

All strings of lowercase letters that contain the five vowels in order

1) non-v  $\rightarrow$  [b|c|d|f|...|z]

2) see-e  $\rightarrow$  non-v<sup>\*</sup> e

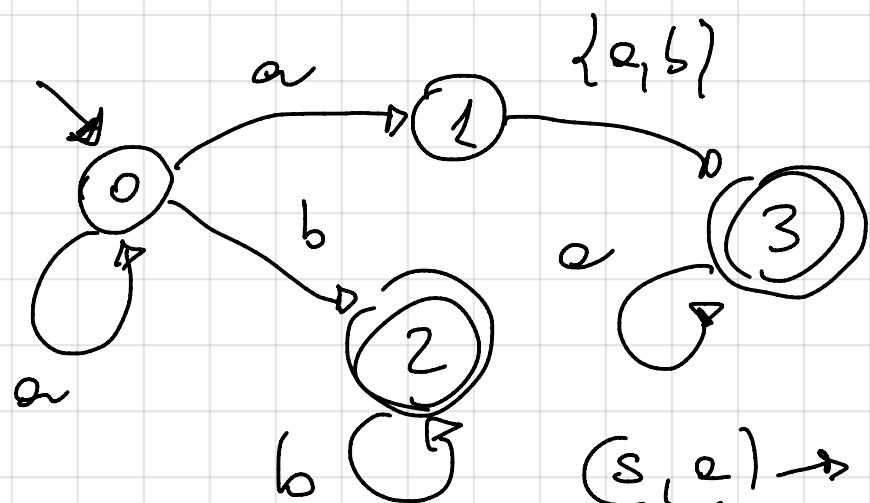
3) see-e  $\rightarrow$  see-e non-v<sup>\*</sup> e

4) see-i  $\rightarrow$  see-e non-v<sup>\*</sup> i

5) see-o  $\rightarrow$  see-i non-v<sup>\*</sup> o

6) token  $\rightarrow$  see-o non-v<sup>\*</sup> u non-v<sup>\*</sup>

$\langle S, \Sigma, \delta, s_0, F \rangle$  S set of states



$\Sigma = \text{alphabet}$

$= \{a, b\}$

$s_0 \in S$

F final states

$F \subseteq S$

$(s, a) \rightarrow s'$   
S determinism

$\delta: S \times \Sigma \rightarrow$

$\mathcal{P}(S)$  non-determinism

$(s, a) \rightarrow \{s', s''\}$

$$S = \{0, 1, 2, 3\} \quad |S| = 4$$

$$\mathcal{P}(S) = \{ \emptyset, \{0\}, \{1\},$$

$$\{2\}, \{3\}, \{0, 1\},$$

$$\{0, 2\}, \{0, 3\},$$

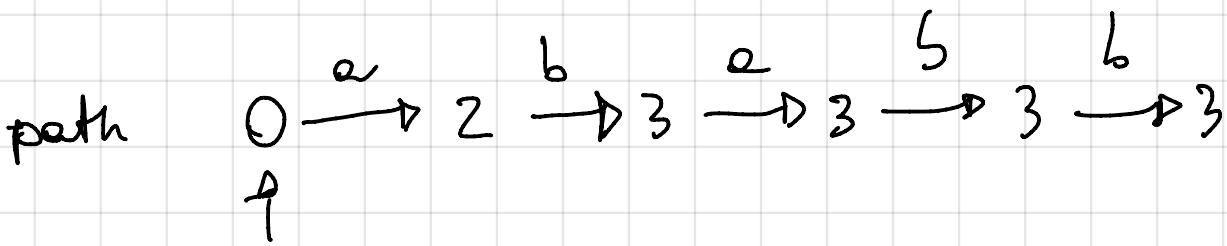
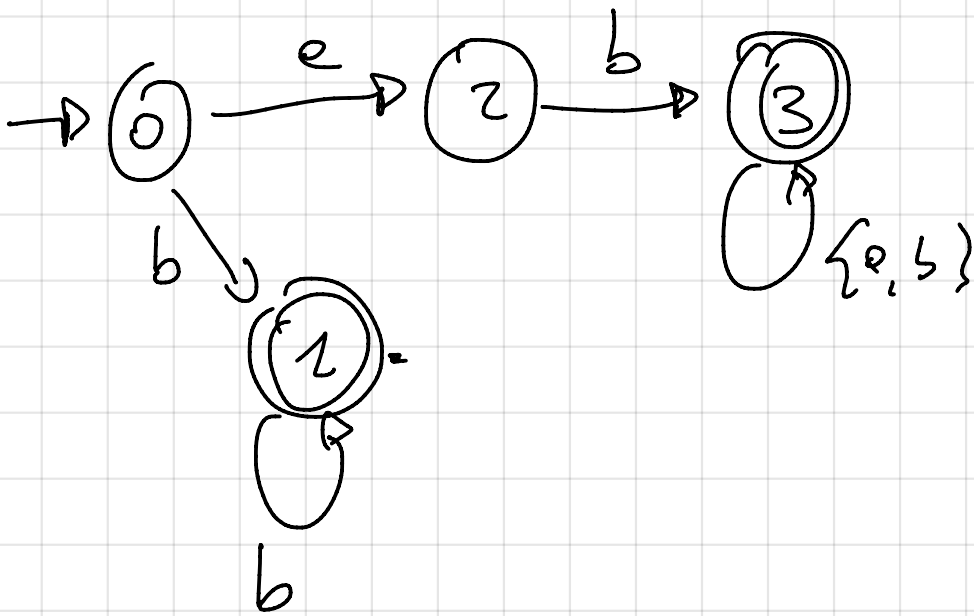
$$\{1, 2\}, \{1, 3\}$$

