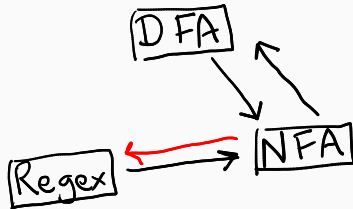


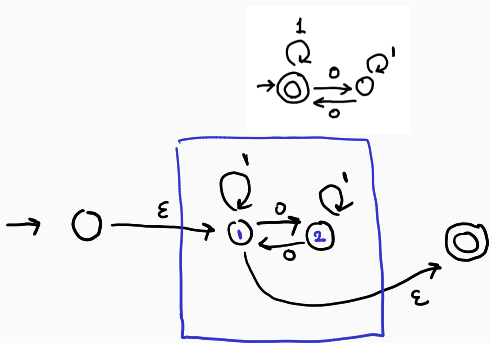
# Games, graphs, and machines

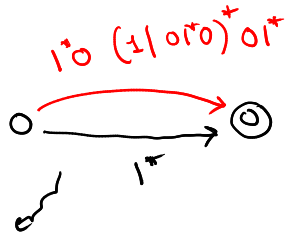
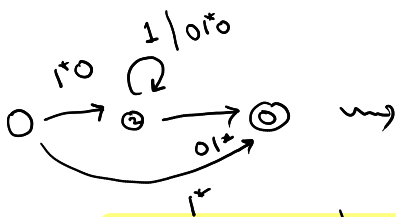
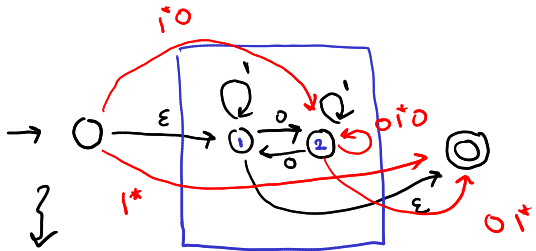


“Begin at the beginning,”  
the King said, very gravely,  
“and go on till you come to the end: then stop.”

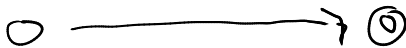
# Counting evens

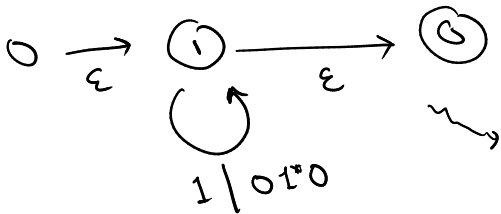
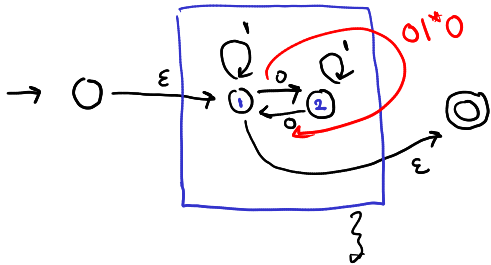
This DFA accepts strings with even number of 0s. Convert it to a regex.





$1^*0(1/01^*0)^+01^* / 1^*$





$$0 \xrightarrow{(1|01^*0)^*} \odot$$

# How to do this?

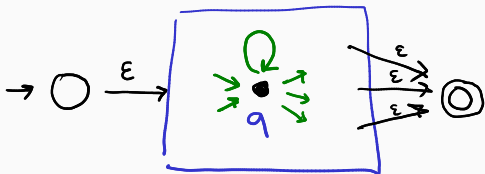
1. Sanitise: one start state and one end state.

2. Pick an internal state  $q$ .

For every pair of incoming and outgoing arrows at  $q$ : short-circuit with a new label.

3. Delete  $q$ .

4. Repeat.



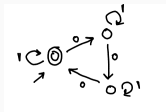
Simplify  
Complicate

states  
arrows

← label with regex.

# Counting mod 3

This DFA accepts strings with number of 0s divisible by 3. Convert it to a regex.



Not containing 000

# Not containing 000

Draw a DFA that accepts the strings containing 000, negate it, and convert to a regex.

→ contiguous

