

abb  
aabbbb

# Theory of Computation

## Exercise 10: (Pushdown Automata)

Find Pushdown Automata for the following languages.

1.  $L1 = \{ a^n b^{2n} : n \geq 0 \}$
- input pop push      input pop push      ① ✗  
a      a      aa      , b      a      1
- input pop push      , match bb and a      ② ✗  
a      a      a

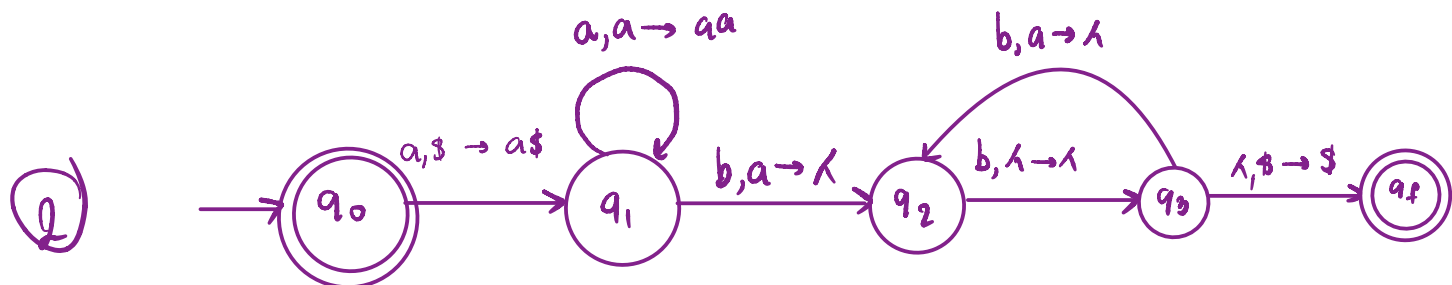
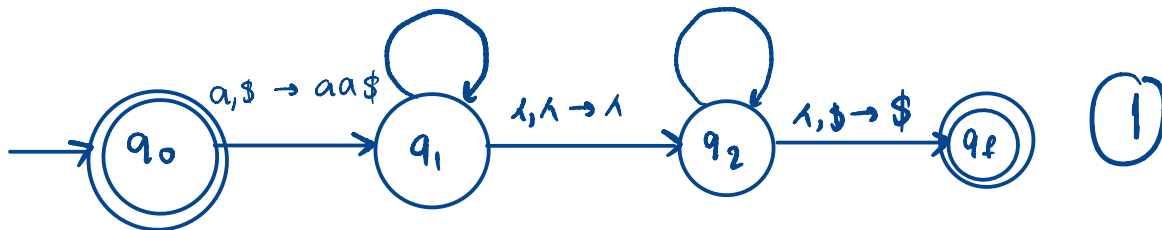
$a, 1 \rightarrow aa$

↪ มีทั้งกรณีเดียว ไม่มีการทำ

กรณีเดียว  
กรณีเดียว

$a, 1 \rightarrow aa$   
 $a, a \rightarrow aaa$

$b, a \rightarrow \Lambda$



xx

a  
ab  
aab

anđi / mđ a, λ → λ

$$2. L2 = \{w \in \{a, b\}^* : n_a(w) > n_b(w)\}$$

đi a, \$ → a\$, b, \$ → b\$

đi đ

a, b → λ

a, a → aa

b, a → λ

b, b → bb

ab  
aa  
ba  
bb  
λ

b, \$ → b\$

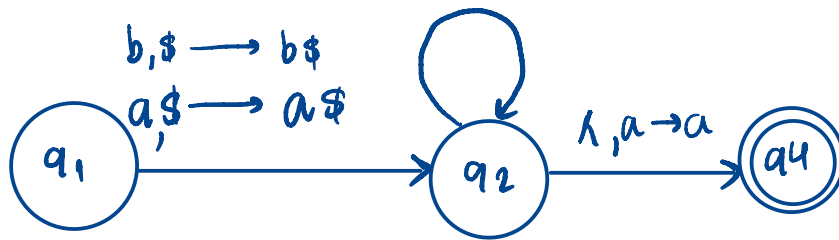
a, \$ → a\$

a, b → λ

b, a → λ

a, a → aa

b, b → bb



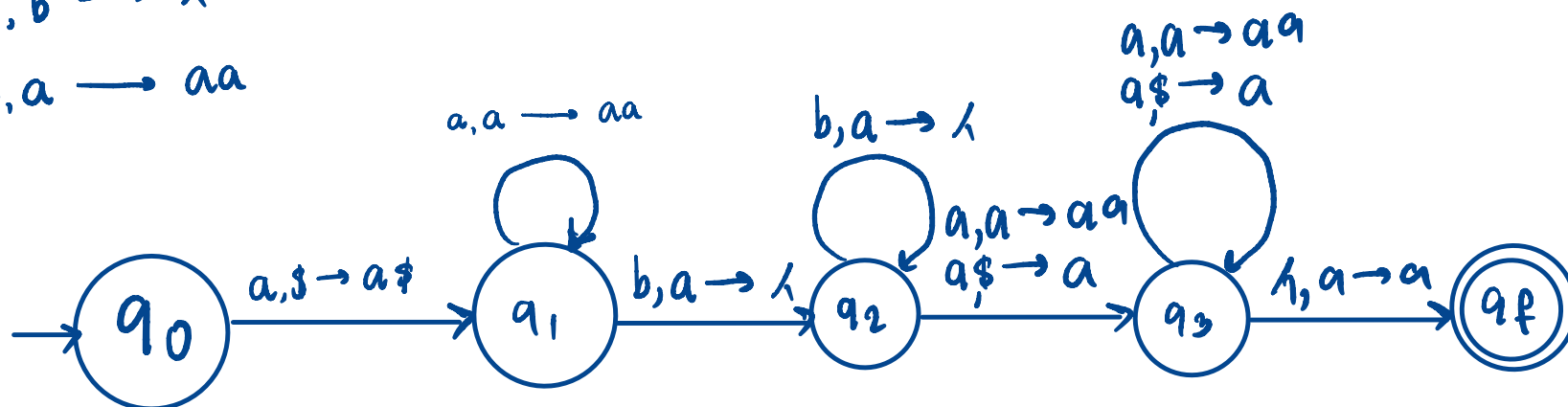
\*3.  $L3 = \{a^n b^m a^{n+m} : n, m \geq 1\}$

(Homework 8)

$a, \$ \rightarrow a\$$

$a, b \rightarrow \lambda$        $b, a \rightarrow \lambda$

$a, a \rightarrow aa$



\*3.  $L3 = \{a^n b^m a^{n+m} : n, m \geq 1\}$

(Homework 8)

พหุนาม