$$\{2, 3\}, \{0, 1, 2\}$$

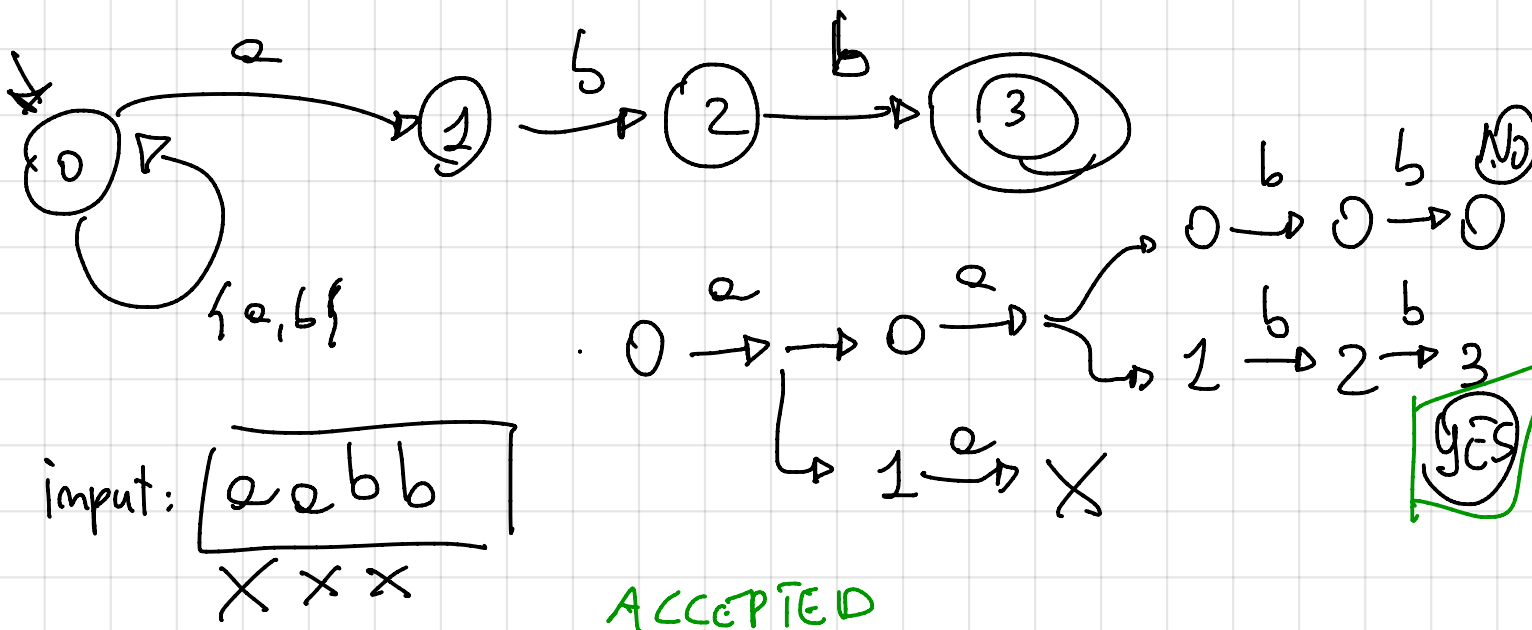
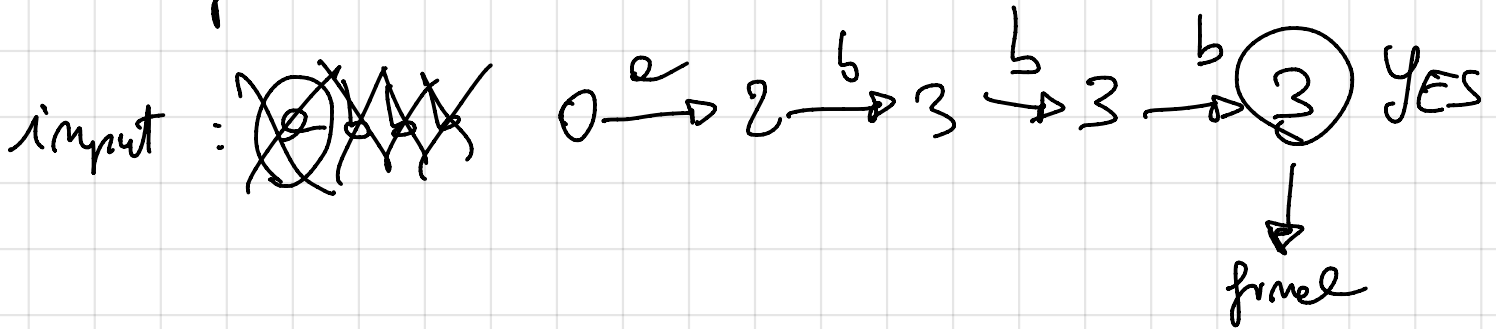
$$\{0, 1, 3\}, \{1, 2, 3\}$$

