# RE to NFA

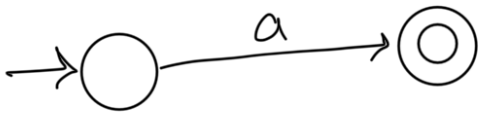
If a language is described by a regular expression, then it is regular.

→ NFA/DFA

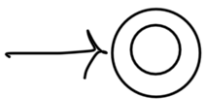
So, RE → NFA or DFA

1. $R = a$, for some $a$ in the alphabets.

$$L(R) = \{a\}$$




2. $R = \epsilon$, $L(R) = \{\epsilon\}$



3. $R = \phi$ $L(R) = \phi$

4. $R = R_1 \cup R_2$

5. $R = R_1 \circ R_2$

6. $R = R_1^*$

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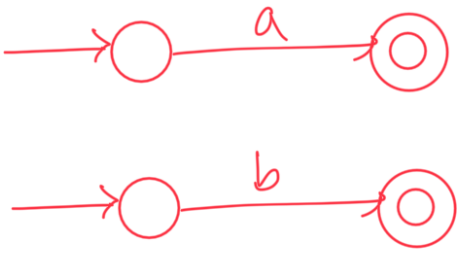
$L_1 = \{a\}$

$L_2 = \{b\}$

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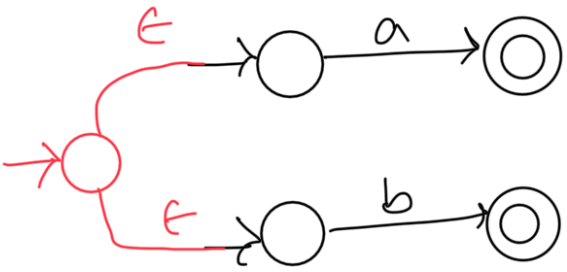
$L_3 = L_1 \cup L_2$

$L_3 = \{a, b\}$

$(a \cup b) / (a+b) / a|b$

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$L_4 = L_1 . L_2$

$= L_1 L_2$

$= L_1 \circ L_2$

$L_4 = \{ab\}$


OR


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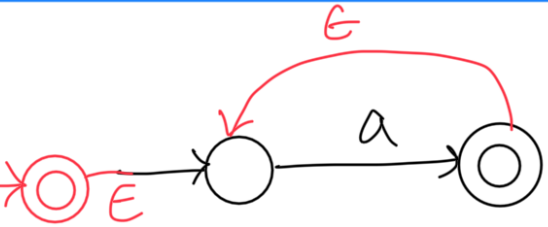
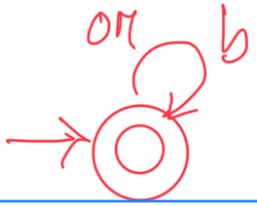
$L_5 = (L_1)^*$

$L_5 = \{\epsilon, a, aa, aaa, \ldots\}$




OR

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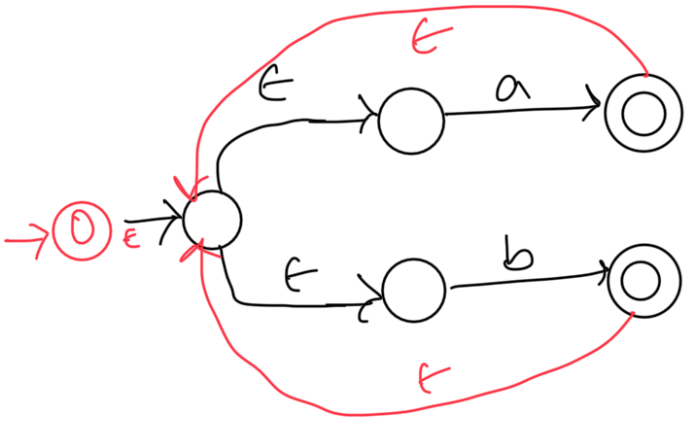
$(a+b)^*$

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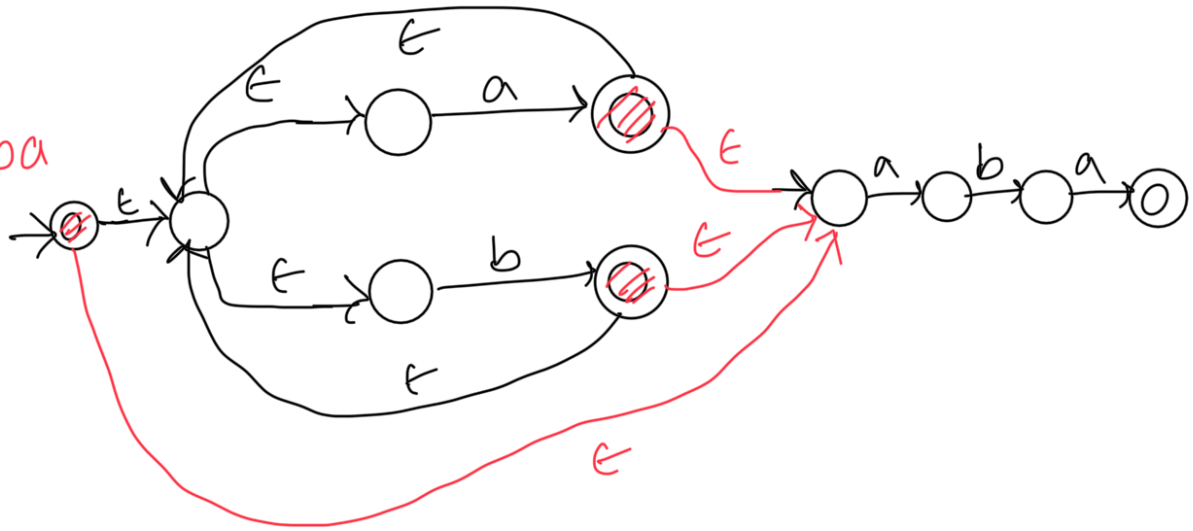
$(a+b)^*aba$

