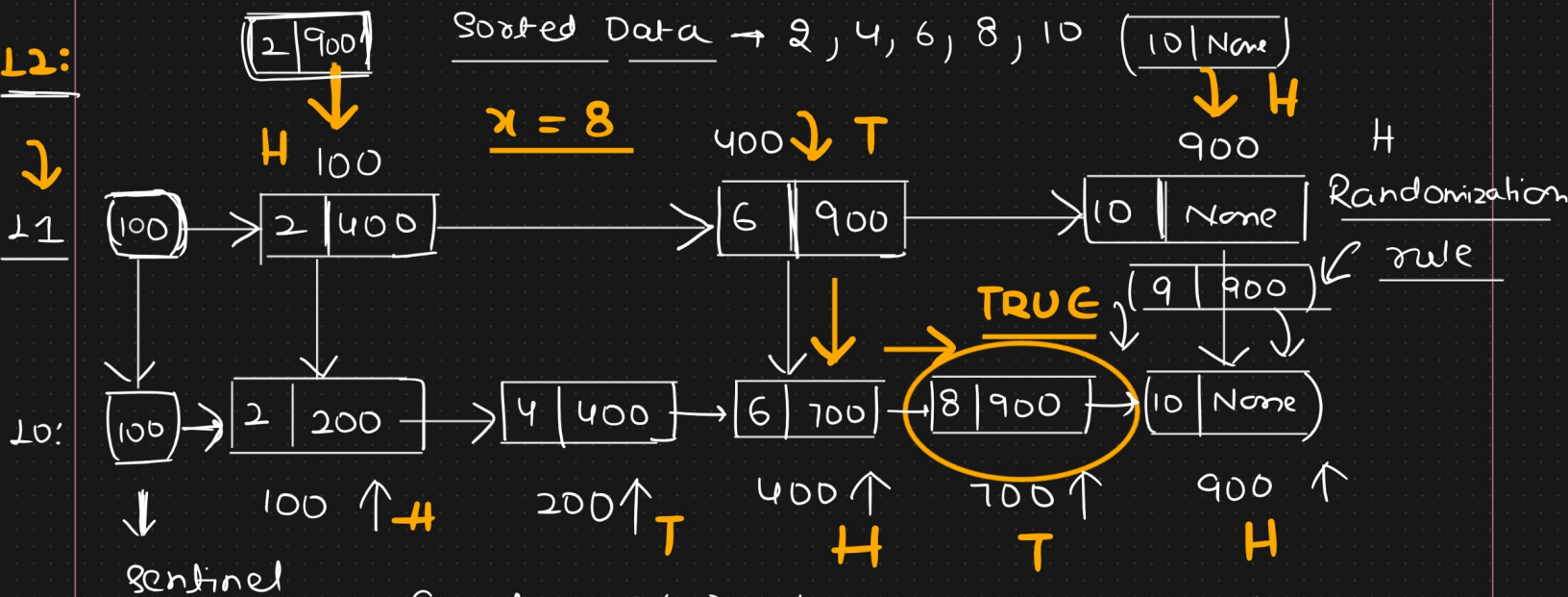


# Skip List (Randomized Data Structure)



Event  $\rightarrow P(H) = \frac{1}{2}$  {unbiased event}

$P(T) = \frac{1}{2}$

$\left\{ \begin{array}{l} H \rightarrow \text{extend node to upper layer} \\ T \rightarrow \text{Not extend} \end{array} \right.$

$n \rightarrow \# \text{ nodes Linked List}$

$\# \text{ layers} = \log_2 n$

newnode =  $\left[ \begin{array}{c|c} 9 & \text{None} \end{array} \right]$

Stack  $\rightarrow$  LIFO

(Last In first Out)

