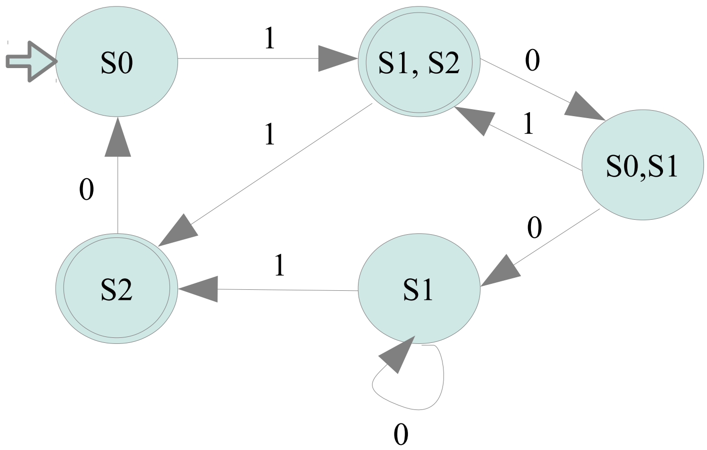
Exercice 1

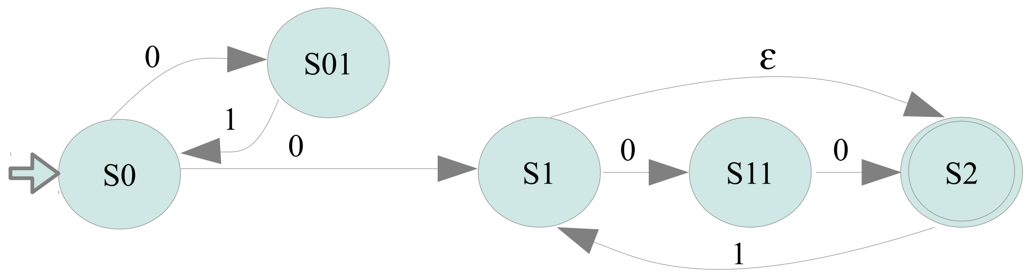
	0	1
{S0}	/	{S1,S2}
{S1,S2}	{S0,S1}	{S2}
{S0,S1}	{S1}	{S1,S2}
{S2}	{S0}	/
{S1}	{S1}	{S2}



Exercice 2

1.

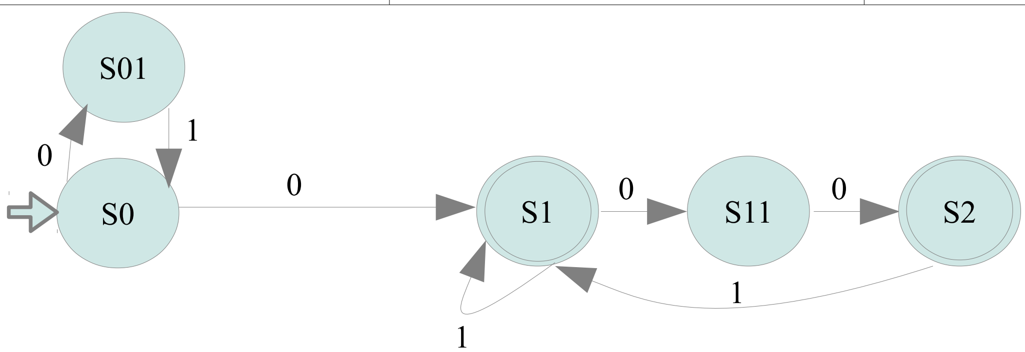
Étape 1: décomposition des transitions complexes



Étape 2: Élimination des ε transitions

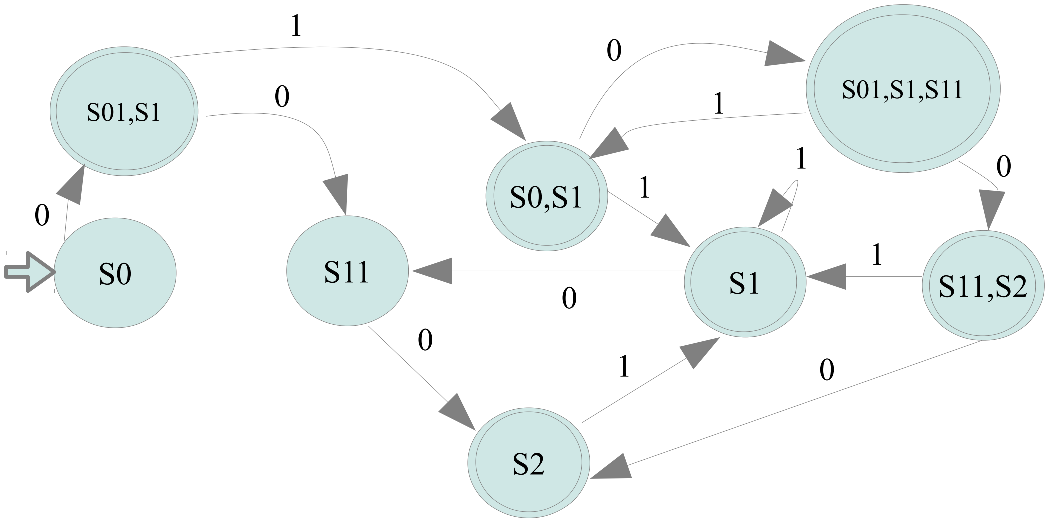
ε-fermeture(S0)={S0} , ε-fermeture(S01)={S01} , ε-fermeture(S1)={S1,S2} , ε-fermeture(S11)={S11}
ε-fermeture(S2)={S2}

