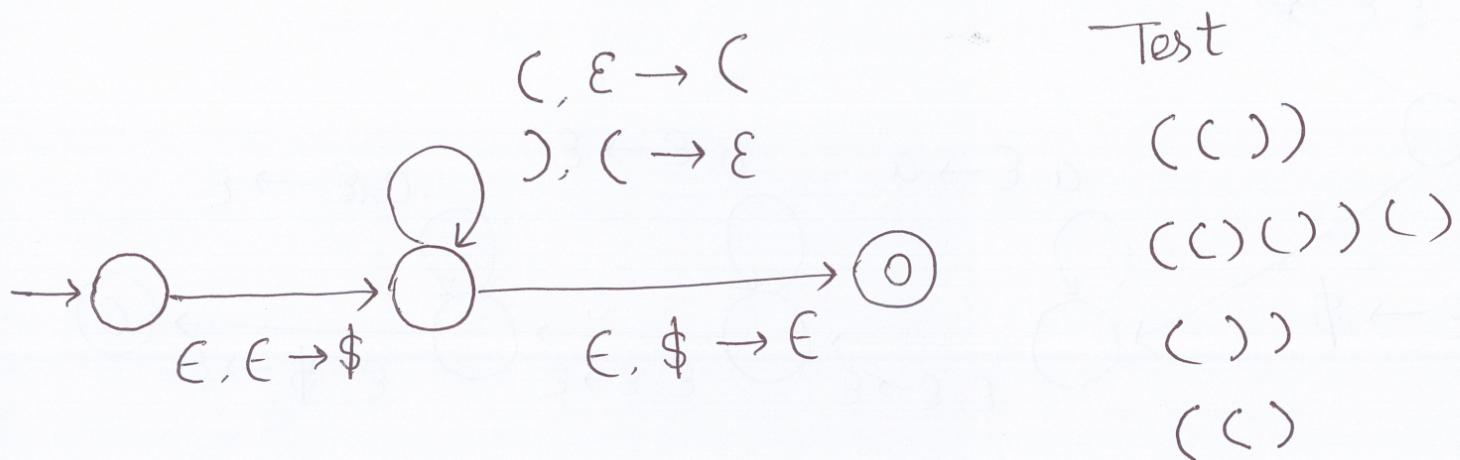
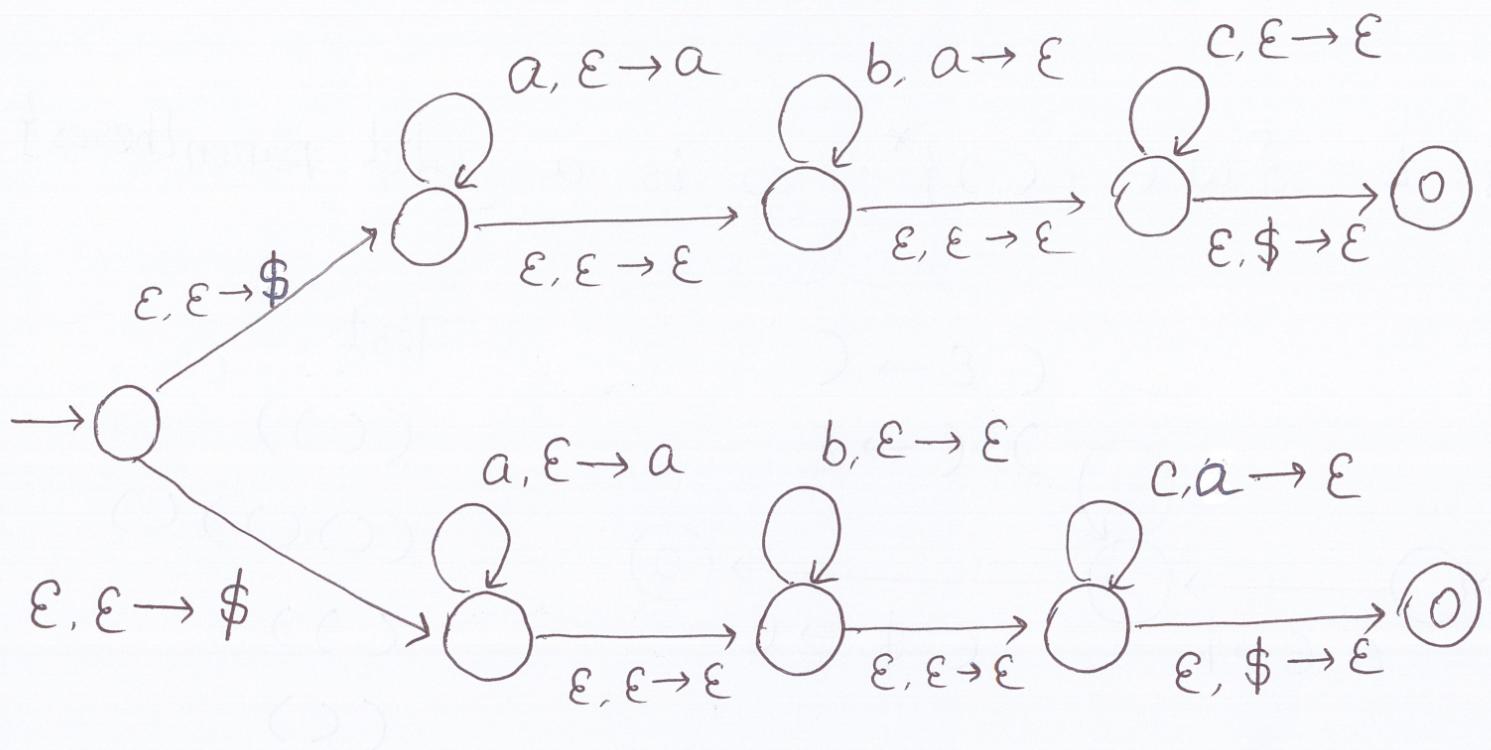