- ↳ function calling
- ↳ Migrating
- ↳ undo
- ↳ exp evaluation

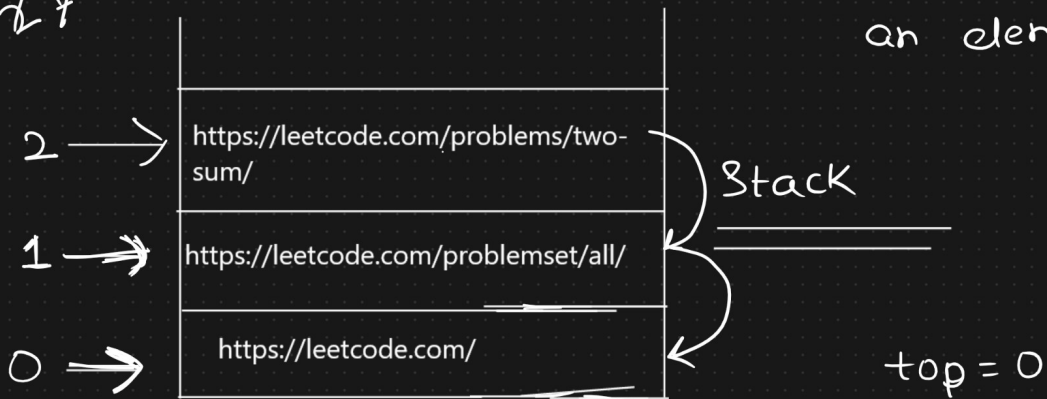
ADT  $\rightarrow$  Abstract Data Type

most frequent operations

top

- ↳ Push - insertion of an element
- ↳ Pop - Deletion of an element

Push  
top = 2



$\Theta(1)$

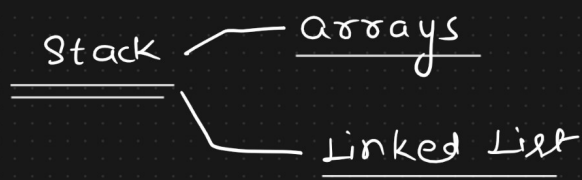
push(arr, x):

top++

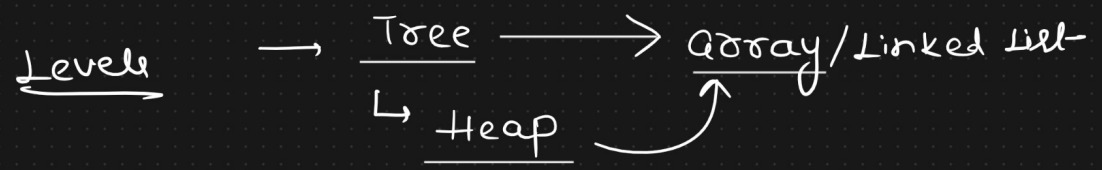
arr[top] = x

pop():

$\Theta(1)$   $\Rightarrow$   $\left\{ \begin{array}{l} x = \text{arr}[\text{top}] \\ \text{top} -- \\ \text{return } x \end{array} \right.$



