Automata và Ngôn ngữ hình thức – Weekly Exercise 10

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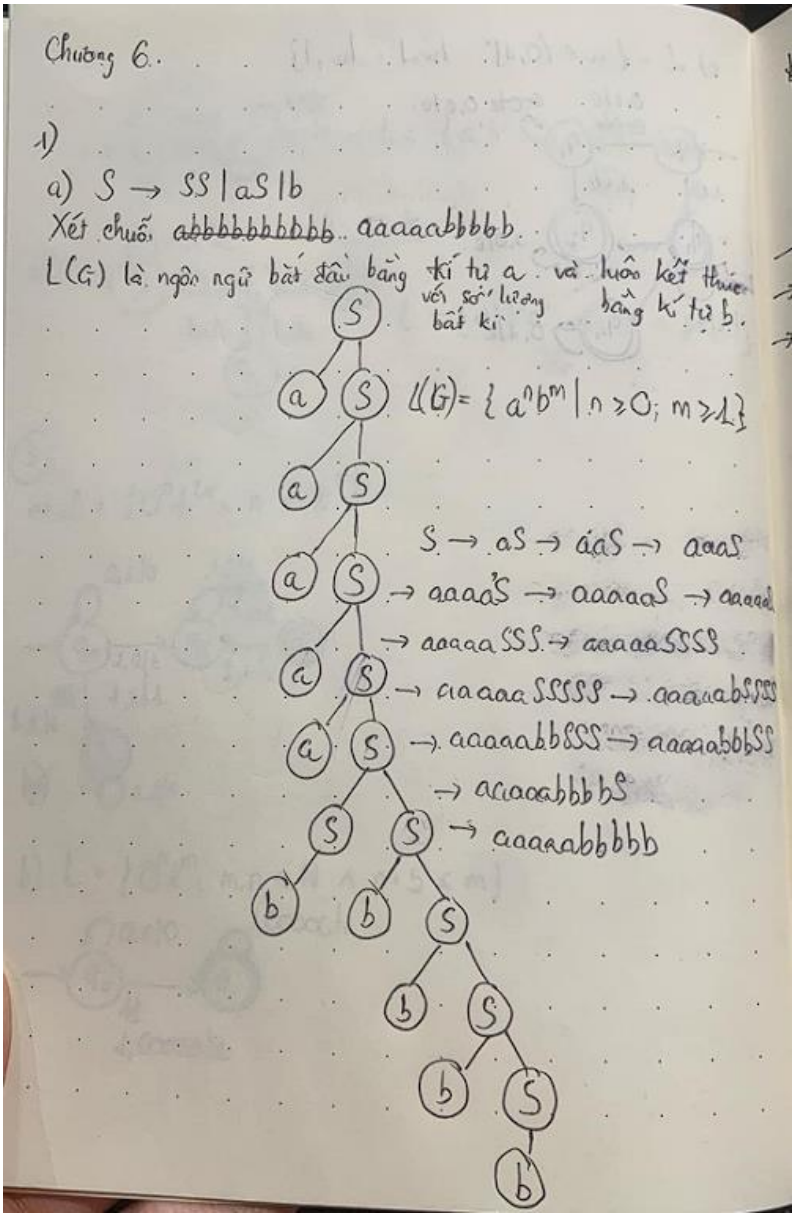
Sinh viên thực hiện: 21127329 – Châu Tấn Kiệt

Bài 1:



c) $S \rightarrow aS \mid aSbS \mid \epsilon$.