# PDA

Q:  $L = \{w \in \{(, )\}^*: w \text{ is a valid parentheses}\}$



Q.  $L = \{a^i b^j c^k \mid i, j, k \geq 0 \text{ and } i=j \text{ or } i=k\}$



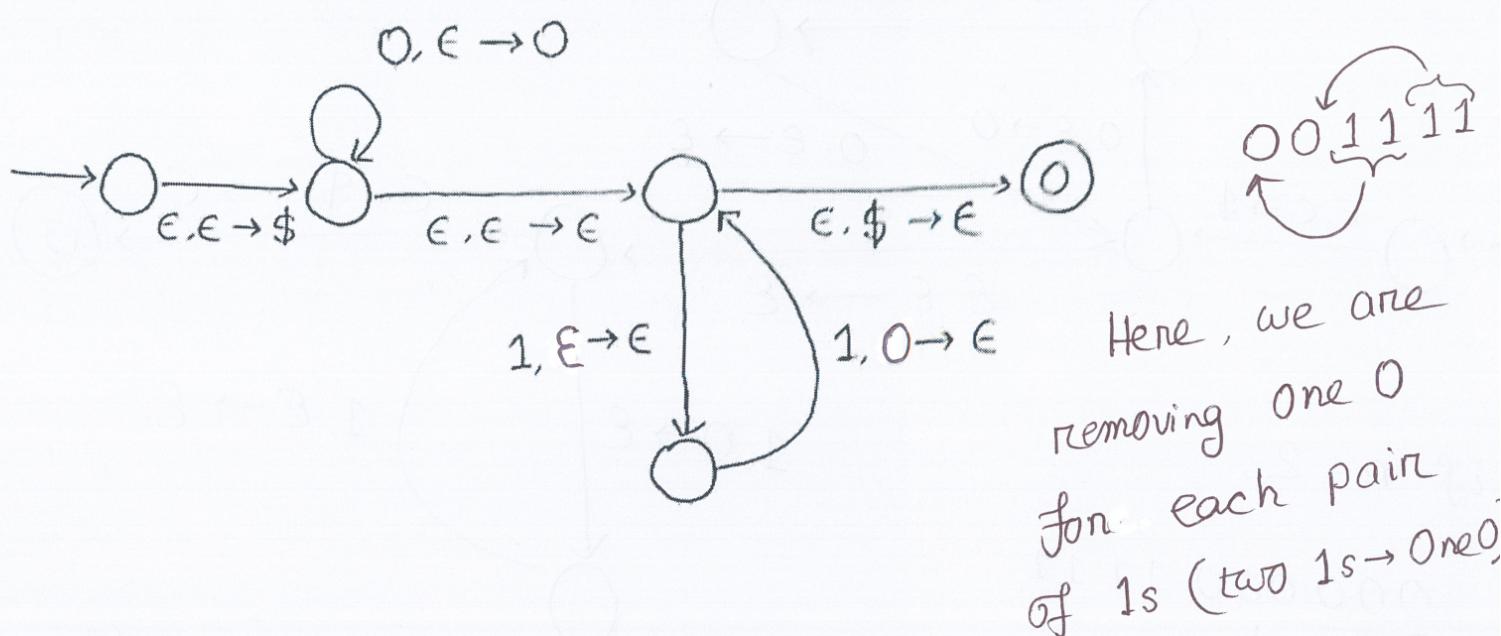
$i=j$  or  $i=k$ ; we are happy if  $\underset{\downarrow}{(a^i b^j c^k)}$   
amount of a and  
b are same

as well as, we are happy if  $\underset{\downarrow}{(a^i b^j c^k)}$   
amount of a and  
c are same.

