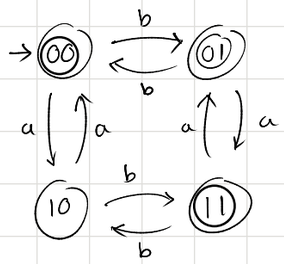
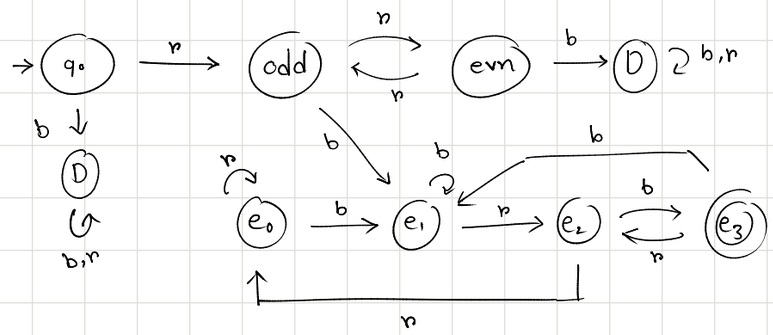
1. Design DFAs that accept the following languages:

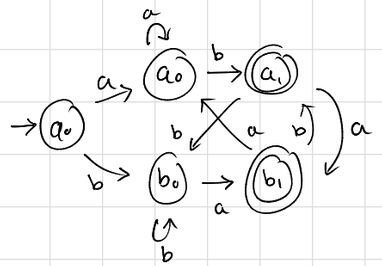
a) L = accepts any string that has an even number of 'a' or odd number of 'b' over alphabet {a, b}



b) L = accepts any string which starts with an odd number of 'r' and ends with 'brb' over the alphabet {b, r}

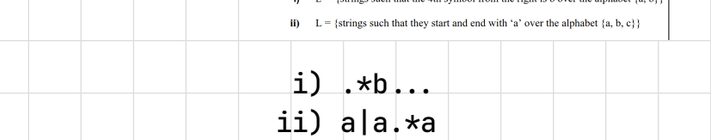


c) L = accepts any string where the last two symbols are different over the alphabet {a, b}

