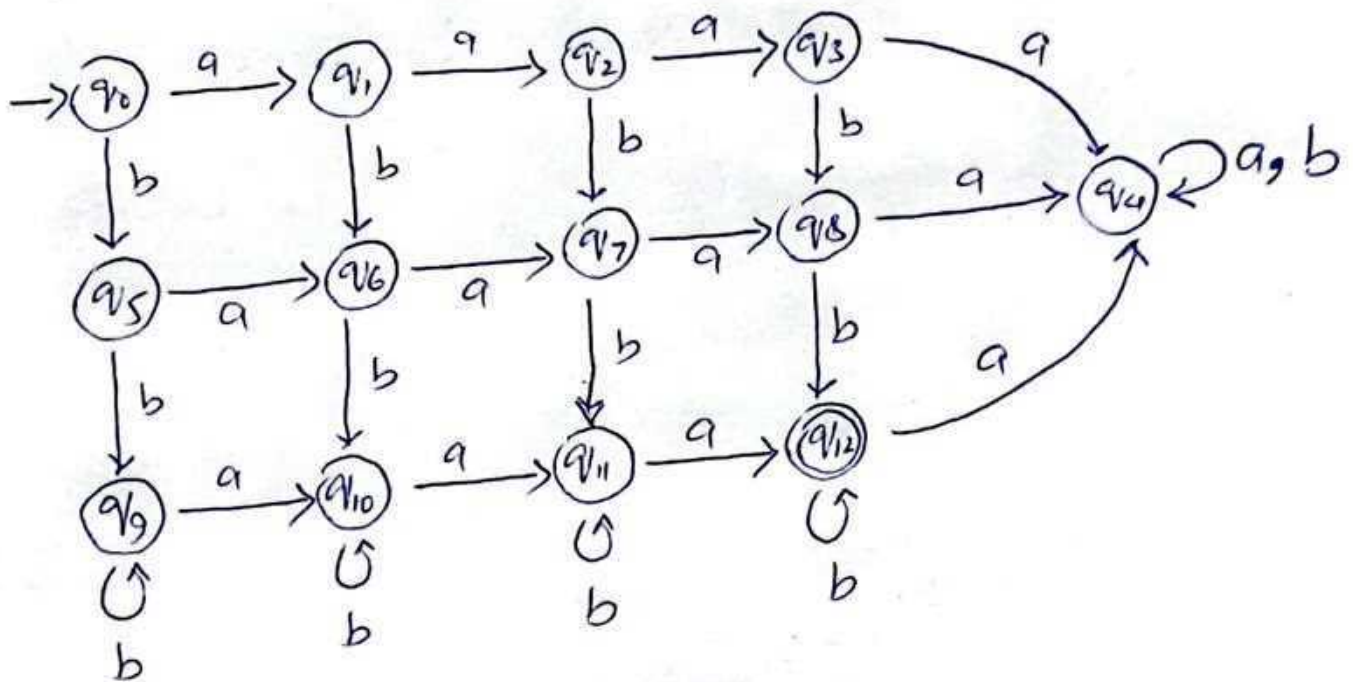


ToA S24 Midterm Solution

Q-1

3) aaabb, aabba, abbaa, bbaaa, abbba, baaba,

7)



Q-2

5)

$$(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*[a+(ba+ab)(aa+bb)^*b]$$

5)

$$1 + a + b + ba + (a + b)^*(\underline{aa + ab + bb + bba})$$

2/3 length...

safe

Q-3 DFA \rightarrow NFA

	a	b
$\rightarrow q_0$	$\{q_1, q_2, q_5\}$	$\{q_1, q_2, q_5\}$
q_1	$\{ \}$	$\{q_2, q_4\}$
q_2	$\{q_4\}$	$\{q_2, q_4\}$
* q_5	$\{q_5\}$	$\{q_1\}$
q_4	$\{ \}$	$\{ \}$

	a	b
$\{q_0\}$	$\{q_1, q_2, q_5\}$	$\{q_1, q_2, q_5\}$
* $\{q_1, q_2, q_5\}$	$\{q_4, q_5\}$	$\{q_1, q_2, q_4\}$
* $\{q_4, q_5\}$	$\{q_5\}$	$\{q_1\}$
$\{q_1, q_2, q_4\}$	$\{q_4\}$	$\{q_2, q_4\}$
* $\{q_5\}$	$\{q_5\}$	$\{q_1\}$
$\{q_1\}$	$\{ \}$	$\{q_2, q_4\}$
$\{q_4\}$	$\{ \}$	$\{ \}$
$\{q_2, q_4\}$	$\{q_4\}$	$\{q_2, q_4\}$
$\{ \}$	$\{ \}$	$\{ \}$

9 States
3 final

Q-4

3) $aba, \underline{a}aba, \underline{b}aba, \underline{a}baa, aaaba, ababa, bbaab, baaba$
 $aaaba, baba, baba,$

7)

