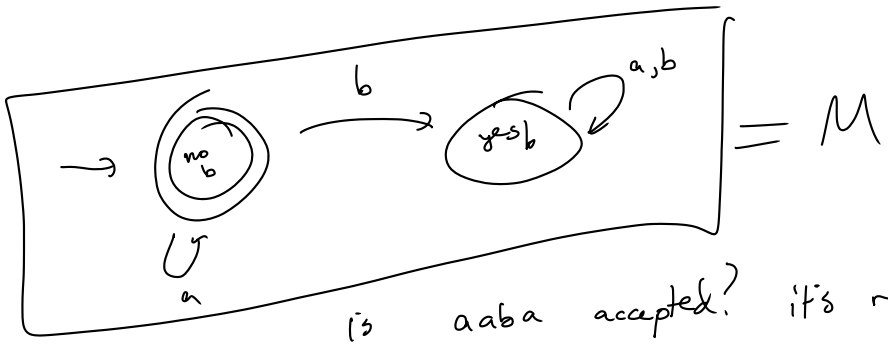
$\Sigma = \{a, b\}$ a DFA to accept only strings with no b:



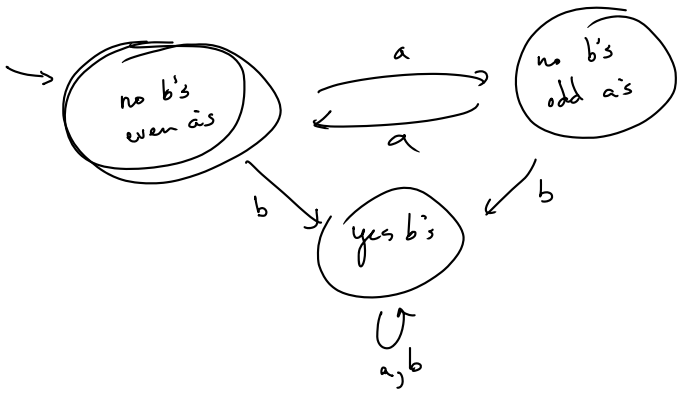
$= M$

is aaba accepted? it's rejected.

The language of the DFA is the set of all strings with no b in them

$$L(M) = \{a^n \mid n \in \mathbb{N}\}$$

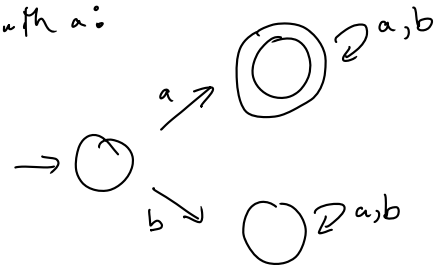
Make a DFA on $\Sigma = \{a, b\}$ which accepts any string with an even # of a's & no b's.



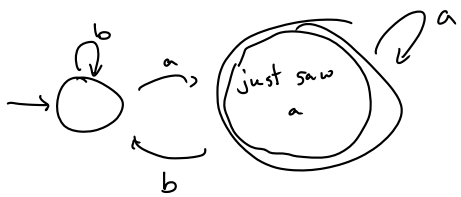
You try Make a DFA on $\Sigma = \{a, b\}$ which accepts:

- any string starting with a
- " " ending with a
- any string starting & ending with a
- any string starting OR ending with a

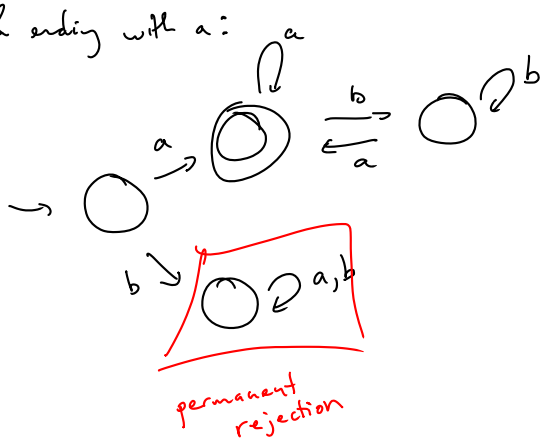
start with a:



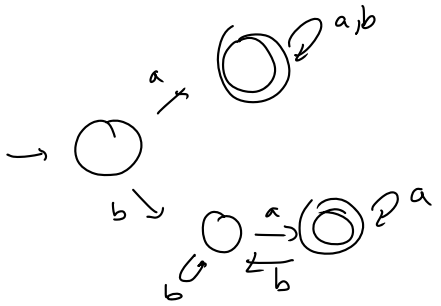
ends with a:



starting & ending with a:



Start or end with a



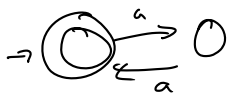
Big question:

What kinds of things can be decided by DFA?

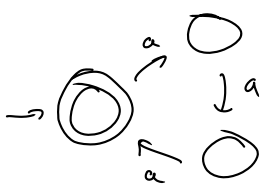
ending/beginning letters,

even vs odd

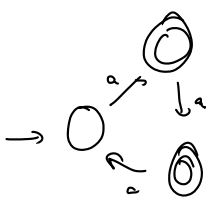
Can we do a^n when n is even?



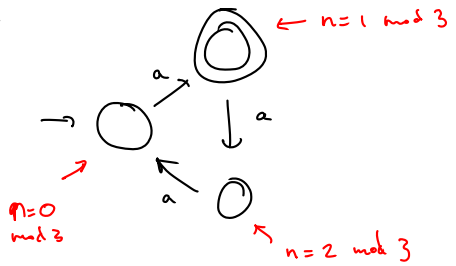
accept a^n when n is div by 3?



when n is not div by 3?



when $n = 1 \bmod 3$?



accepts a^n when n is prime:

Much much harder, maybe impossible.
(yes it is impossible)

a DFA which accepts any string with same # of a's & b's.

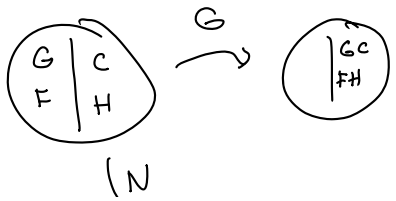
This is impossible with DFA.

DFAs can model simple situations:

The Farmer with the goat, cabbage, hyena

Where they are makes a possible state,
each trip across the river moves from one state to another.

a state looks like



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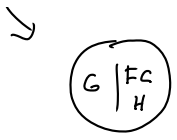
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