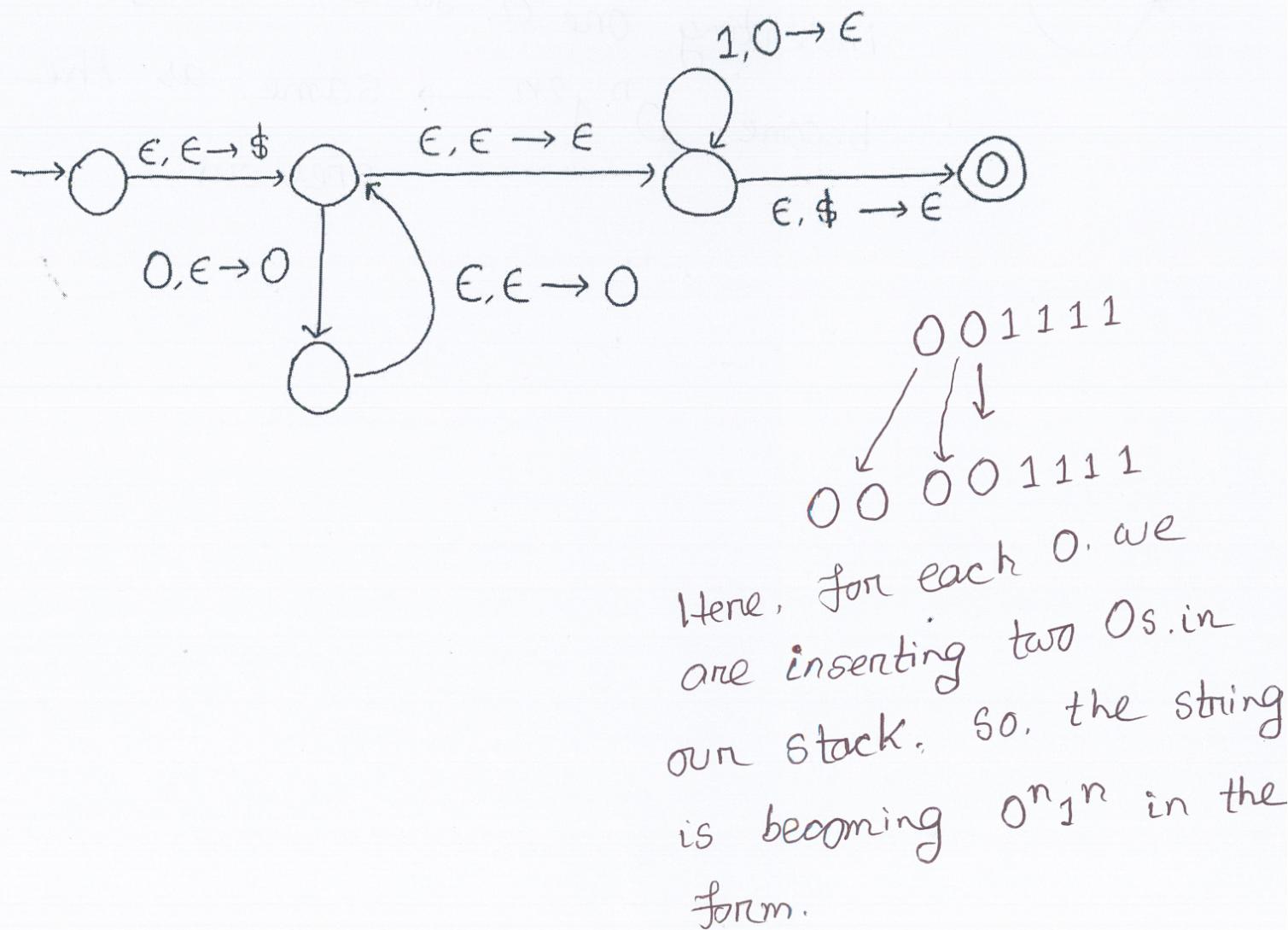
Since, PDA is NFA with a stack, it can  
decide the accepted path.