$L(G) = \{ w \in \{a,b\}^* \mid |w|_a \geq |w|_b \}$

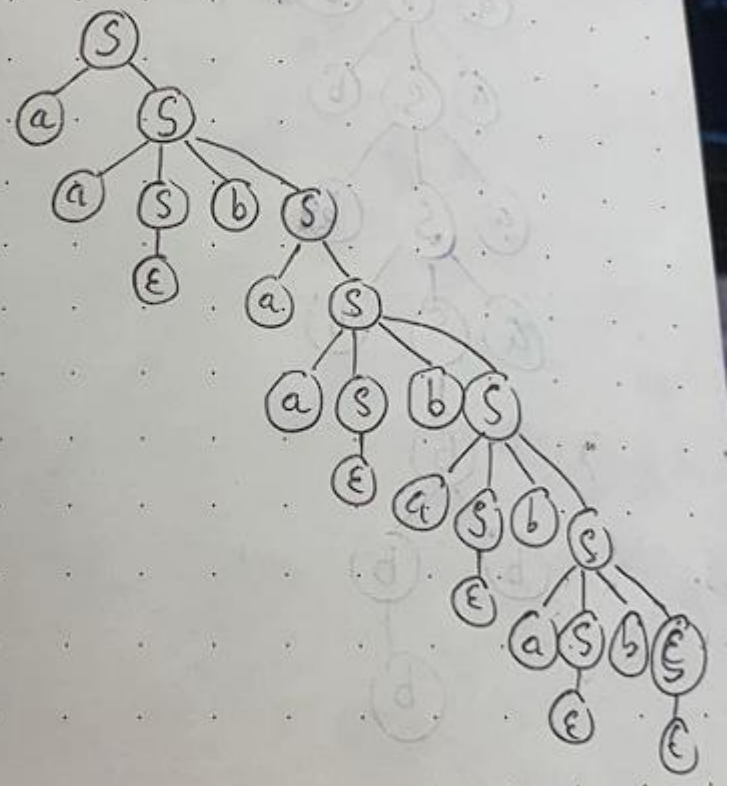
Xét chuỗi aababaabab

$S \rightarrow aS \rightarrow aaSbS \rightarrow aaSbaS \rightarrow aaSbaaSbS$

$\rightarrow aaSbaaSbaSbS \rightarrow aaSbaaSbaSbaSbS$

$\rightarrow aabaaSbaSbaSbS \rightarrow aababaaSbaSbS \rightarrow aababaababS$

$\rightarrow aababaabab.$



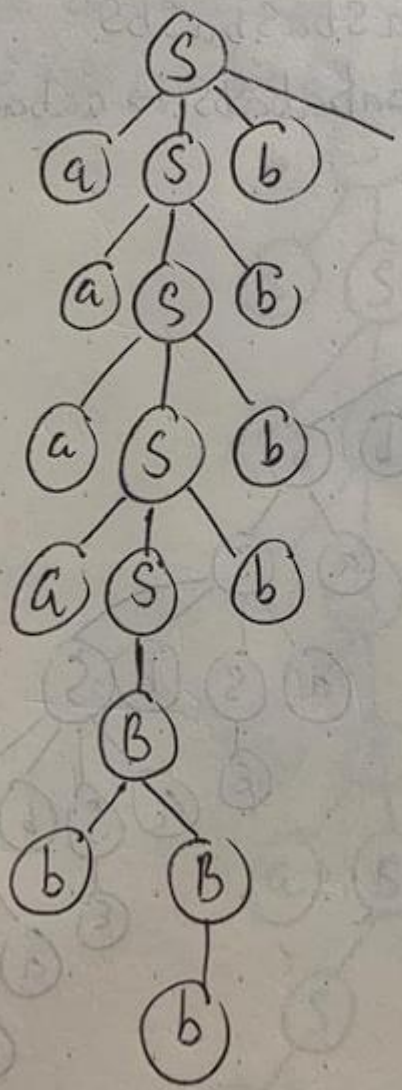
d) $S \rightarrow aSb \mid B$, $B \rightarrow bB \mid b$.

$L(G) = \{a^i b^j : i \geq 0; j \geq 1\}$.