	0	1
S0	S01, S0	/
S01	/	S0
S1	S11	S1
S11	S2	S1



Étape 3: : l'automate déterministe correspondant

	0	1
S0	{S01, S1}	/
{S01, S1}	S11	{S0, S1}
{S0, S1}	{S01, S1, S11}	S1
{S01, S1, S11}	{S11, S2}	{S0, S1}
S1	S11	S1
S11	S2	/
{S11, S2}	S2	S1
S2	/	S1



2ème méthode

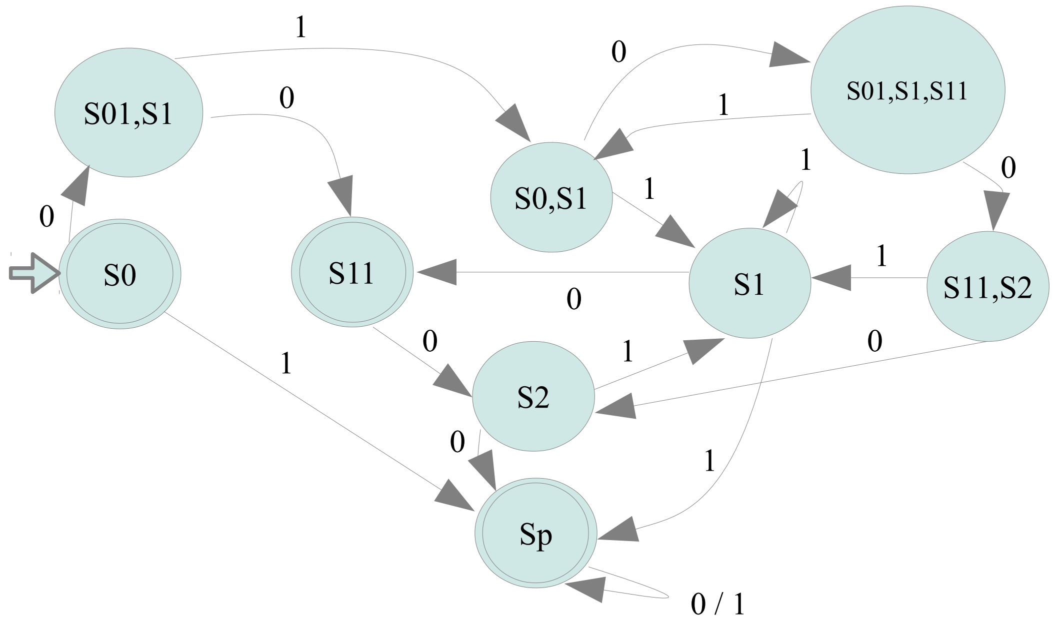
On applique les transitions ensuite la fermeture pour chaque état

	0	1
S0	{S01,S1,S2}	/
{S01,S1,S2}	S11	{S0,S1,S2}
{S0,S1,S2}	{S01,S1,S11,S2}	{S1,S2}
{S01,S1,S11,S2}	{S11,S2}	{S0,S1,S2}
{S1,S2}	S11	{S1,S2}
{S11,S2}	S2	{S1,S2}
S11	S2	/
S2	/	{S1,S2}

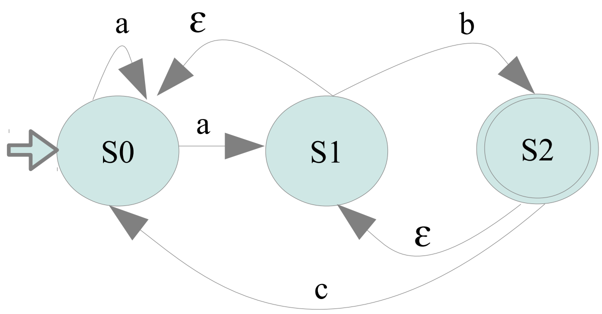
2.

