

### Exercice 1

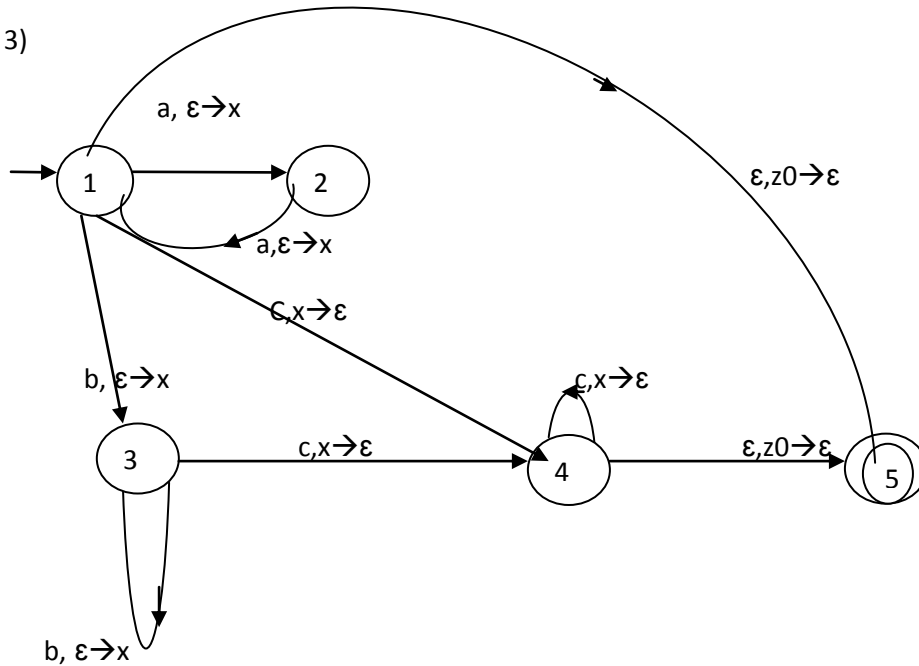
1)

$S \rightarrow aaSc|bAc|\epsilon$

$A \rightarrow bAc|\epsilon$

2)  $S \rightarrow aaSc \rightarrow aabSc \rightarrow aabccc$

3)



4)  $(1, aabccc, z0) \vdash (2, abccc, xz0) \vdash (1, bccc, xxz0) \vdash (3, ccc, xxxz0) \vdash (4, cc, xxz0) \vdash (4, c, xz0) \vdash (4, \epsilon, z0) \vdash (5, \epsilon, \epsilon)$

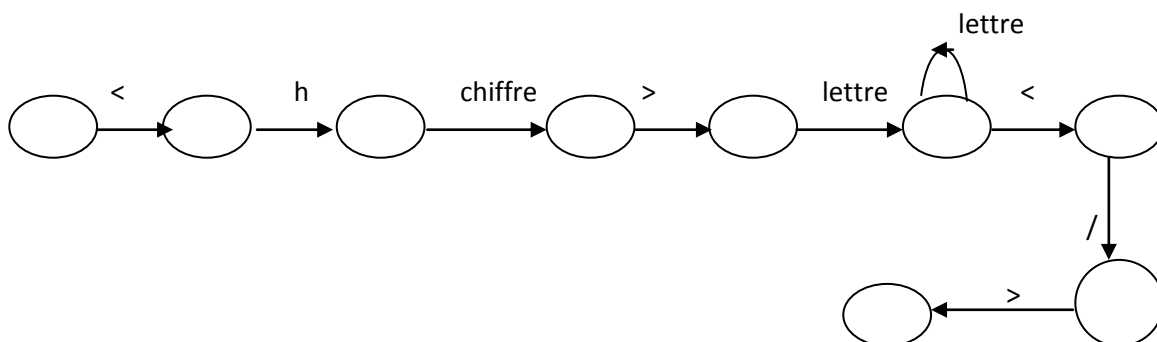
### Exercice 2 :

Balise  $\rightarrow '<' 'h' \text{ chiffre } '>' \text{ texte } '<' '/' 'h' \text{ chiffre } '>'$

Chiffre  $\rightarrow 1|2|3|4|5|6$

Texte  $\rightarrow (\text{lettre})^+$

Lettre  $\rightarrow [a-z|A-Z]$



Exercice 3 :

$$S \rightarrow SxAS \mid y$$

$$A \rightarrow yxSA \mid ySA \mid x \mid y \mid \epsilon$$

1)

$$S \rightarrow SxAS \rightarrow yxAS \rightarrow yxySAS \rightarrow yxyyAS \rightarrow yxyyySAS \rightarrow yxyyyyxy$$

2)

$$S \rightarrow yS'$$

$$S' \rightarrow xASS' \mid \epsilon$$

$$A \rightarrow yxSA \mid ySA \mid x \mid y \mid \epsilon$$

3)

$$S \rightarrow yS'$$

$$S' \rightarrow xASS' \mid \epsilon$$

$$A \rightarrow yA' \mid x \mid \epsilon$$

$$A' \rightarrow xSA \mid SA \mid \epsilon$$

Exercice 4:

1)

$$P(S) = \{ \{ \} \}$$

$$P(C) = \{ \{ \} + pr(C') \{, id, int, float, \epsilon \}$$

$$P(C') = p(A) / \{ \epsilon \} + p(D) / \{ \epsilon \} + \{ \epsilon \} = \{ id, int, float, \epsilon \}$$

$$P(A) = p(B) / \{ \epsilon \} = \{ id \}$$

$$P(D) = \{ int, float \}$$

$$P(B) = \{ id \}$$

$$P(E) = p(B) / \{ \epsilon \} = \{ id \}$$

$$P(E') = \{ +, -, \epsilon \}$$

$$S(S) = \{ \$ \}$$

$$S(C) = \{ \{ \} \}$$

$$S(C') = suiv(C) + suiv(C') = \{ \{ \} \}$$

$S(A) = pr(C') \setminus \{\epsilon\} + suiv(C') = \{ id, int, float, , \}$

$S(D) = pr(C') \setminus \{\epsilon\} + suiv(C') = \{ id, int, float, , \}$

$S(B) = \{=\} + \{;\} + p(E') \setminus \{\epsilon\} + suiv(E) + suiv(E') = \{=, ;, +, -, \}$

$S(E) = \{;\}$

$S(E') = suiv(E) + suiv(E') = \{;\}$

2)

	{	}	id	int	float	;	+	=	-	\$
S	$S \rightarrow \{C\}$									
C	$C \rightarrow \{C\}C'$	$C \rightarrow \epsilon$	$C \rightarrow C'$	$C \rightarrow C'$	$C \rightarrow C'$					
C'		$C' \rightarrow \epsilon$	$C \rightarrow AC'$	$C' \rightarrow DC'$	$C \rightarrow DC'$					
A			$A \rightarrow B=E;$							
B			$B \rightarrow id$							
D				$D \rightarrow int B;$	$D \rightarrow float B;$					
E			$E \rightarrow BE'$							
E'						$E' \rightarrow \epsilon$	$E' \rightarrow + B E'$		$E' \rightarrow - B E'$	

3)

Pile	Entrée	Sortie
$\$S$	$\{int\ id; id=id+id;\}\$$	
$\$ \{C\}$	$\{int\ id; id=id+id;\}\$$	$S \rightarrow \{C\}$
$\$ \{C\}$	$int\ id; id=id+id;\}\$$	$C \rightarrow C'$
$\$ \{C\}$	$int\ id; id=id+id;\}\$$	$C' \rightarrow DC'$
$\$ \{C\}D$	$int\ id; id=id+id;\}\$$	$D \rightarrow int\ B;$
$\$ \{C\}; B\ int$	$int\ id; id=id+id;\}\$$	
$\$ \{C\}; B$	$id; id=id+id;\}\$$	$B \rightarrow id$
$\$ \{C\}; id$	$id; id=id+id;\}\$$	
$\$ \{C\};$	$; id=id+id;\}\$$	
$\$ \{C\}$	$id=id+id;\}\$$	$C' \rightarrow AC'$
$\$ \{C\}A$	$id=id+id;\}\$$	$A \rightarrow B=E;$
$\$ \{C\}; E=B$	$id=id+id;\}\$$	$B \rightarrow id$
$\$ \{C\}; E=id$	$id=id+id;\}\$$	
$\$ \{C\}; E=$	$=id+id;\}\$$	
$\$ \{C\}; E$	$id+id;\}\$$	$E \rightarrow BE'$
$\$ \{C\}; E'B$	$id+id;\}\$$	$B \rightarrow id$
$\$ \{C\}; E'id$	$id+id;\}\$$	$E' \rightarrow +BE'$
$\$ \{C\}; E'B+$	$+id;\}\$$	
$\$ \{C\}; E'B$	$id;\}\$$	$B \rightarrow id$
$\$ \{C\}; E'id$	$id;\}\$$	
$\$ \{C\}; E'$	$;\}\$$	$E' \rightarrow \epsilon$

\$)C';	;) \$	
\$)C'	) \$	$C' \rightarrow \epsilon$
\$)	) \$	
\$	\$	

- 4)  $S \rightarrow \{C\} \rightarrow \{C'\} \rightarrow \{DC'\} \rightarrow \{\text{int } B; C'\} \rightarrow \{\text{int id}; C'\} \rightarrow \{\text{int id}; AC'\} \rightarrow \{\text{int id}; B=E; C'\} \rightarrow \{\text{int id}; \text{id}=E; C'\} \rightarrow \{\text{int id}; \text{id}=BE'; C'\} \rightarrow \{\text{int id}; \text{id}=\text{id}E'; C'\} \rightarrow \{\text{int id}; \text{id}=\text{id}+BE'; C'\} \rightarrow \{\text{int id}; \text{id}=\text{id}+\text{id}E'; C'\} \rightarrow \{\text{int id}; \text{id}=\text{id}+\text{id}; C'\} \rightarrow \{\text{int id}; \text{id}=\text{id}+\text{id};\}$