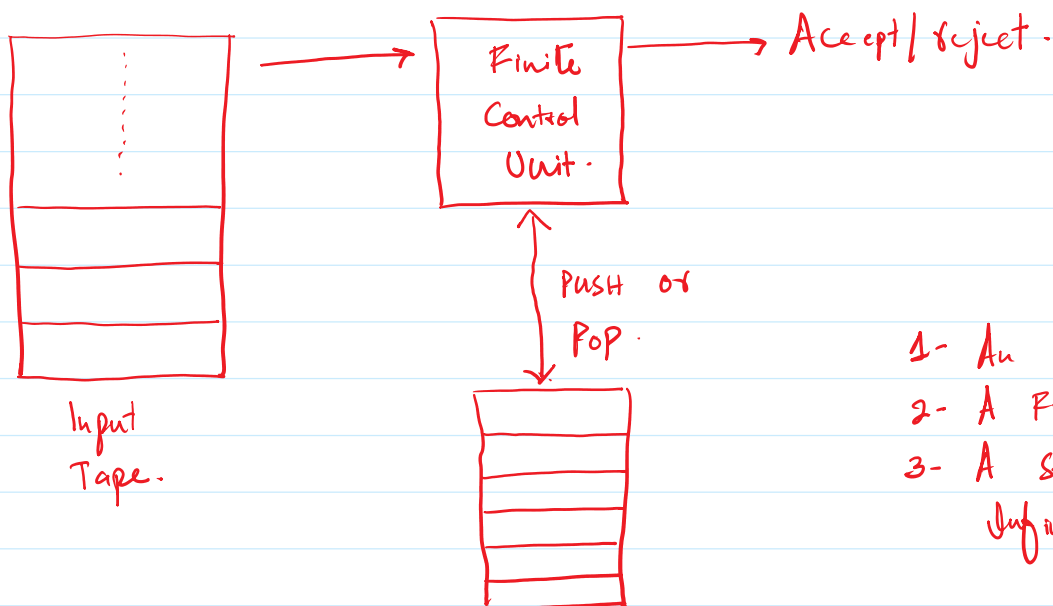
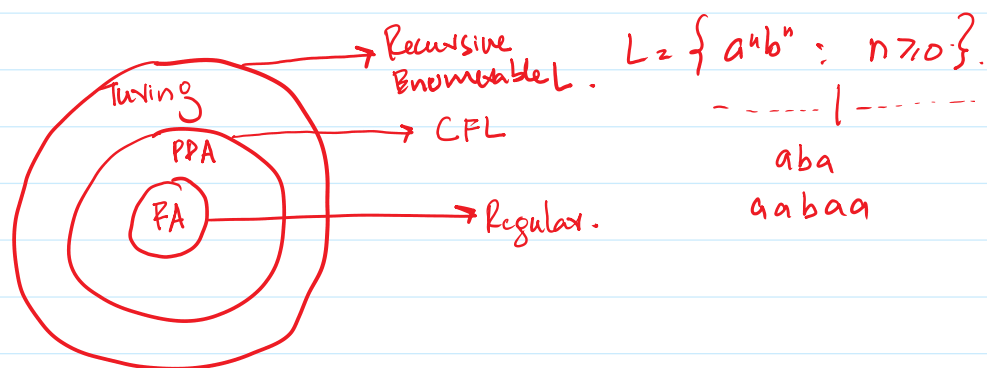


Lecture 27:

PUSH DOWN AUTOMATA (PDA).