- on ajoute un état puits Sp
- on ajoute les transition {(S0,1,Sp), (S1,1,Sp), (S2,0,Sp)}

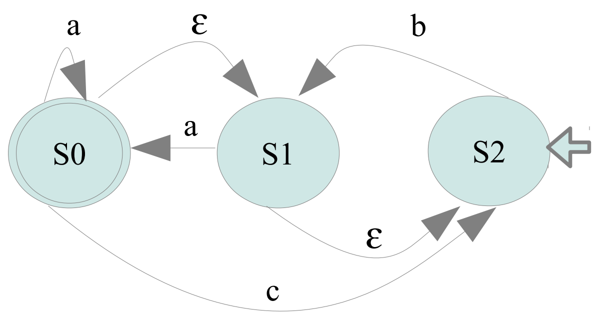
3.



Exercice 3
1. Automate A

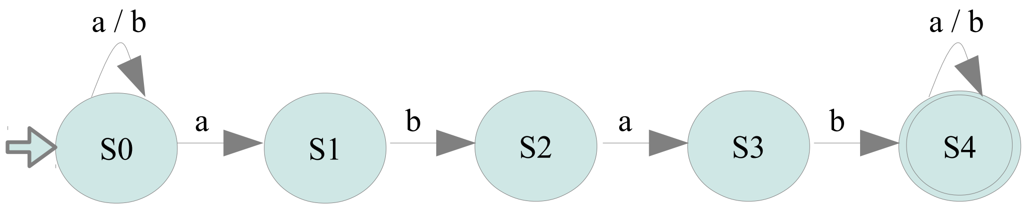


2. Automate B

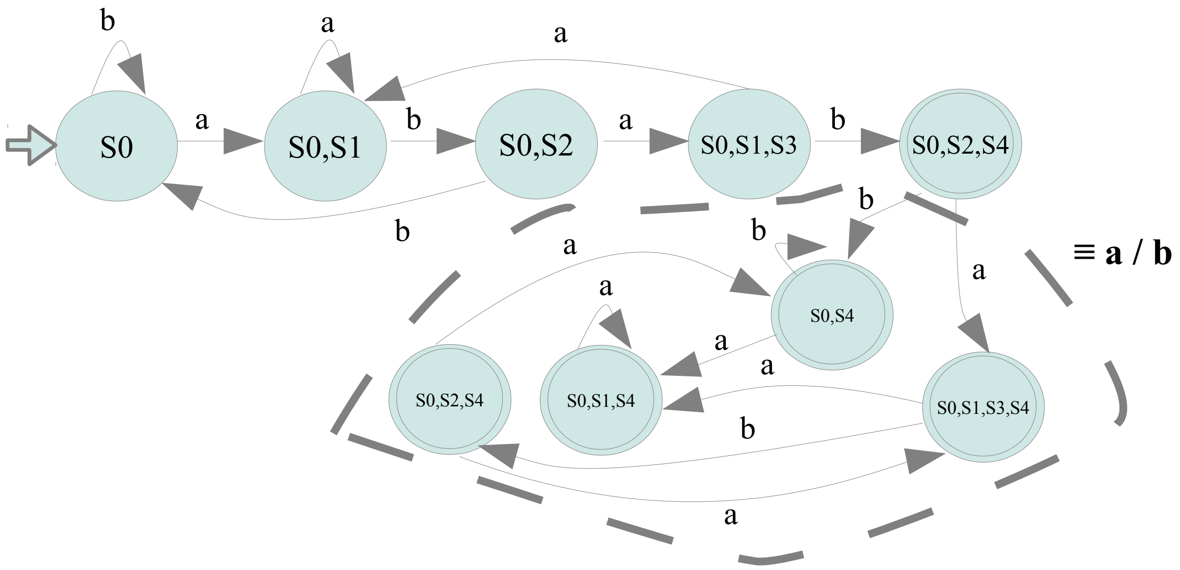


Exercice 4

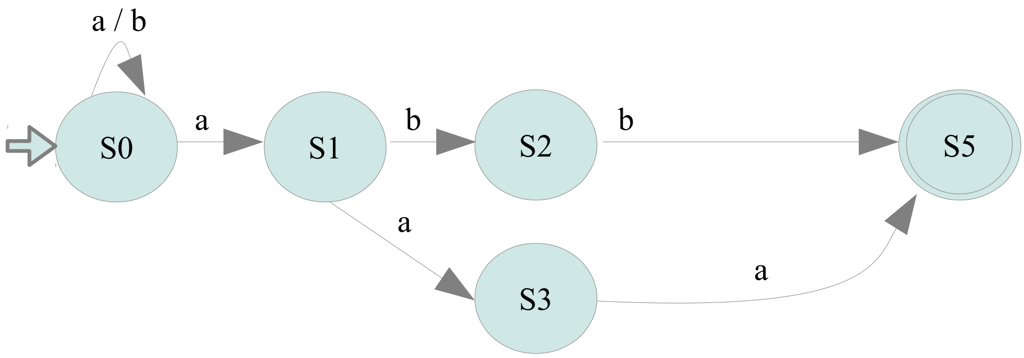
1.