$$\{0, 1, 2\}, \{0, 1, 2, 3\} \}$$

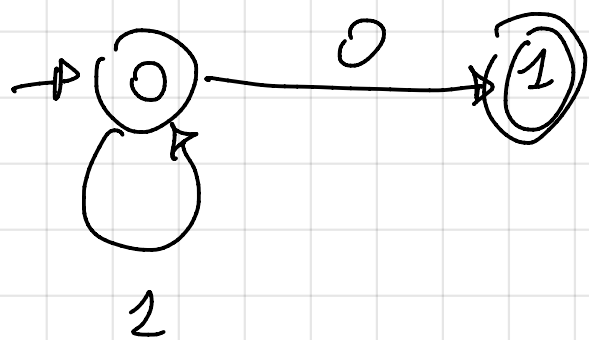
$$|\mathcal{P}(S)| = 2^4 = 16$$



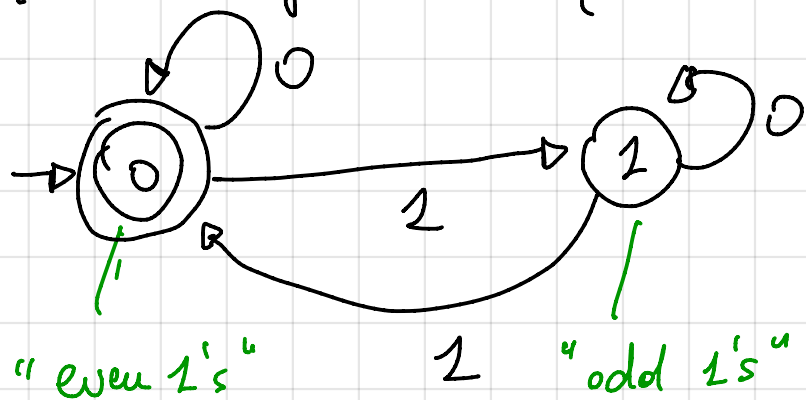
string eabbb



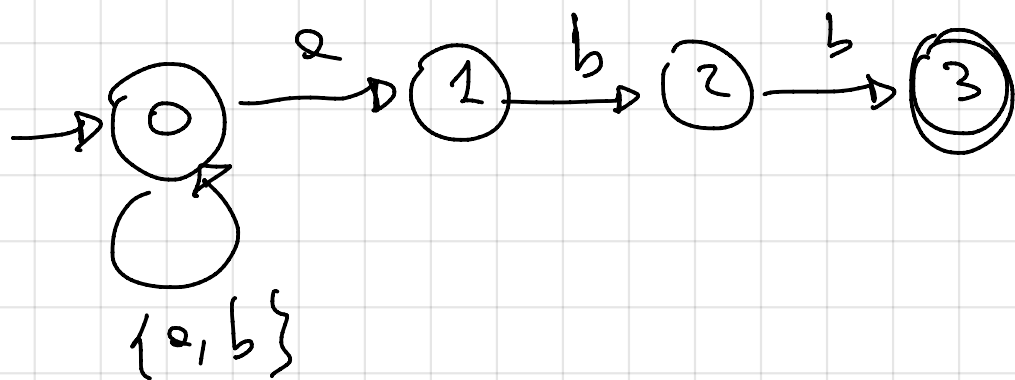
