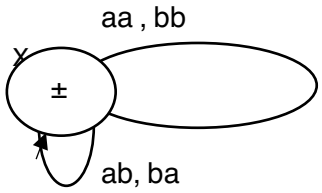
Complier Design Name Jesse Shaihar, Jay Vang row.....

Assignment No. 4 Cristian Salinas

1. (5 points)Find the language and its CFG of this FA

FA	CFG and Language
	$L = (a^2 + b^2 + ab + ba)^*$ CFG: $X \to a^2X$ $X \to baX$ $X \to b^2x$ $X \to \lambda$ $X \to abX$

2. (5 points) Given L = a*b*. Find the complement of L. Show all steps for full credit

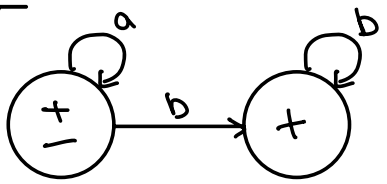
3. (10 points) Given CFG below which is not deterministic. Convert the CFG to a deterministic grammar.
   S → a B | b A
   B → b B | b A | λ
   A → a A| aB

4. (5 points) Remove λ from this CFG
   S → XYZ
   X → aX | bX | λ
   Y → aY | bY | λ
   Z → aZ | λ

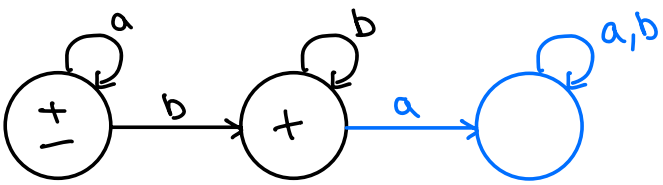
5. (5 points) Remove the unit production from this CFG
   S → aX | Yb
   X → S
   Y → bY | b

② Given $L = a^*b^*$

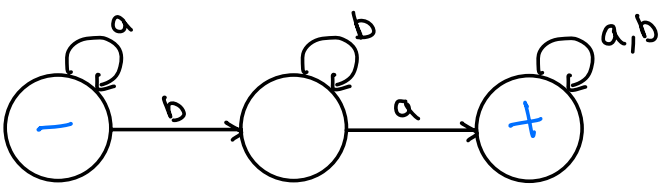
step1



step2



step3

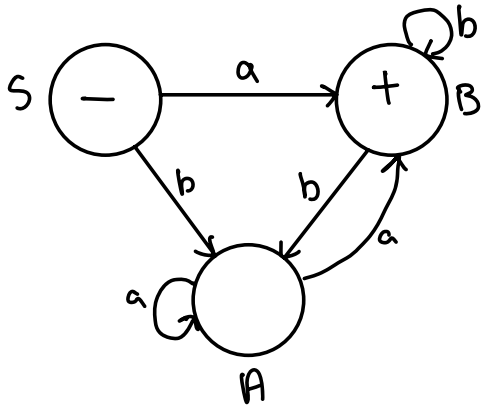


$\bar{L} = a^*bb^*a(a+b)^*$

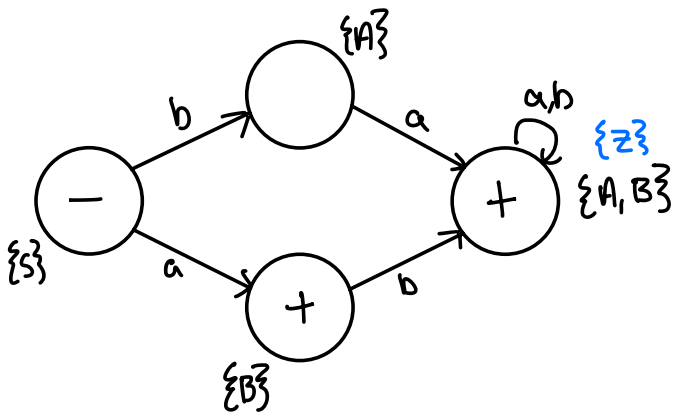
③ Given $S \to aB \mid bA$

$B \to bB \mid bA \mid \lambda$

$A \to aA \mid aB$



state \ input	a	b
{S}	{B}	{A}
{A}	{A,B}	{ }
{B}	{ }	{A,B}
{Z} {A,B}	{A,B}	{A,B}



CFG:

$S \to aB \mid bA$

$A \to aZ$

$B \to bZ \mid \lambda$

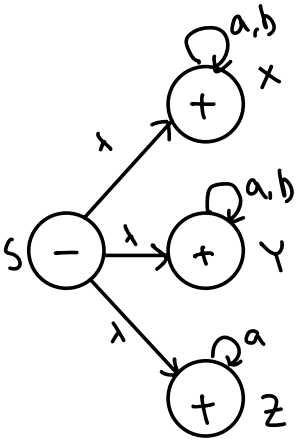
$Z \to aZ \mid bZ \mid \lambda$

④ Given $S \to XYZ$

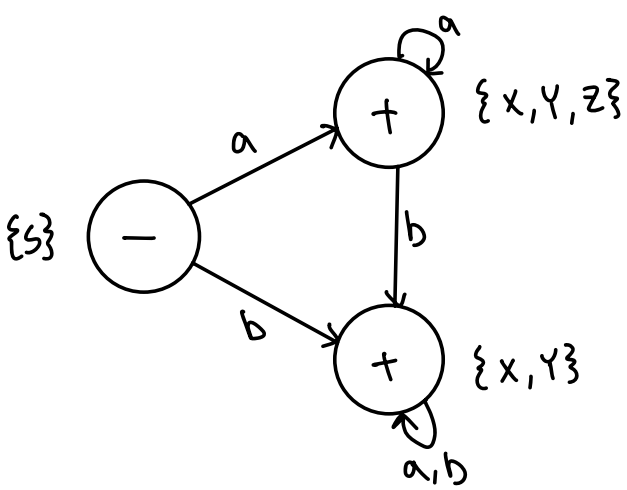
$X \to aX \mid bX \mid \lambda$

$Y \to aY \mid bY \mid \lambda$

$Z \to aZ \mid \lambda$



state \ input	a	b
{S}	{X,Y,Z}	{X,Y}
{X}	{X}	{X}
{Y}	{Y}	{Y}
{Z}	{Z}	{}
{X,Y}	{X,Y}	{X,Y}
{X,Y,Z}	{X,Y,Z}	{X,Y}



⑤ Given $S \to aX \mid Yb$
$X \to S$
$Y \to bY \mid b$

$X \to S \to Y$

$Y \to b$

$S \to S$ (a, b)

$X \to S$

$S \to a \mid b$
$X \to a \mid b$
$Y \to b$