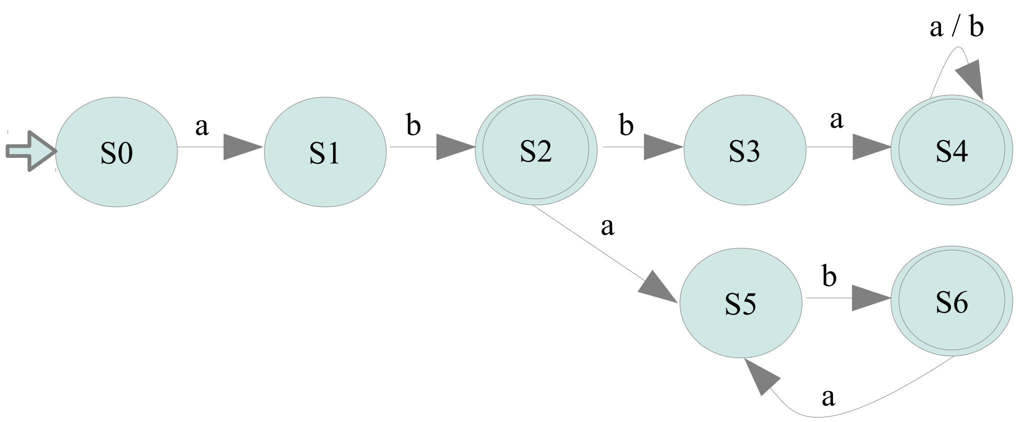
	a	b
S0	{S0,S1}	S0
{S0,S1}	{S0,S1}	{S0,S2}
{S0,S2}	{S0,S1,S3}	S0
{S0,S1,S3}	{S0,S1}	{S0,S2,S4}
{S0,S2,S4}	{S0,S1,S3,S4}	{S0,S4}
{S0,S4}	{S0,S1,S4}	{S0,S4}
{S0,S1,S3,S4}	{S0,S1,S4}	{S0,S2,S4}
{S0,S1,S4}	{S0,S1,S4}	{S0,S2,S4}



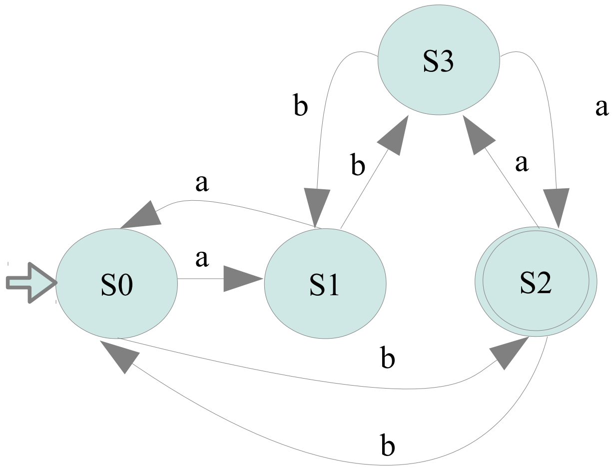
2.



3.

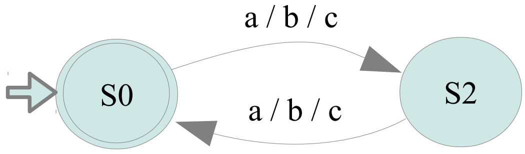


4.



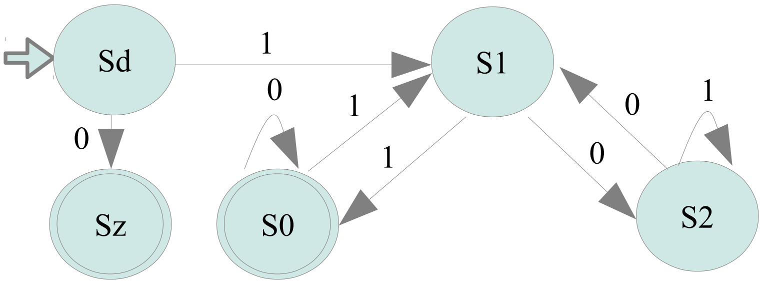
5.