DFA for a string with any number of 1's followed by a single 0  
(also 0)



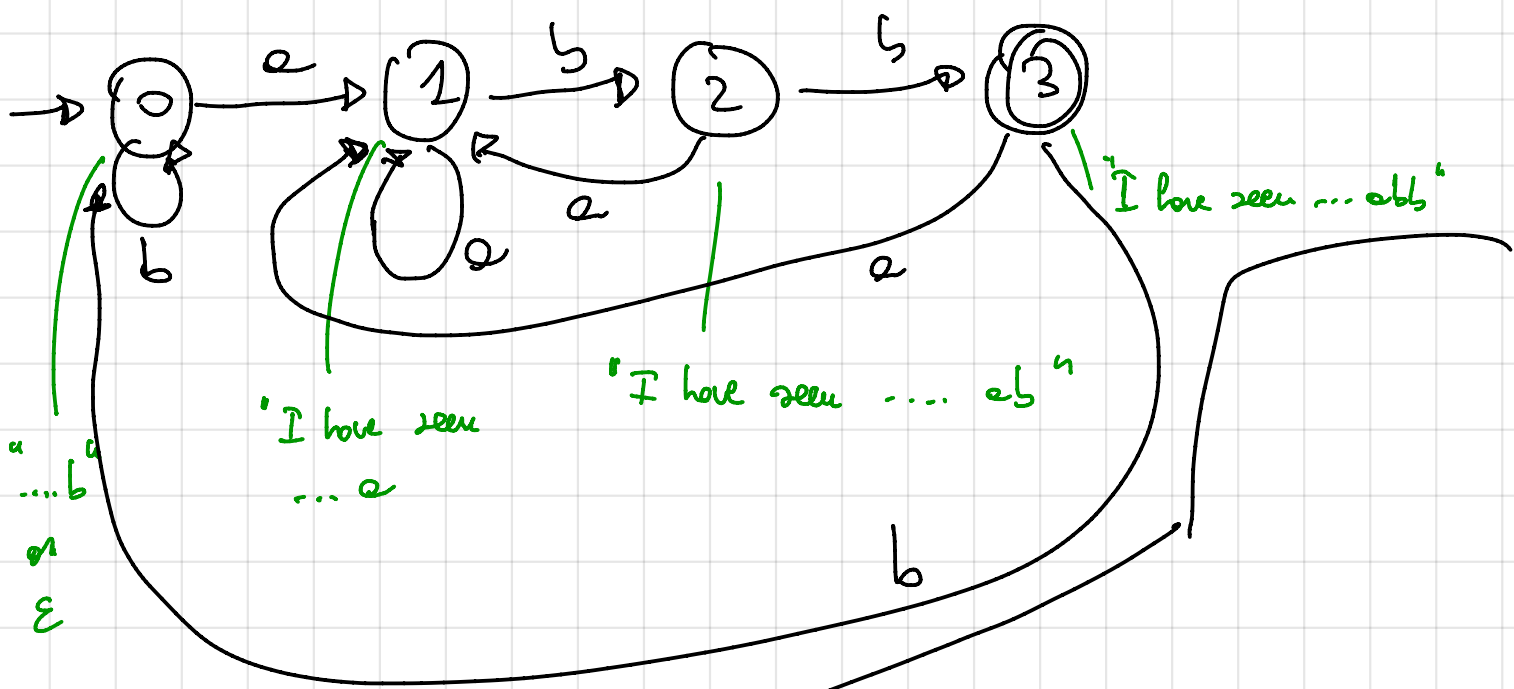
DFA for an even number of 1's and any number of 0's (zero is even)