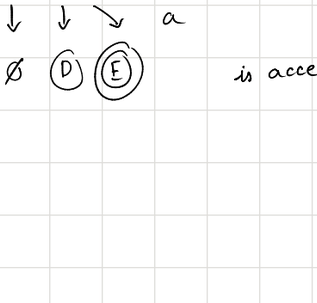


2. Design NFAs that accept the following languages:

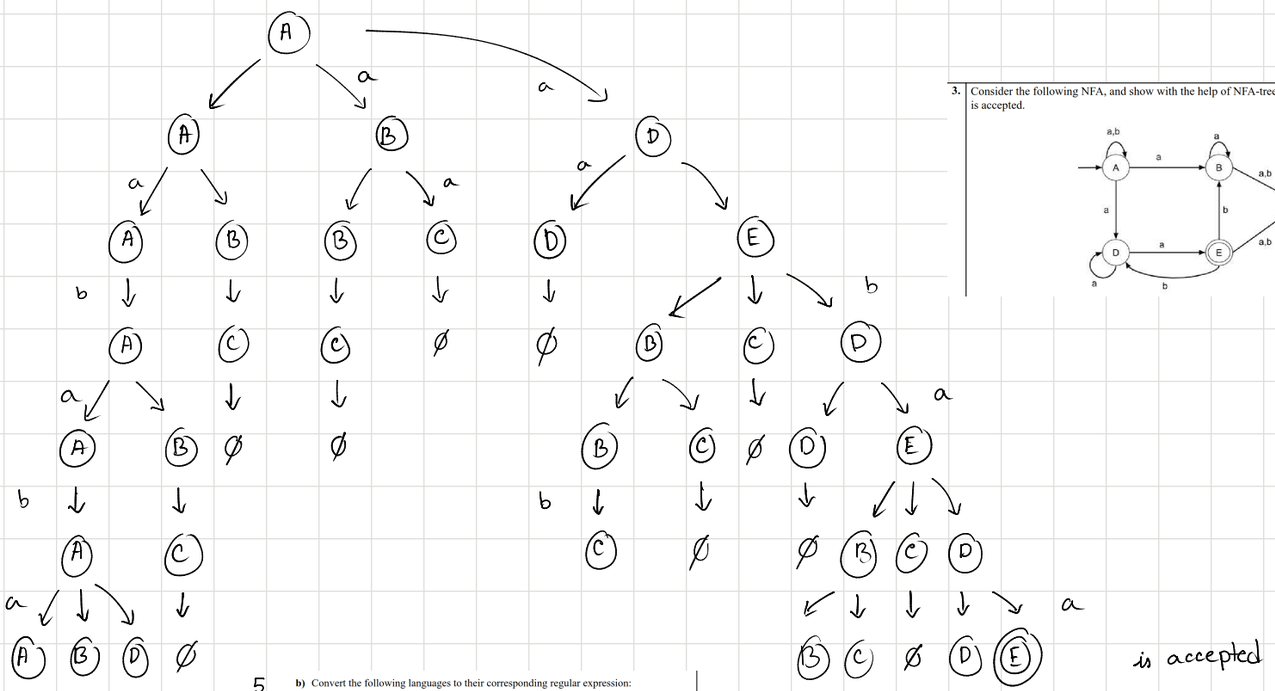
a) L= {w | w starts with 'a' or 'b' *and* contains 'cca' *and* ends with 'b' or 'c'} | Σ = {a, b, c}



b) L= {w | w starts *and* ends with different symbols with a total length of at least 2} | Σ = {0, 1}

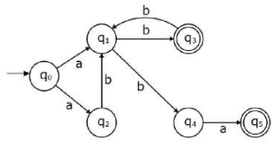


c) L = {w | w contains 'xyz' or 'yzx' or 'zxx' *and* ends with 'yz'} | Σ = {x, y, z}



3. Consider the following NFA, and show with the help of NFA-tree whether the string **"aababa"** is accepted.

4. Convert the following NFA over the alphabet Σ= {0, 1} to an equivalent DFA.

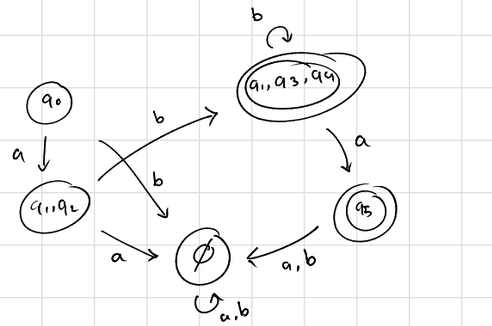


NFA transition table

		a	b
→	q_0	$\{q_1, q_2\}$	$\emptyset$
	q_1	$\emptyset$	$\{q_3, q_4\}$
	q_2	$\emptyset$	$\{q_1\}$
*	q_3	$\emptyset$	$\{q_1\}$
	q_4	$\{q_5\}$	$\emptyset$
*	q_5	$\emptyset$	$\emptyset$

DFA transition table

	a	b
→ $\{q_0\}$	$\{q_1, q_2\}$	$\emptyset$
$\{q_1, q_2\}$	$\emptyset$	$\{q_1, q_3, q_4\}$
$\{q_1, q_3, q_4\}$ *	$\{q_5\}$	$\{q_1, q_3, q_4\}$
$\{q_5\}$ *	$\emptyset$	$\emptyset$
$\emptyset$	$\emptyset$	$\emptyset$



5. **b)** Convert the following languages to their corresponding regular expression:

i) L = {strings such that the 4th symbol from the right is b over the alphabet {a, b}}

ii) L = {strings such that they start and end with 'a' over the alphabet {a, b, c}}

i) .*b...

ii) a|a.*a