Data Structure



Basic of Tree

LIFO

FIFO

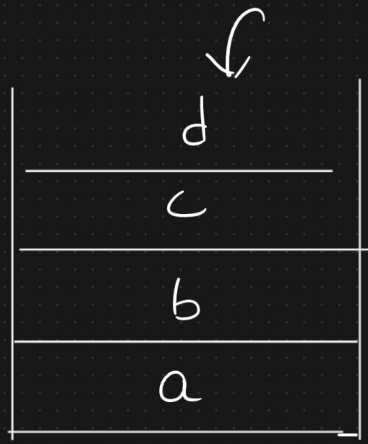
Stack & Queue → array/linked list

networking

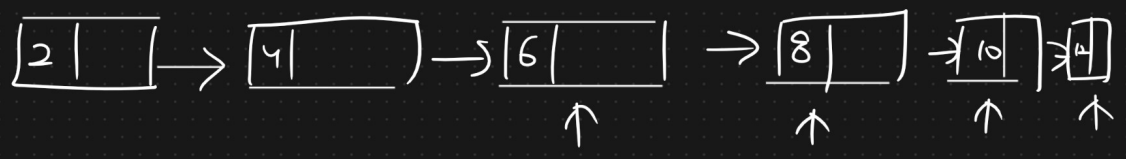
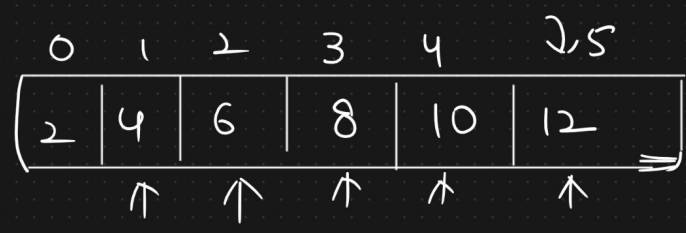
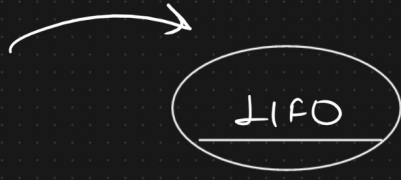
Graph → array/linked list