	0≡[2] A	1≡[2] B
A		a,b,c
B	a,b,c	



Exercice 5

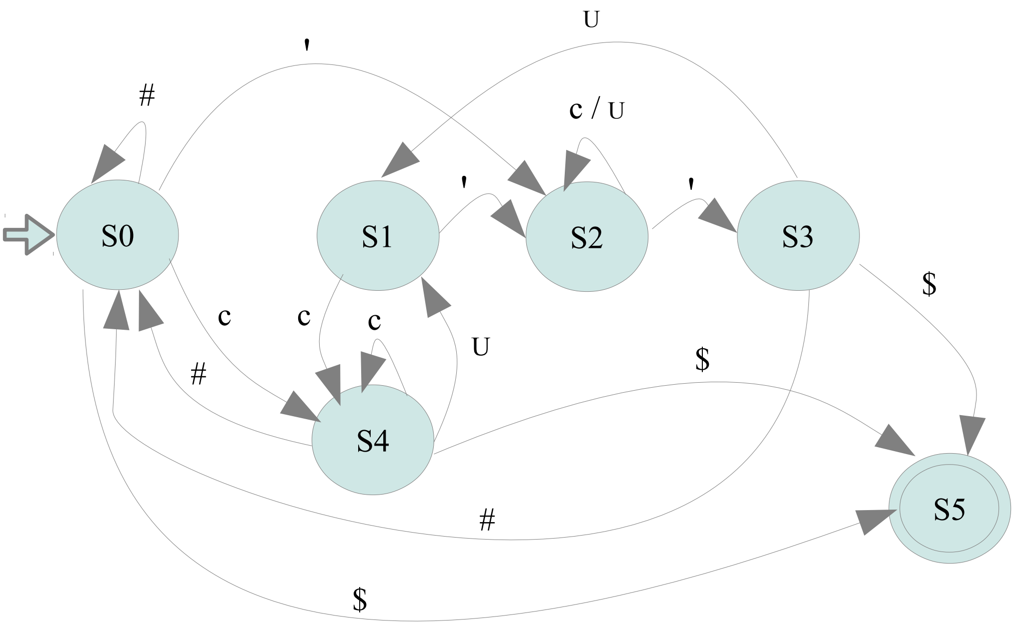
1.



2. $A<X, (S_0,\dots,S_{p-1},S_d,S_z\}, S_d, (S_0,S_z\}, II>$

$II=\{ (S_d , 0 , S_z) ; (S_d ,1 , S_1) ;(S_i , 0 , S_{(2i\equiv[p])}) ; (S_i ,1 , (S_{(2i+1\equiv[p])})\}$ avec $p > i \geq 0$