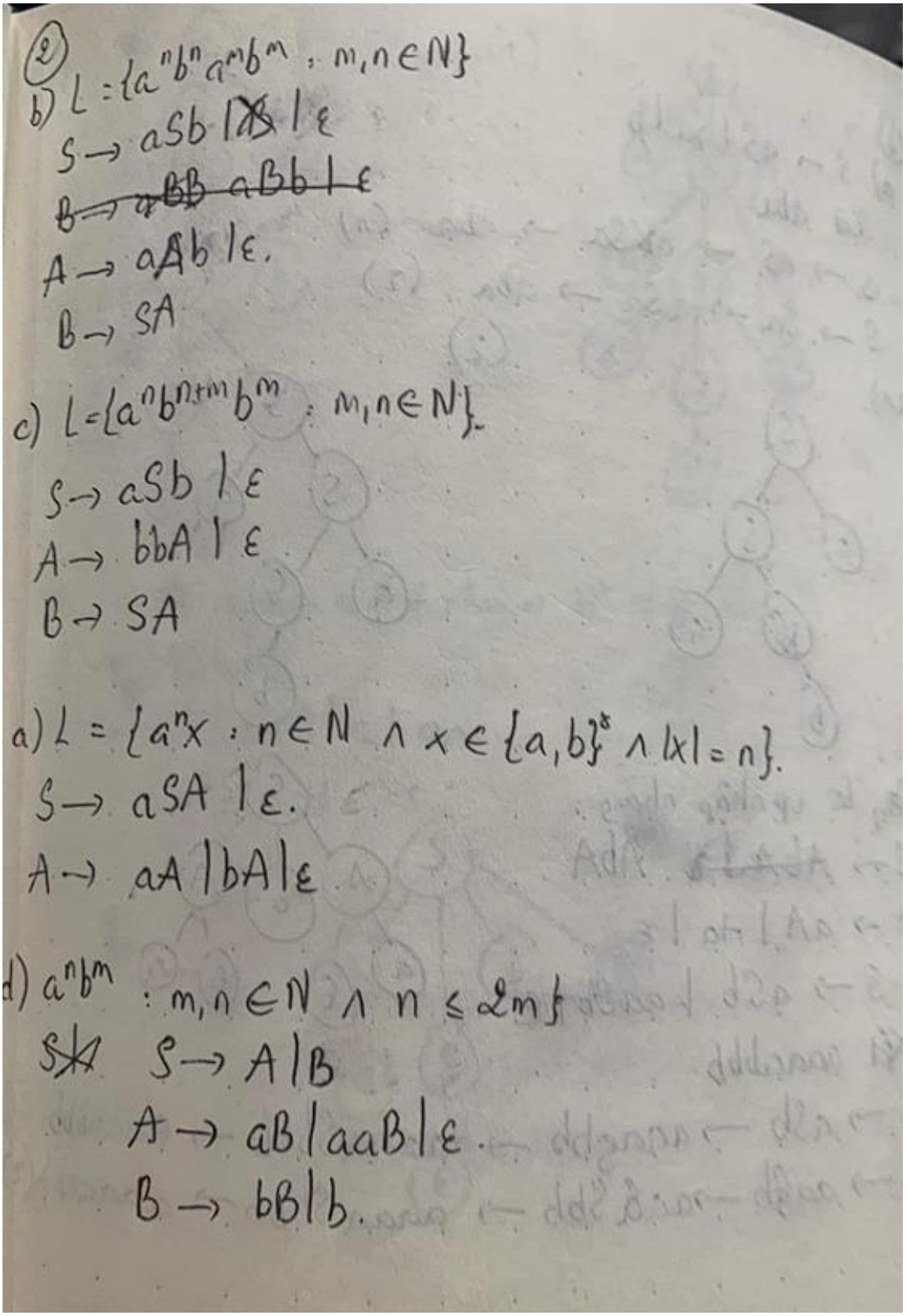
Xét chuỗi aaaabbbbbb:

$S \rightarrow aSb \rightarrow aaSbb \rightarrow aaaSbbb \rightarrow aaaaSbbbb$

$\rightarrow aaaaBbbbb \rightarrow aaaaBBbbbb \rightarrow aaaabbbbbb$.



