

Theory of Computation

Exercise 3: (Nondeterministic Finite Automata - NFA)

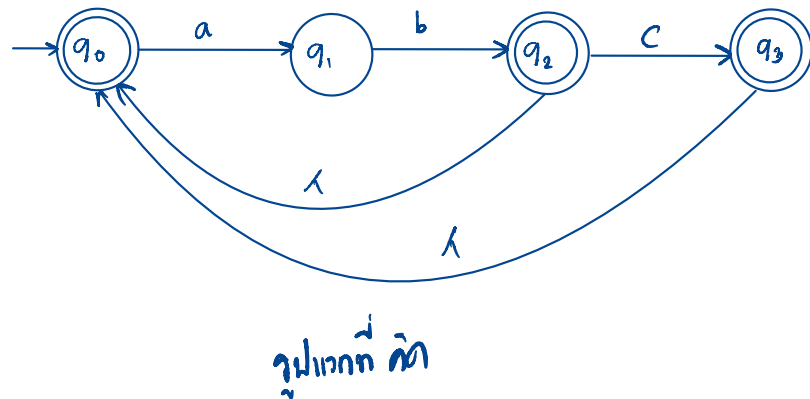
minimal state 3

1. Construct the minimal-state NFA that accepts the language $\{ab, abc\}^* = \{\epsilon, ab, abc, ababc, abcab, abcab, \dots\}$

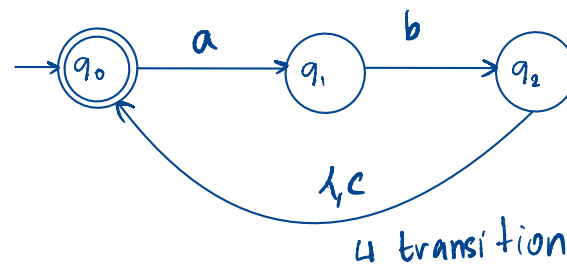
ab

ab ab ba bb 2

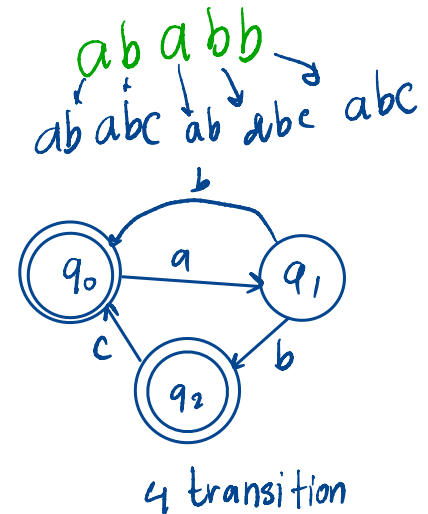
abab, abab, abab, abab, abab, abab, abab, abab 3
ab ab ab ab ab ab ab ab