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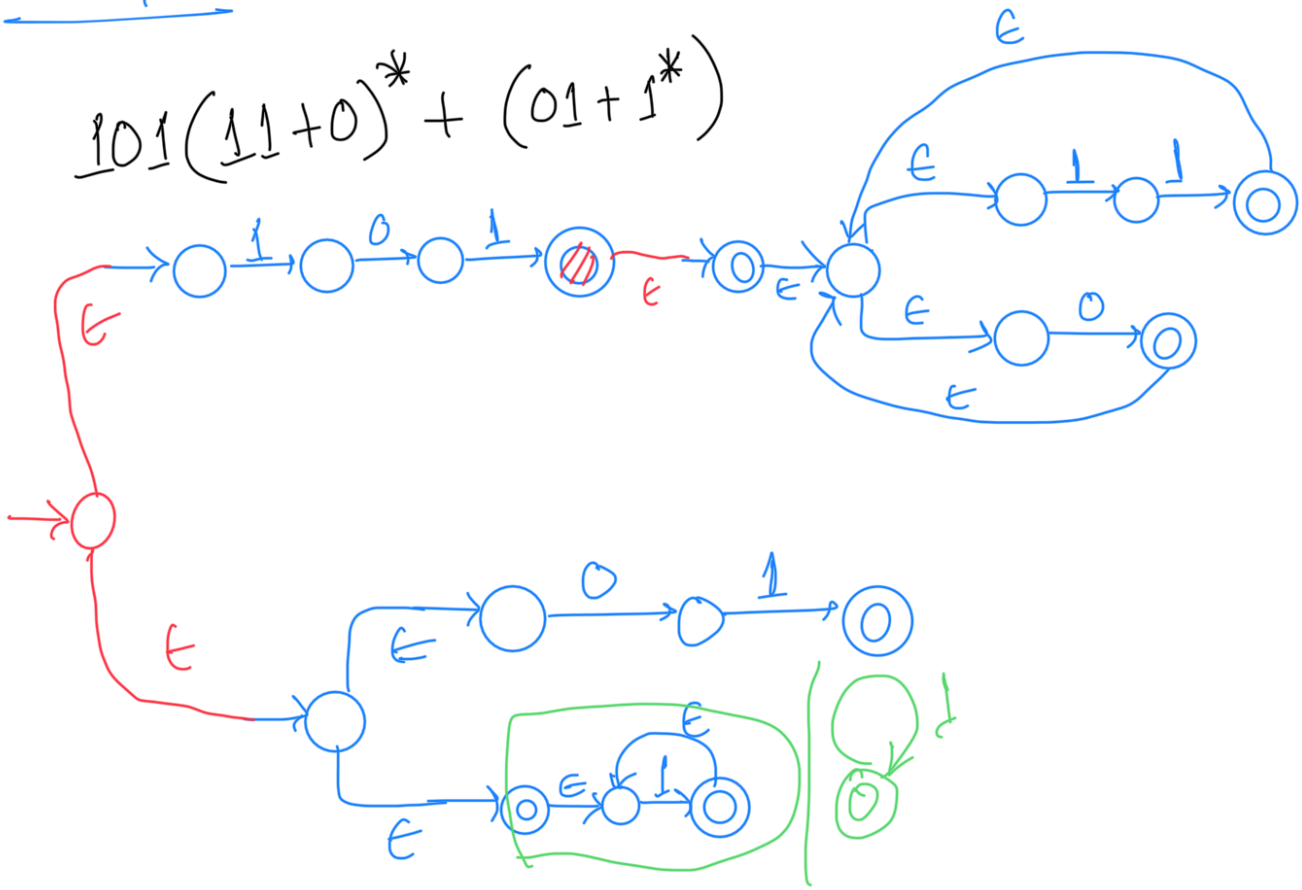
Example

$\underline{1}0\underline{1}(\underline{1}\underline{1}+0)^* + (0\underline{1}+\underline{1}^*)$



## Practice

1. $(ab + ab^*a)^* bba + ba$
2. $(010 + 00^*)^*(1 + 011)^*$
3. $1 + 10^*1 + ((0+1)(00+11)^*)^*$