Exercice 6

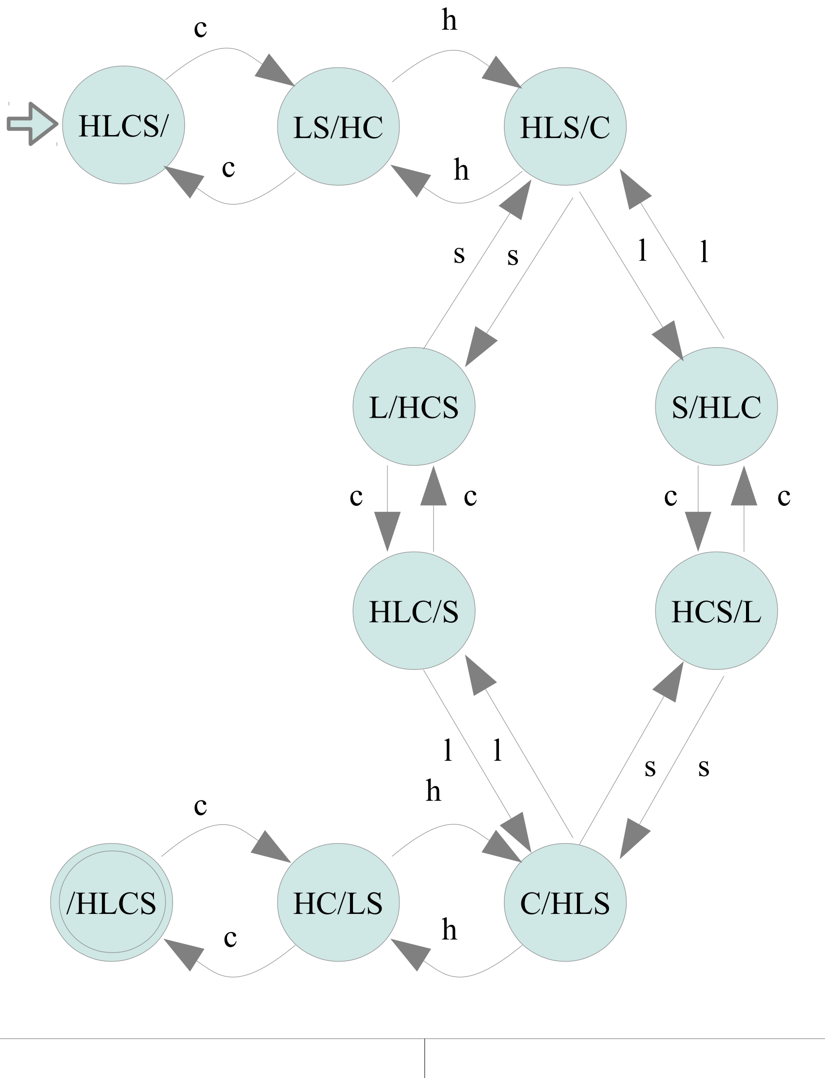


Exercice 7

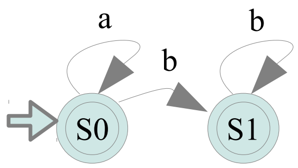
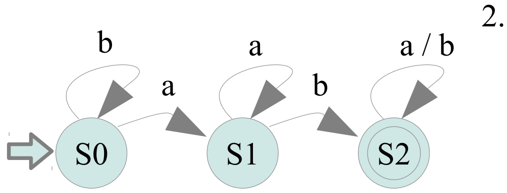
Notation des états
'H' pour Homme, 'L' pour Loup, 'C' pour Chèvre et 'S' pour Salade
'/ ' pour déterminer la position sur les rives

Notation des conditions
'h' lorsque l'homme traverse seul,
'l' lorsque l'homme et le loup traversent
'c' lorsque l'homme et la chèvre traversent
's' lorsque l'homme et la salade traversent

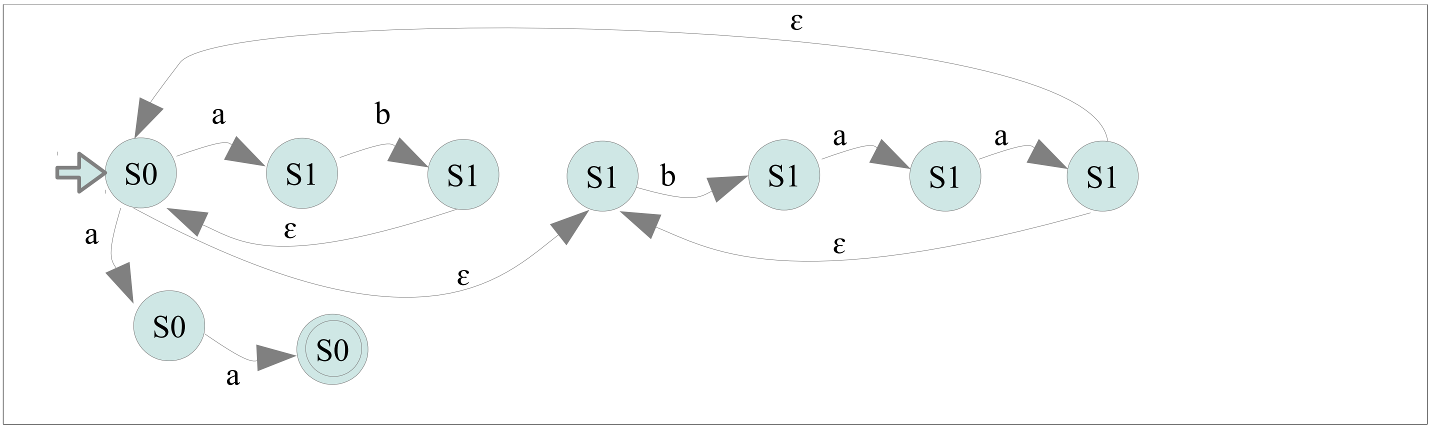
10 états autorisés : HLCS/, LS/HC, HLS/C, S/HLC, L/HCS, HCS/L, HLC/S, C/HLS, HC/LS et /HLCS
6 états interdits : LC/HS, HS/LC, HL/CS, CS/HL, CLS/H et H/CLS



Exercice 8

1.  a*b* || a = a*b* a*b* || b = b* b* || a = ∅ b* || b = b*	2.  X*abX* || a = X*abX* ∪ bX* X*abX* || b = X*abX* (X*abX* ∪ bX*) || a = X*abX* ∪ bX* (X*abX* ∪ bX*) || b = X* X* || a = X* X* || b = X*

3. 1[ere] méthode



2ème méthode

((ab)*(baa)*)*aa

((a1b2)*(b3a4a5)*)*a6a7

begin={a1,b3,a6}   end={a7}

	a	b
0	{a1, a6}	{b3}
1	∅	{b2}
2	{a1, a6}	{b3}
3	{a4}	∅
4	{a5}	∅
5	{a1, a6}	{b3}
6	{a7}	∅
7	∅	∅