abca

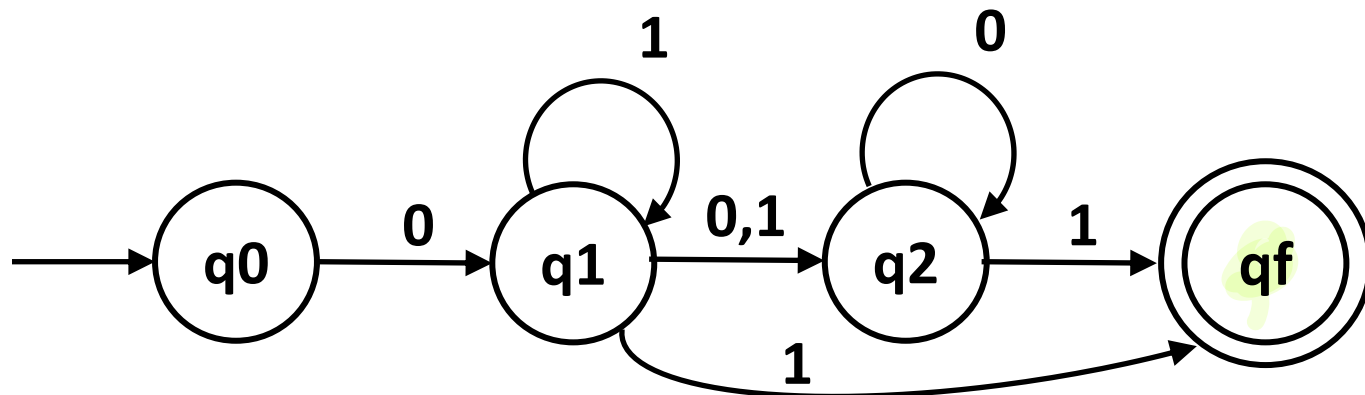


รูป 2 ที่จริง 1 state 3 state

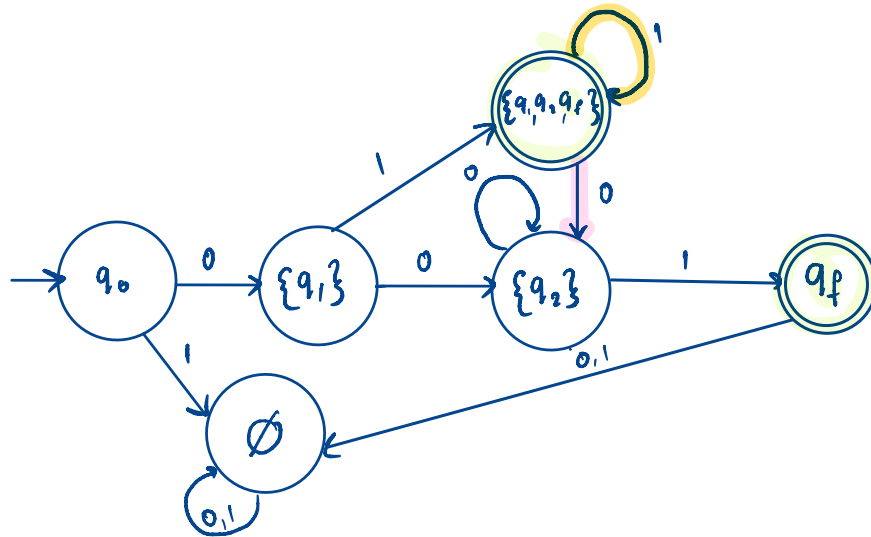


2. Convert the following NFA to DFA

NFA



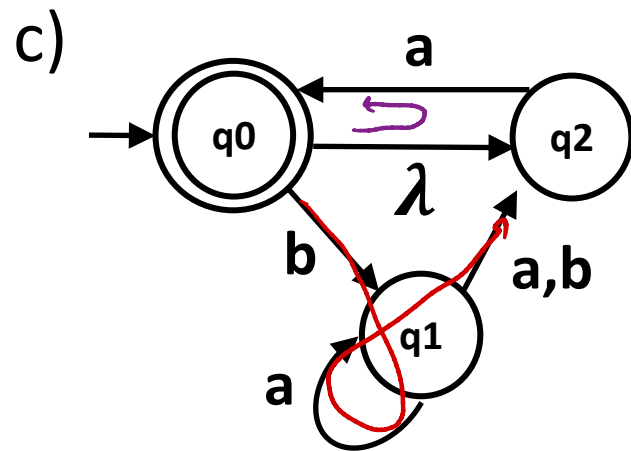
	0	1
q_0	$\{q_1\}$	\emptyset
q_1	$\{q_2\}$	$\{q_1, q_2, q_f\}$
q_2	$\{q_2\}$	$\{q_f\}$
q_f	\emptyset	\emptyset



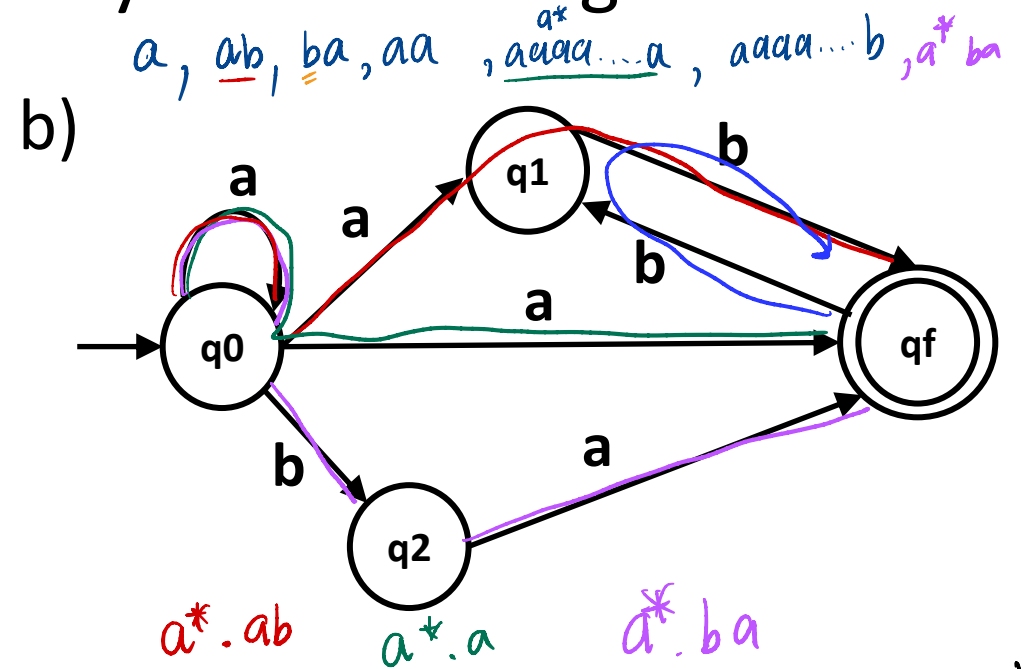
*3. What are the languages accepted by the following NFA ?