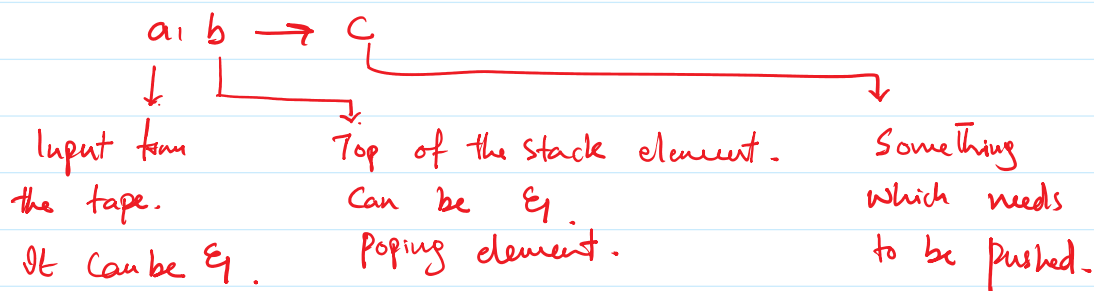


- 1- An Input tape.
- 2- A Finite Control Unit
- 3- A Stack with infinite size.

PDA General form.

$PDA = FA + \text{Memory (Stack)}$.

Transition.

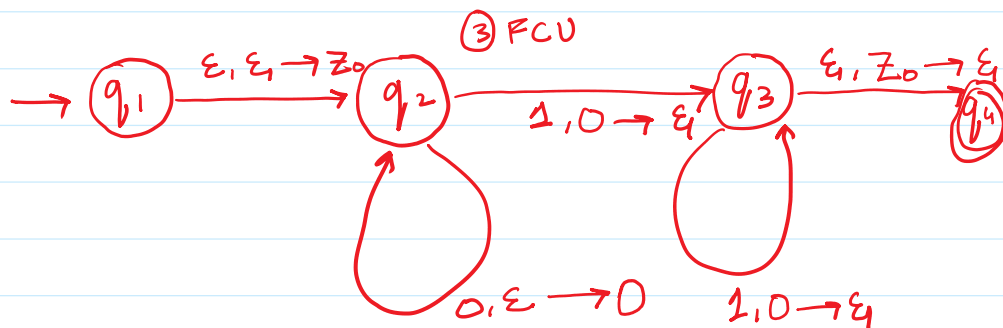


$L = \{0^n 1^n \mid n \geq 0\}$.

01, 0011, 000111, ...

$L_2 = \{0^n 1^n \mid n \geq 0\}$.

01, 0011, 000111, ...
 $\frac{11}{x}, \frac{10}{x}, \frac{00}{x}, \dots$

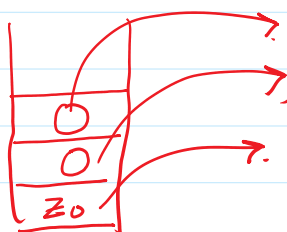


000111.

① Input tape.

0011ε

PDA = P + Stack.



② stack.

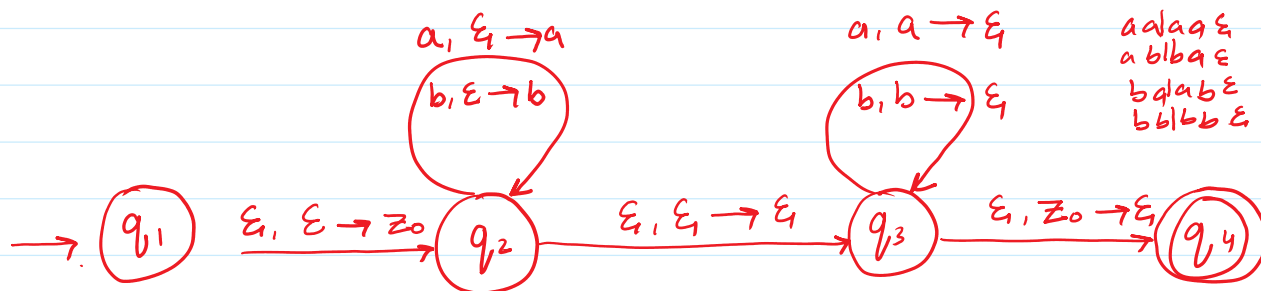
Questions:-

- 1- what symbol needs to be stored.
- 2- when to push ϵ when to pop.

