$ $L2 = a^*b$

FA1:



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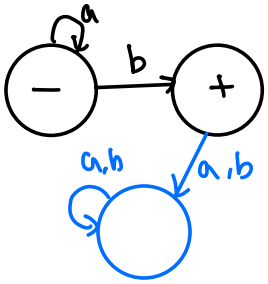

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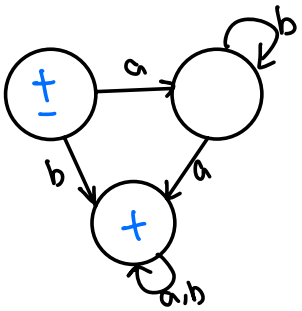

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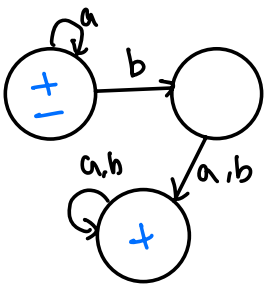
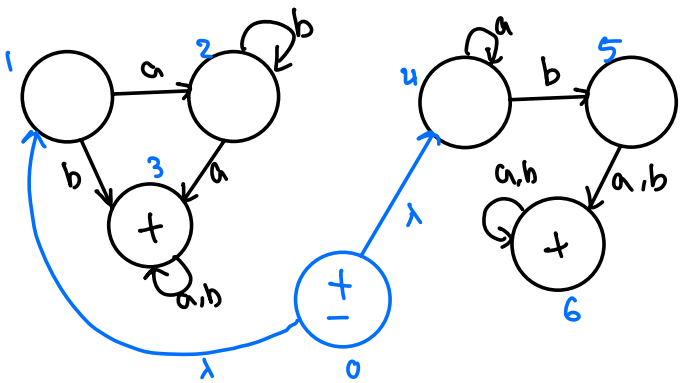


$\overline{FA1} \cup \overline{FA2}$



state \ input	a	b
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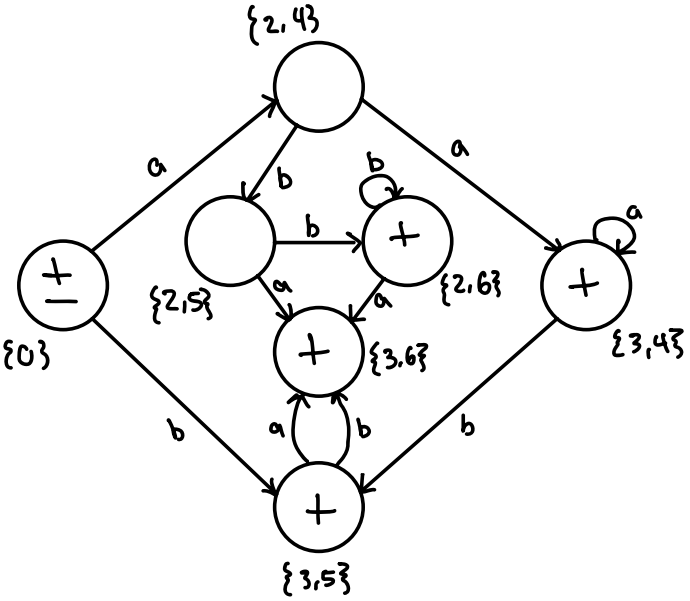
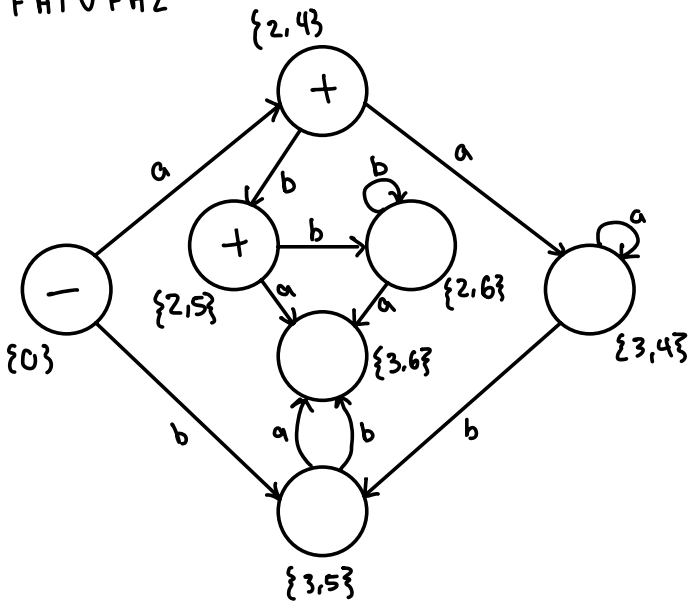
{3}	{3}	{3}
{4}	{4}	{5}
{5}	{6}	{6}
{6}	{6}	{6}
{2,4}	{3,4}	{2,5}
{3,5}	{3,6}	{3,6}
{3,4}	{3,4}	{3,5}
{2,5}	{3,6}	{2,6}
{3,6}	{3,6}	{3,6}
{2,6}	{3,6}	{2,6}



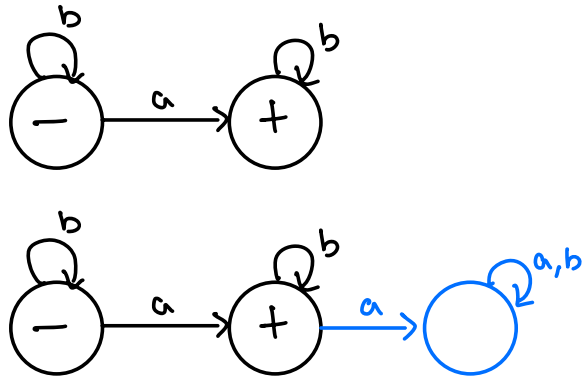
$\overline{\overline{FA1} \cup \overline{FA2}}$



$L = a + ab$

(3) $L = ab^* + b^*a$

FA:



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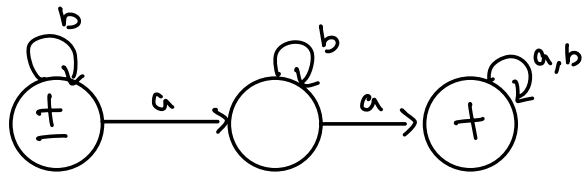

$\overline{L} = b^* + b^*ab^*a(a+b)^*$