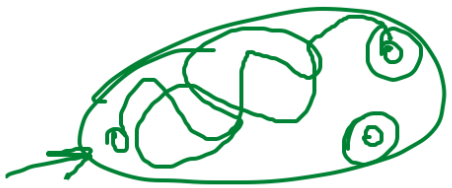
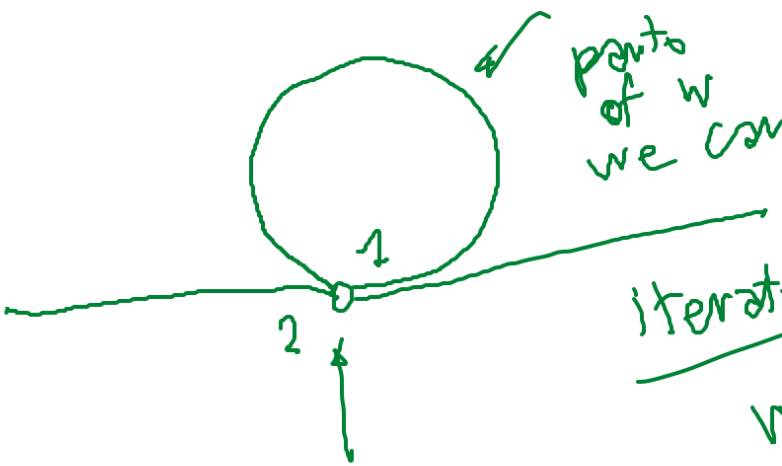
$L \in REG \rightarrow \exists$ FSA (det)



finite states

→ if string is long, states must be used several times



parts of w we can iterate

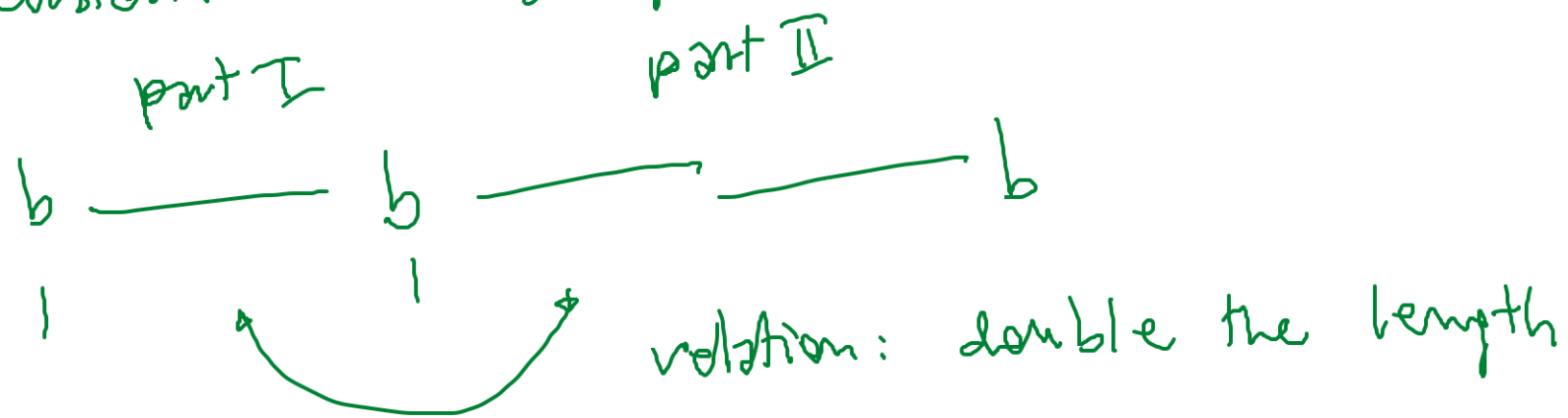
first time you re-use old state

removed

Exercise (July 3rd)