Adjacency list/

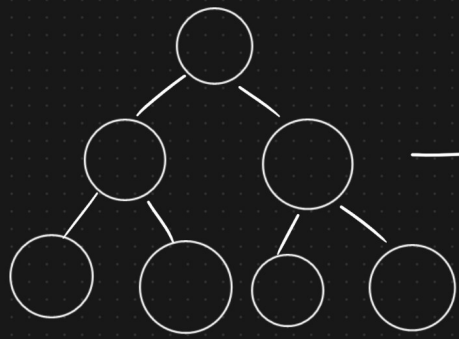
Adjacency matrix

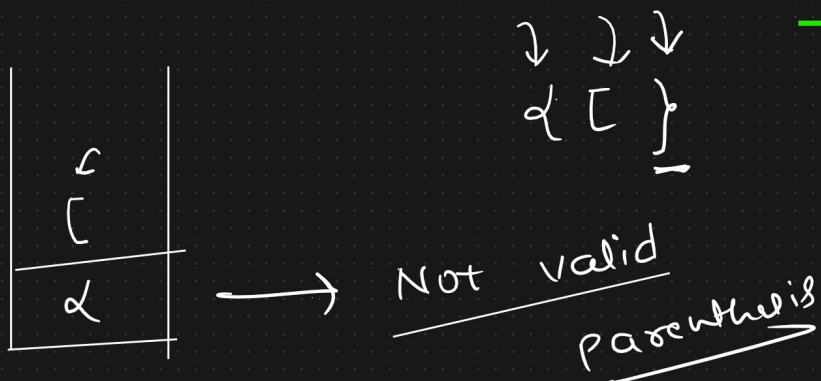
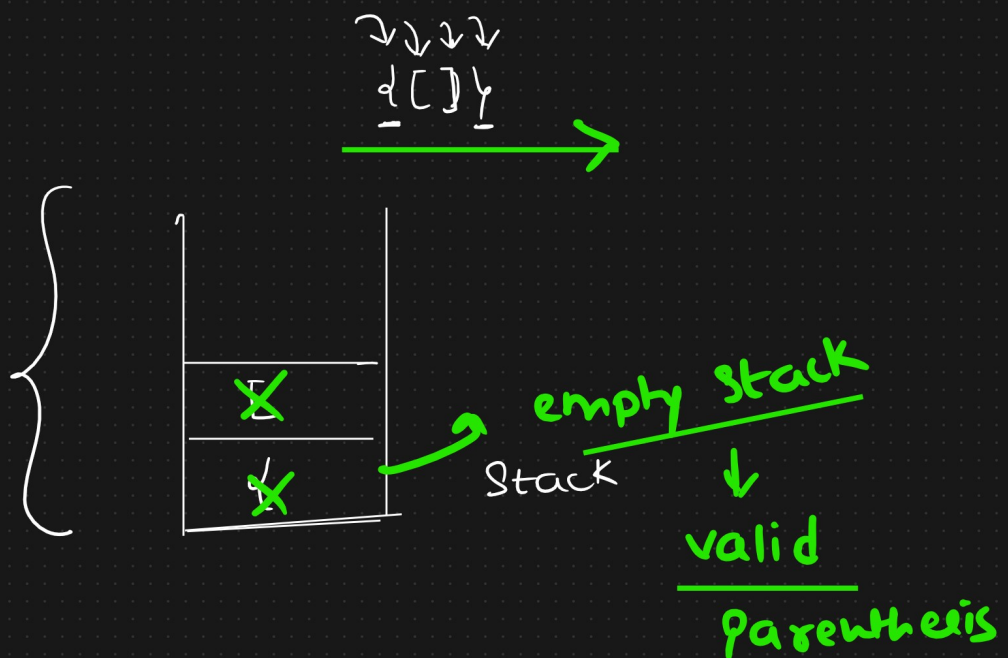
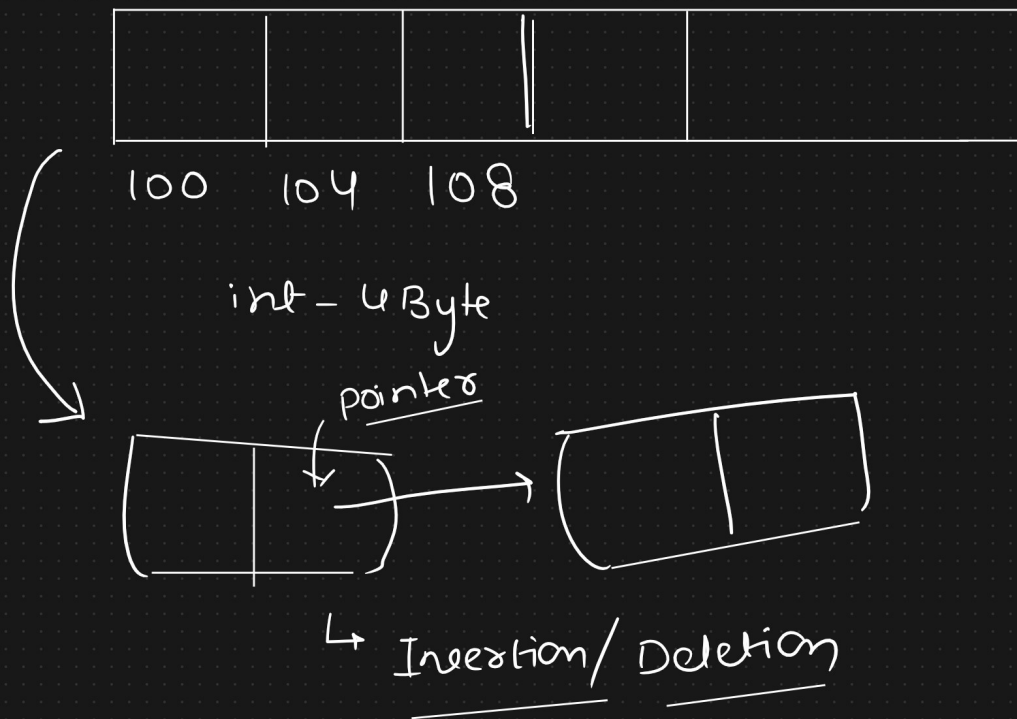


Stack



Tree





$\begin{matrix} \downarrow & & \downarrow \\ ( \} & \{ ) \\ \uparrow & \uparrow \end{matrix}$

|          |
|----------|
| $\alpha$ |
| $($      |

→ Not a valid parentheses