3ème méthode

((ab)*(baa)*)*aa || a = b(ab)*(baa)*((ab)*(baa)*)*aa | a
((ab)*(baa)*)*aa || b = aa(baa)*((ab)*(baa)*)*aa
q0

b((ab)*(baa)*)$^+$aa | a || a = ε
b((ab)*(baa)*)$^+$aa | a || b = ((ab)*(baa)*)$^+$aa
q1

aa(baa)*((ab)*(baa)*)*aa || a = a(baa)*((ab)*(baa)*)*aa
aa(baa)*((ab)*(baa)*)*aa || b = ∅
q2

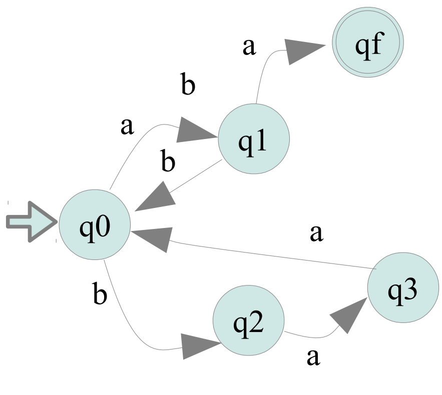
a(baa)*((ab)*(baa)*)*aa || a = (baa)*((ab)*(baa)*)*aa
a(baa)*((ab)*(baa)*)*aa || b = ∅
q3

(baa)*((ab)*(baa)*)*aa || a = b((ab)*(baa)*)$^+$aa | a
(baa)*((ab)*(baa)*)*aa || b = aa(baa)*((ab)*(baa)*)*aa
q4

((ab)*(baa)*)$^+$aa || a = b((ab)*(baa)*)$^+$aa | a
((ab)*(baa)*)$^+$aa || b = aa(baa)*((ab)*(baa)*)*aa
q5

((ab)*(baa)*)$^+$aa ≡ ((ab)*(baa)*)*aa
(baa)*((ab)*(baa)*)*aa ≡ ((ab)*(baa)*)*aa
remplace q5 et q4 avec q0 dans le tableau

	a	b
q0	q1	q2
q1	qf	q5
q2	q3	∅
q3	q4	∅
q4	q1	q5
q5	q1	q2



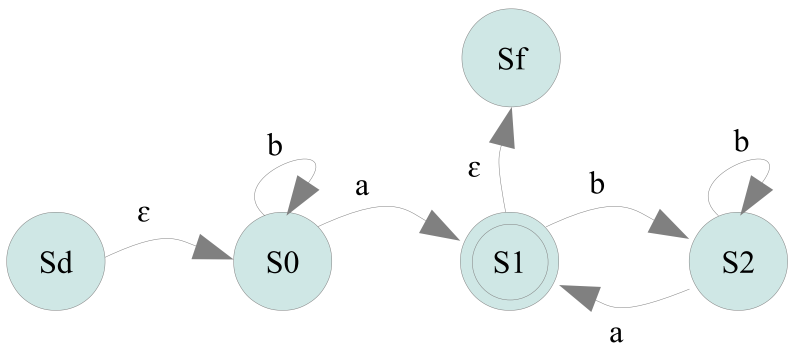
Exercice 9

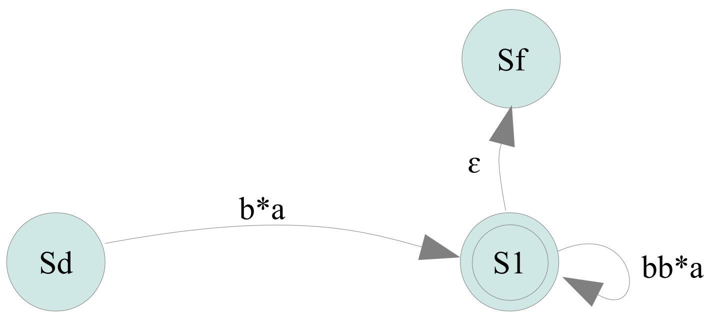
a.

