

Automata

COURSE WORK 1.3
F29LP

SUBMITTED BY

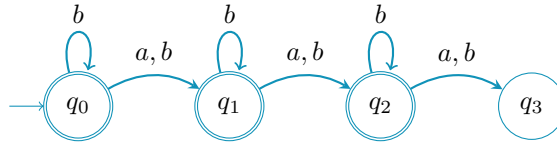
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1 $/(ab)^*/$

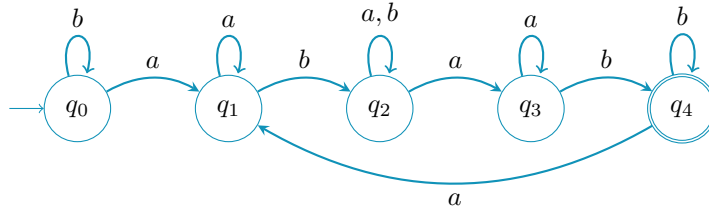
2 $/(b^*a) + a + b[ab]^*/$

3 NFA

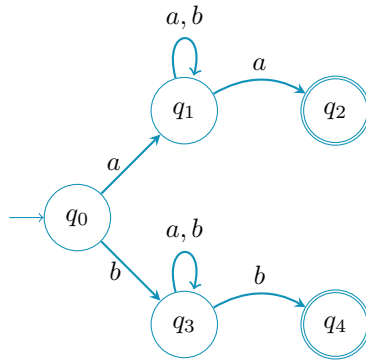
1. $L = \{w \in \{a, b\}^* \mid w \text{ contains at most two a's}\}$



2. $L = \{w \in \{a, b\}^* \mid w \text{ contains an even number of occurrences of ab as a subword}\}$



3. $L = \{w \in \{a, b\}^* \mid \text{the first and the last letter of } w \text{ are identical}\}$



4 $/a * (ba\{2, \})^*/$

5

$$\begin{aligned} S &\rightarrow aA \\ A &\rightarrow aB \\ B &\rightarrow aS \mid aC \\ C &\rightarrow aS \mid \epsilon \end{aligned}$$

6 Unmarked, N/A

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1.

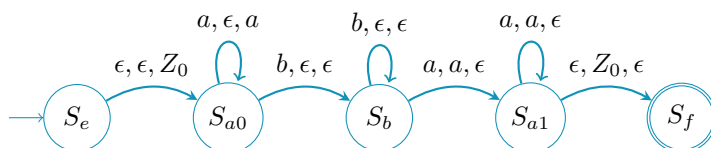
$$\begin{aligned} S &\rightarrow aA|bB \\ A &\rightarrow aA|bS|aB|\epsilon \\ B &\rightarrow aS \end{aligned}$$

2. Is ambiguous as "aaaa" can be constructed in two ways

	Rule	Result		Rule	Result
(I)	$S \rightarrow aA$	a	(II)	$S \rightarrow aA$	a
	$A \rightarrow aA$	aa		$A \rightarrow aB$	aa
	$A \rightarrow aA$	aaa		$B \rightarrow aS$	aaa
	$A \rightarrow aA$	aaaa		$S \rightarrow aA$	aaaa
	$A \rightarrow \epsilon$	<u>aaaa</u>		$A \rightarrow \epsilon$	<u>aaaa</u>

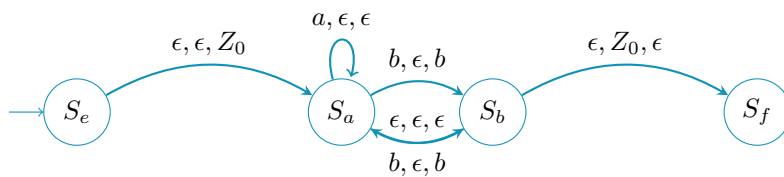
8 The CFG is used to create a number of a's with an equivalent number of b's, in any order.

9 $L = \{a^m b^n a^m | m, n \geq 0\}$, alphabet = $\{a, b, Z_0\}$,
Start stack symbol = Z_0

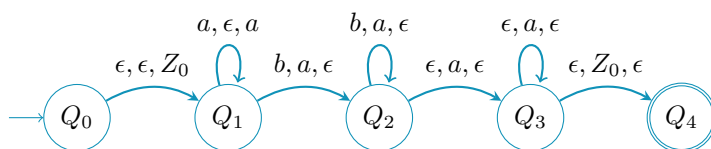


10 Not possible as DFA express regular languages, and $a^m b^n a^m$ is only expressible as a context-free language.

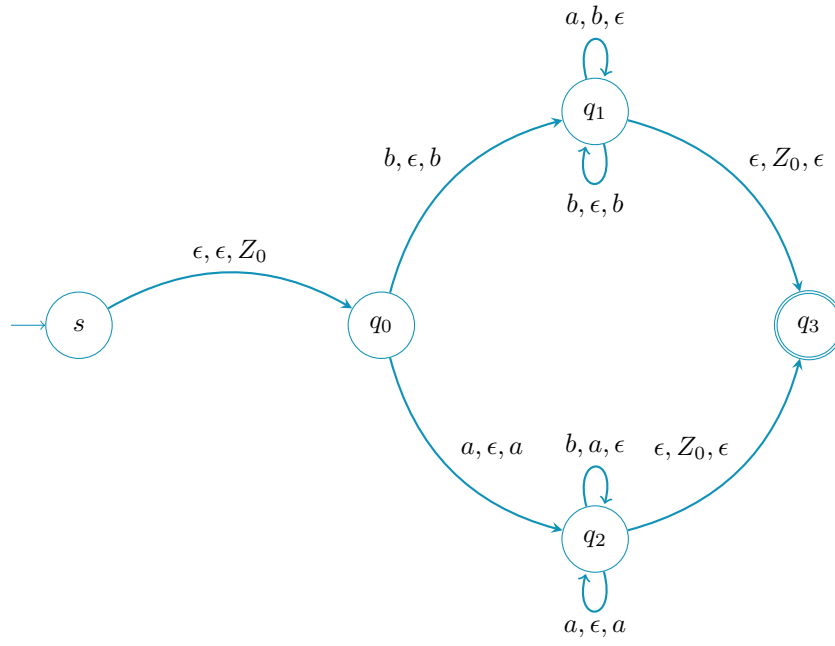
11 $L = \{a^m b^{2n} \mid m, n \geq 0\}$



12 $L = \{a^m b^n \mid m > n > 0\}$



13 $L = \{w \mid \#_a = \#_b\}$



14

15