Bài 2:


② b) $L = \{a^n b^n a^m b^m : m, n \in N\}$
$S \to aSb \mid \varepsilon$
$B \to aBb \mid \varepsilon$
$A \to aAb \mid \varepsilon$.
$B \to SA$
c) $L = \{a^n b^{n+m} b^m : m, n \in N\}$.
$S \to aSb \mid \varepsilon$
$A \to bbA \mid \varepsilon$
$B \to SA$
a) $L = \{a^n x : n \in N \wedge x \in \{a,b\}^* \wedge |x| = n\}$.
$S \to aSA \mid \varepsilon$.
$A \to aA \mid bA \mid \varepsilon$
d) $a^n b^m : m, n \in N \wedge n \leq 2m\}$
$S \to A \mid B$
$A \to aB \mid aaB \mid \varepsilon$.
$B \to bB \mid b$.

Bài 3:

(3)

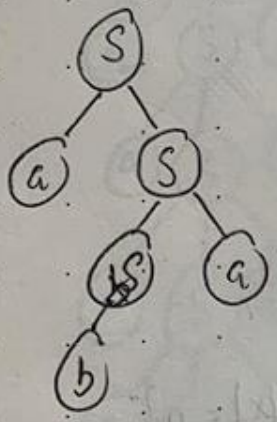
a) $S \to aS \mid Sa \mid b$

Xét aba:

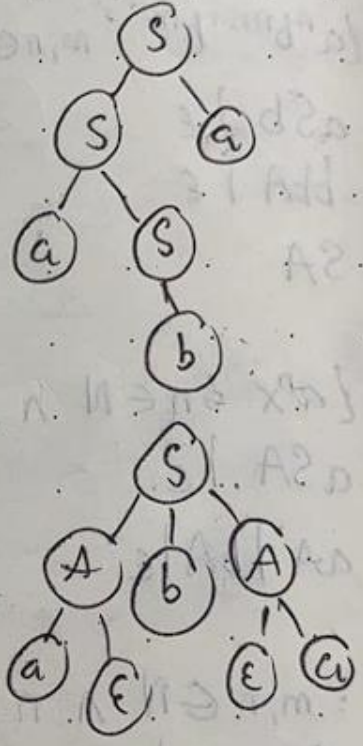
$S \to aS \to aSa \to aba$ (1)

$S \to Sa \to aSa \to aba$ (2)

(1)



(2)



=> Đây là up nhập nhằng:

$S \to AbA \mid AbA$

$A \to aA \mid Aa \mid \varepsilon$

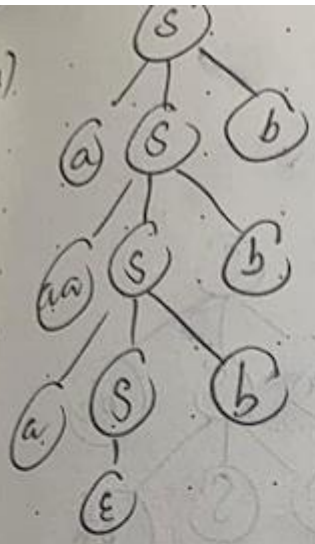
b) $S \to aSb \mid aaSb \mid \varepsilon$

Xét aaaabbb.

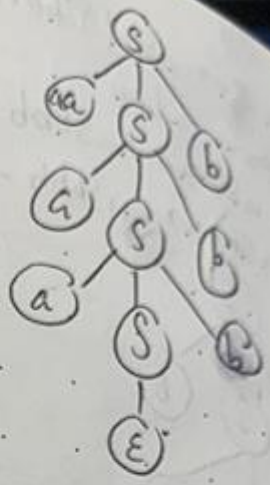
$S \to aSb \to aaaSbb \to aaaaSbbb \to aaaabbb$ (1)

$S \to aaSb \to aaaSbb \to aaaaSbbb \to aaaabbb$ (2)

(1)