$$L_1 = \{ b a^{n/2} b a^n b \mid n \geq 0, n \text{ even} \}$$

1. understand the language



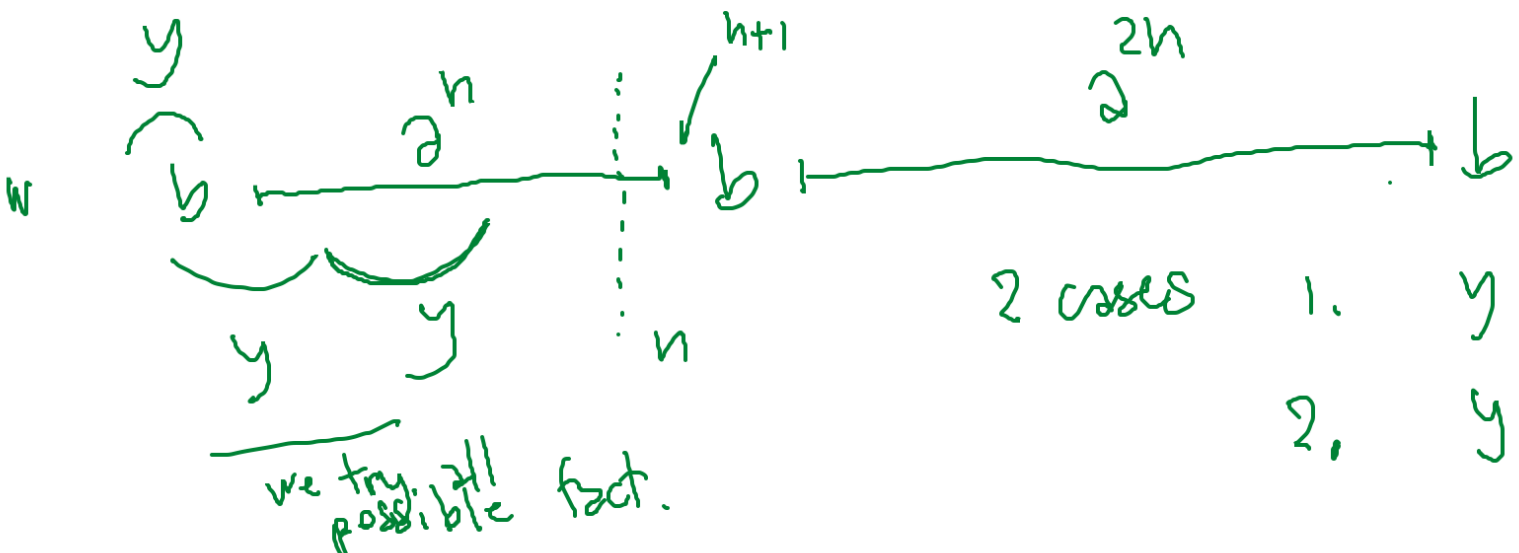
intuition: $L_1 \notin$ REG

- $\exists n$ p.lemma
  - $\forall w \quad |w| \geq n \quad w \in L_1$
    - $\exists$ factorization

$y \neq \varepsilon$
$|xy| \leq n$

$$w = xyz$$

  - $\forall k \geq 0 \quad xy^k z \in L_1$



$\in L_1$

2 cases 1. y includes some b

2. y includes only a's

Mistakes

1. assume $n = 4$

$b\,a^4\,b\,a^8\,b$!!

your reasoning should be valid for <u>any</u> value of n

2. $b\,\underbrace{a^n}\,b\,\underbrace{a^{2n}}\,b$

y

violates condition $|xy| \leq n$!!

3. P. Lemma

if $L \in REG$ then L satisfy p. lemma conditions

$\Rightarrow$

$\not\Leftarrow$ wrong

4. wrong factorization

you need to show p. lemma is not valid
(if consequent false, then anteced. false)

→ for every possible factorization, p. lemma not valid

Therefore: Try all factorization

5. Student does not understand definition of the language (not related to p. lemma)