a) Ans $\{a, ab\}$



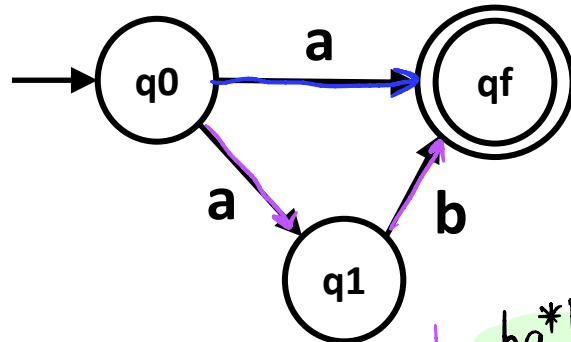
$\{a, ba^* \cdot \underbrace{\{a,b\}}_{\text{a or b}} \cdot a\}^*$



b) Ans $a^* \cdot \{ab, a, ba\} \cdot \{bb\}^*$

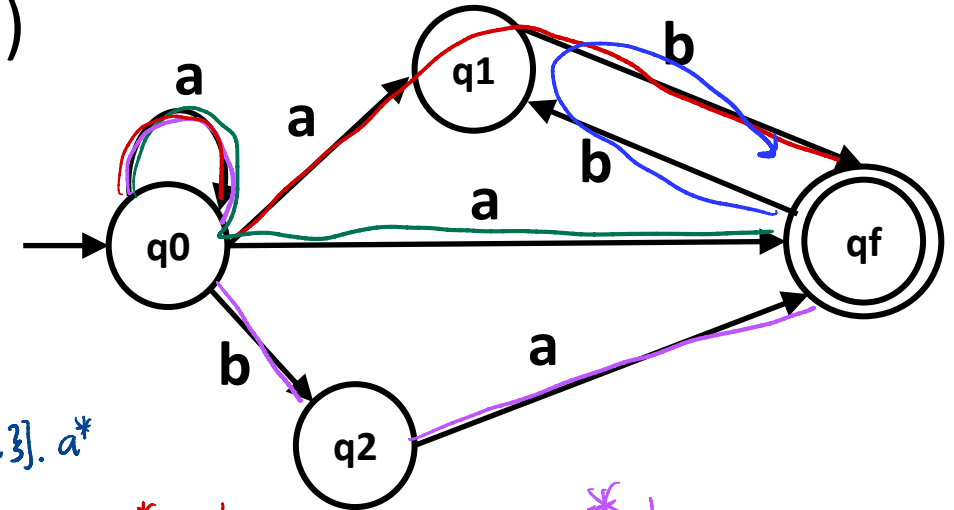
*3. What are the languages accepted by the following NFA ?

a) a, ab



a, ab

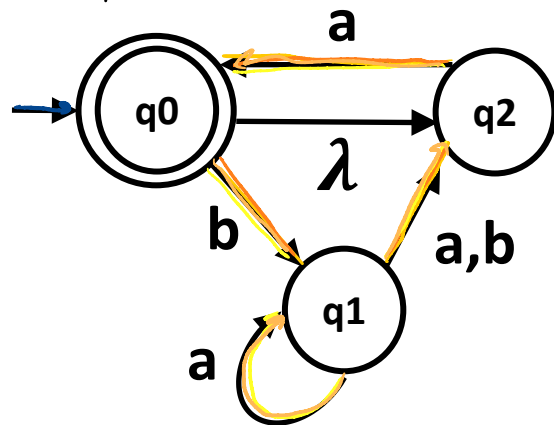
b) $a, ab, ba, aa, a^*a, a^*b, a^*ba$



$a^*.ab, a^*.a, a^*.ba$

$a^* \{ ab, a, ba \}^*$

c) $\lambda, a, a^*, baa, baaa^*, bba, bba^*$



λ, a, baa, bba

$\lambda a^*, \lambda a a^*, b a a a^*, b b a a^*, b a^* a a^*, b a^* b a a^*$

$\{a\}^* \cup \{ \{ba, bb\}.a, ba^*.\{aa, ba\} \}.a^*$

baa, bba, ba^*aa, ba^*ba