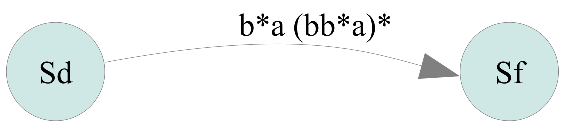
1ère méthode

L0=bL0 ∪ aL1 L1=bL2 ∪ ε L2=bL2 ∪ aL1	L2=bL2 ∪ a(bL2 ∪ ε) L2=bL2 ∪ abL2 ∪ a L2=(b ∪ ab)L2 ∪ a L2=(b ∪ ab)*a	L1=bL2 ∪ ε L1=b((b ∪ ab)*a) ∪ ε L0=bL0 ∪ a(b((b ∪ ab)*a) ∪ ε)	L0=b*a(b((b ∪ ab)*a) ∪ ε) L0=b*a b(b ∪ ab)*a ∪ b*a

2ème méthode







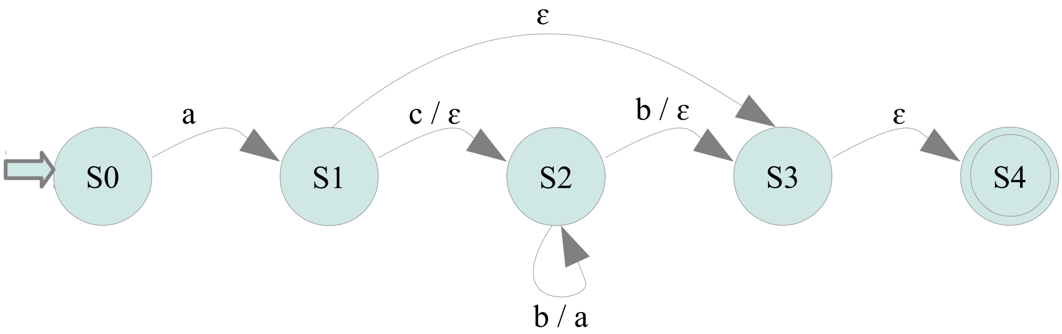
b.

L0=cL0 ∪ aL1 L1=(a ∪ b)L1 ∪ bL0 ∪ cL2 L2=aL3 ∪ ε L3=bL1	L0=c*aL1 L1=(a ∪ b)L1 ∪ bc*aL1 ∪ cL2 L1=(a ∪ b ∪ bc*a)L1 ∪ cL2 L1=(a ∪ b ∪ bc*a)*cL2	L2=aL3 ∪ ε L3=b(a ∪ b ∪ bc*a)*cL2 L3=b(a ∪ b ∪ bc*a)*c(aL3 ∪ ε) L3=b(a ∪ b ∪ bc*a)*c(aL3 ∪ ε) L3=b(a ∪ b ∪ bc*a)*caL3 ∪ b(a ∪ b ∪ bc*a)*c L3=(b(a ∪ b ∪ bc*a)*ca)*b(a ∪ b ∪ bc*a)*c
L3=(b(a ∪ b ∪ bc*a)*ca)*b(a ∪ b ∪ bc*a)*c L2=aL3=a((b(a ∪ b ∪ bc*a)*ca)*b(a ∪ b ∪ bc*a)*c) L1=(a ∪ b ∪ bc*a)* ∪ cL2=(a ∪ b ∪ bc*a)* ∪ ca((b(a ∪ b ∪ bc*a)*ca)*b(a ∪ b ∪ bc*a)*c) L0=c*a((a ∪ b ∪ bc*a)* ∪ ca((b(a ∪ b ∪ bc*a)*ca)*b(a ∪ b ∪ bc*a)*c))		

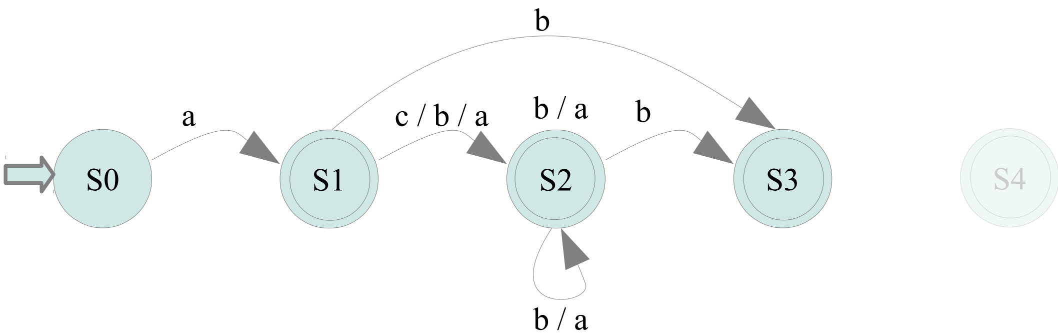
c.

L0=aL1 ∪ bL2 L1=bL2 L2=aL1 ∪ ε	L0=aL1 ∪ bL2 L1=bL2 L2=abL2 ∪ ε	L2=(ab)* L1=b(ab)* L0=ab(ab)* ∪ b(ab)*=(ab ∪ b)(ab)*

Exercice : élimination transitions spontanées



élimination transitions spontanées arrière en utilisant Ɛ-fermeture



élimination transitions spontanées avant