\* what will happen for 'aabbc'?

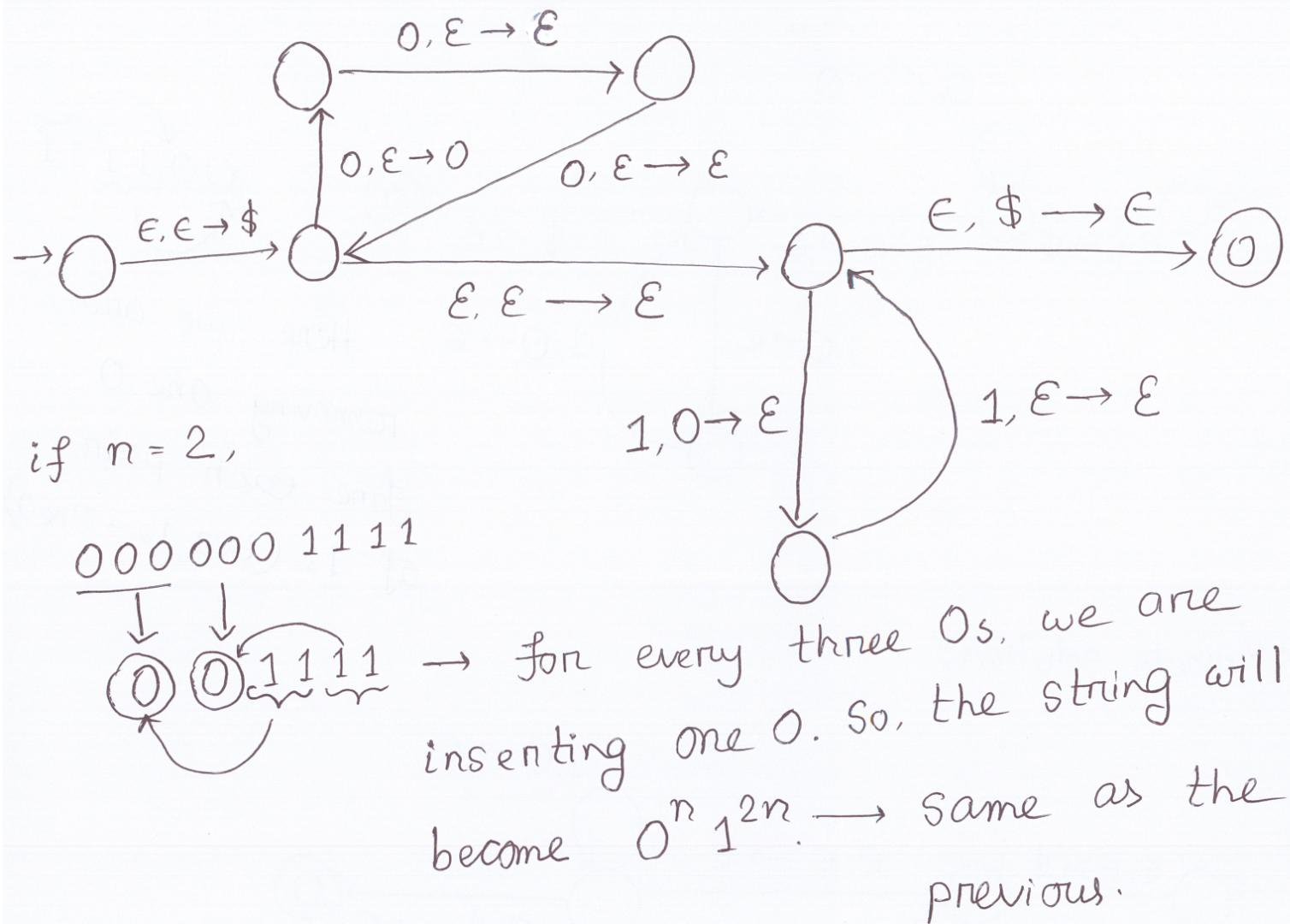
$$L = \{\omega \in \{0,1\}^*: \omega = 0^n 1^{2n}, \text{ where } n \geq 0\}$$



Alternate solution:



Q:  $L = \{ \omega \in \{0, 1\}^*: \omega = 0^{3n}1^{2n}; \text{ where } n \geq 0 \}$