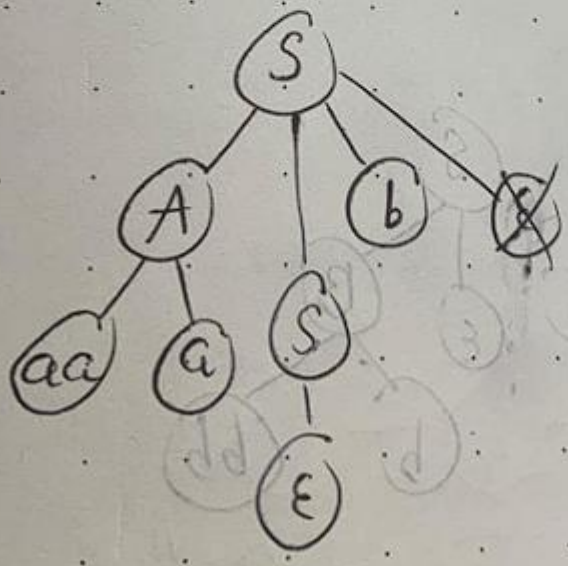
(2)



Vì có ~~0 kết~~ 2 dẫn xuất ≠ nhau ⇒ DX nhập nhằng

$S \to ASb \mid \varepsilon$

$A \to \sout{aA \mid} aaA \mid a \mid aa$



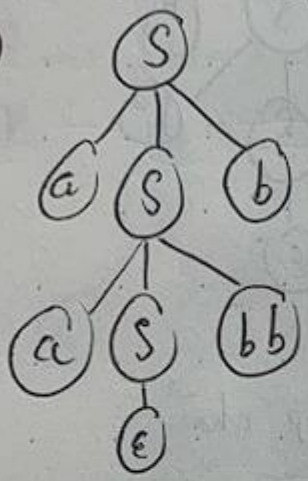
c) $S \to aSb \mid aSbb \mid \varepsilon$

Xét chuỗi aabbb:

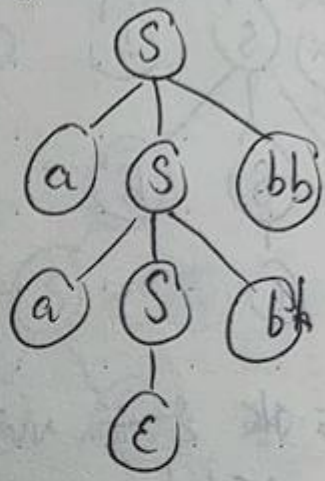
$S \to aSb \to aaSbbb \to aabbb$ (1)

$S \to aSbb \to aaSbbb \to aabbb$ (2)

(1)



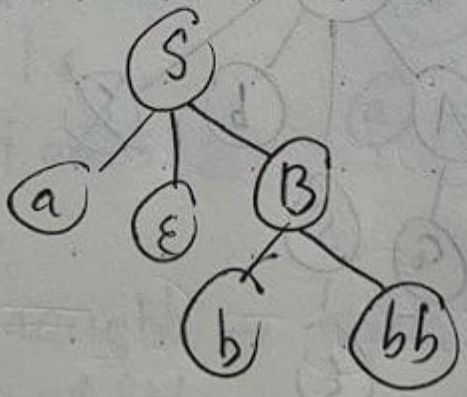
(2)



⇒ Vì tồn tại dẫn xuất ≠ nhau ⇒ DX nhập nhằng

$S \to aSB \mid \varepsilon$.

$B \to b \mid bb$



Bài 4:

④

a) $L = \{w(11)^n w^R : n \in \mathbb{N} \wedge w \in \{0,1\}^*\}$

$S \to 0A0 \mid 1A1 \mid \varepsilon$

$A \to 11 \mid \varepsilon$

b) $L = \{0^n 1^m : m, n \in \mathbb{N} \wedge (m-n) \equiv_2 1\}$

$S \to 0S1A \mid 1A$

$A \to 0A1 \mid 1$