NFA for strings of  $\Sigma = \{0, b\}$  ending with  $ebb$

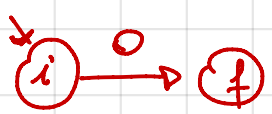
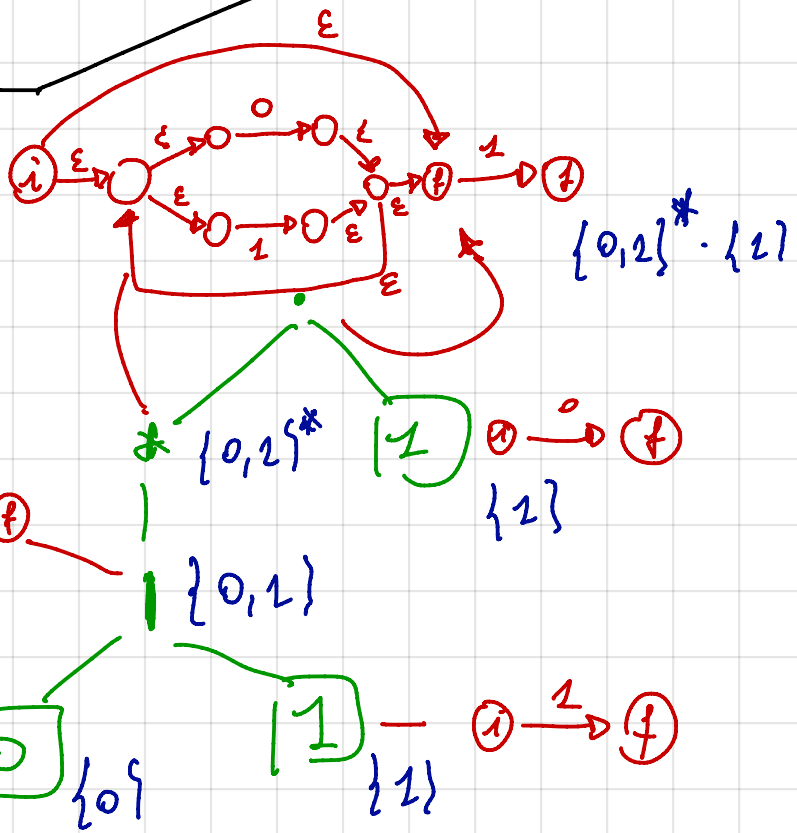


DFA for the same language!

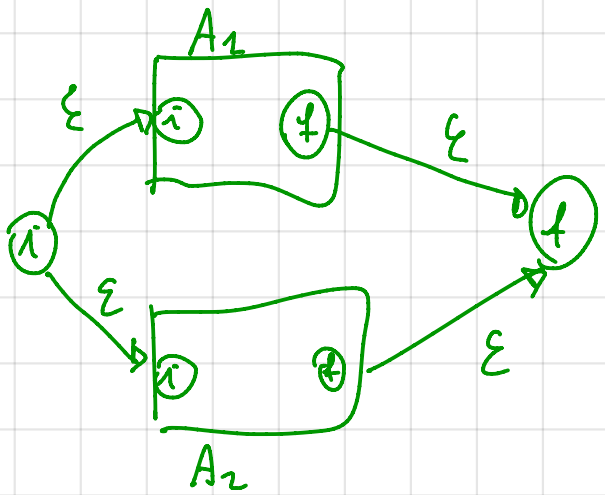


Thompson's algorithm

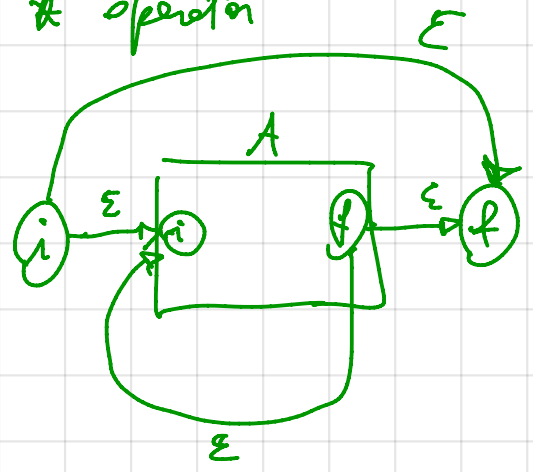
exp  $(0|1)^*1$



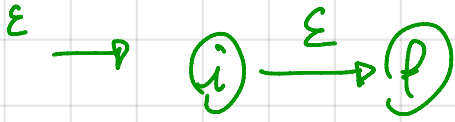
| operator



\* operator



operator .



$a \in \Sigma$