Alternate way:

$$0^{3n} 1^{2n} \rightarrow \text{lcm}(3, 2) = 6$$

$$6/3 = 2$$

for each  $\leftarrow \dots$

0, we can

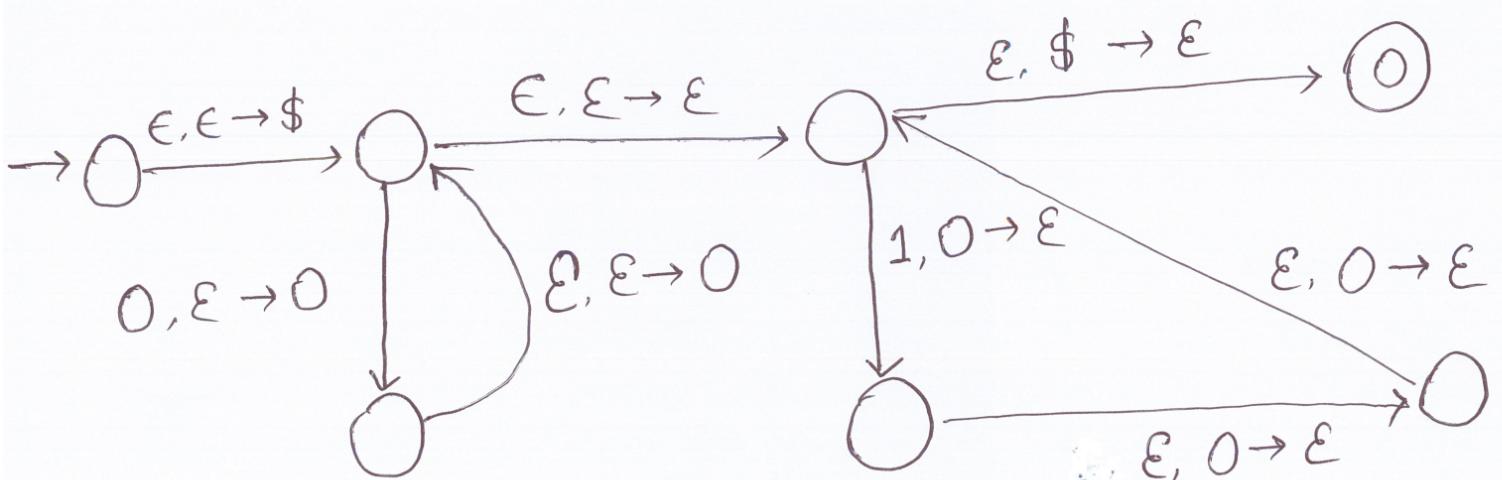
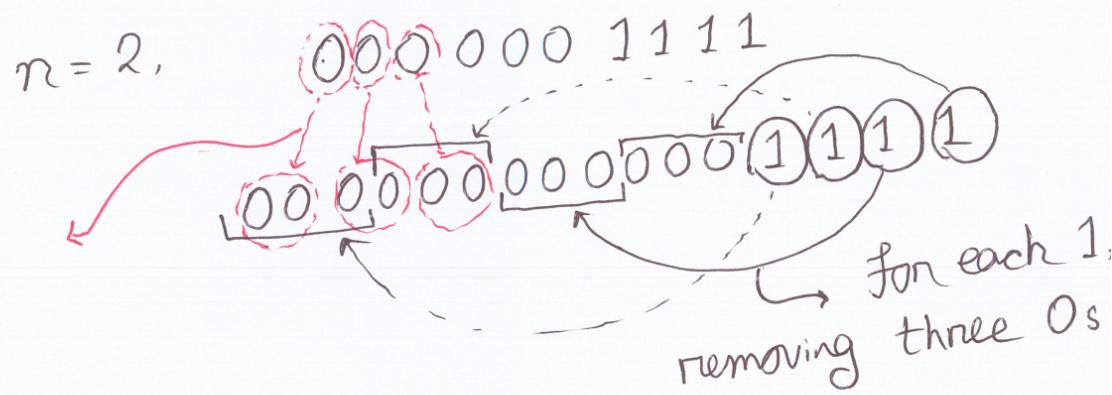
$$\Rightarrow 0^{3n \times 2} 1^{2n \times 3} \dots$$

for each 1,  
we can remove  
three 0s from  
our stack

insert two

$$\Rightarrow 0^{6n} 1^{6n}$$

0s.



Q:  $L = \{ \omega\omega^R : \omega \in \{0,1\}^* \}$

$\hookrightarrow \omega^R$  denotes reverse of  $\omega$

for example:  $\omega = 10110$

$$\omega^R = 01101$$

so,  $\omega\omega^R = 1011001101$

$\downarrow$   
Basically even length palindrome