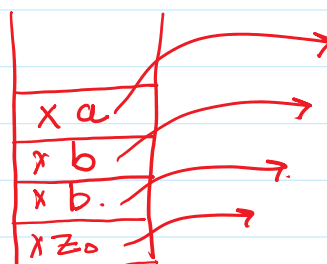
Ex:-

$L = \{ww^R \mid w \in (a+b)^+\}$.

ϵ
 $a|a\epsilon$
 $b|b\epsilon$
 Even length.

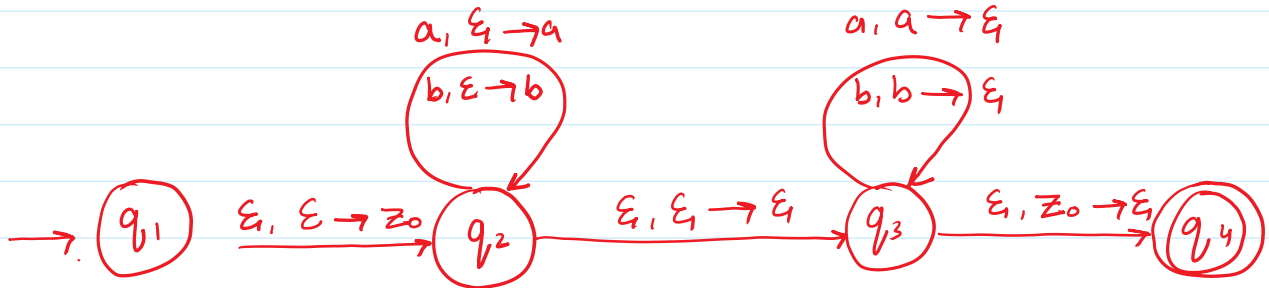


$\epsilon b b a a b b \epsilon$
 Input tape.

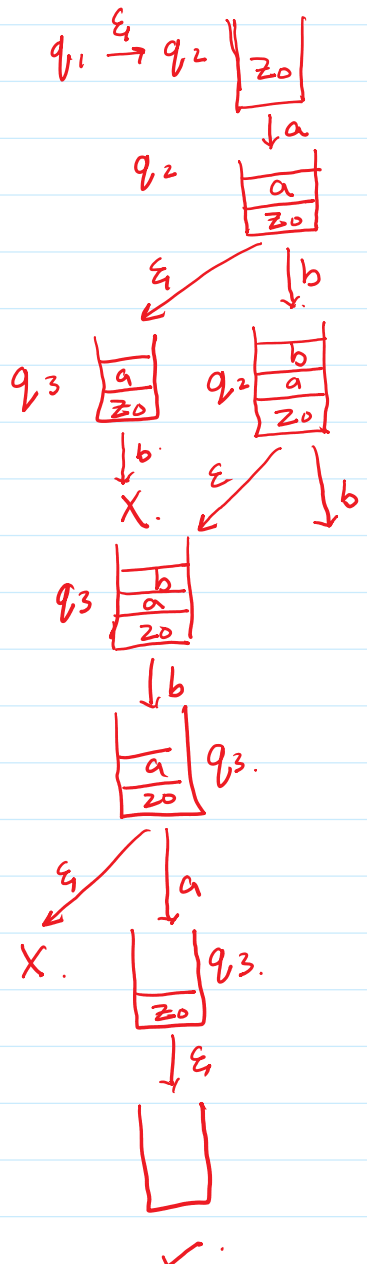


Machine Perspective:-

How to know the middle of the palindrome string.



$\epsilon a \epsilon b \epsilon b \epsilon a \epsilon$
 $\uparrow \uparrow \uparrow \uparrow$



✓.

Ex:-

$L = \{ 0^n 1^{2n} \mid n \geq 0 \}$.

(3n) HW.

q_3
 $\epsilon 0 0 1 1 1 1 \epsilon$
 $q_1 q_2 q_4$

