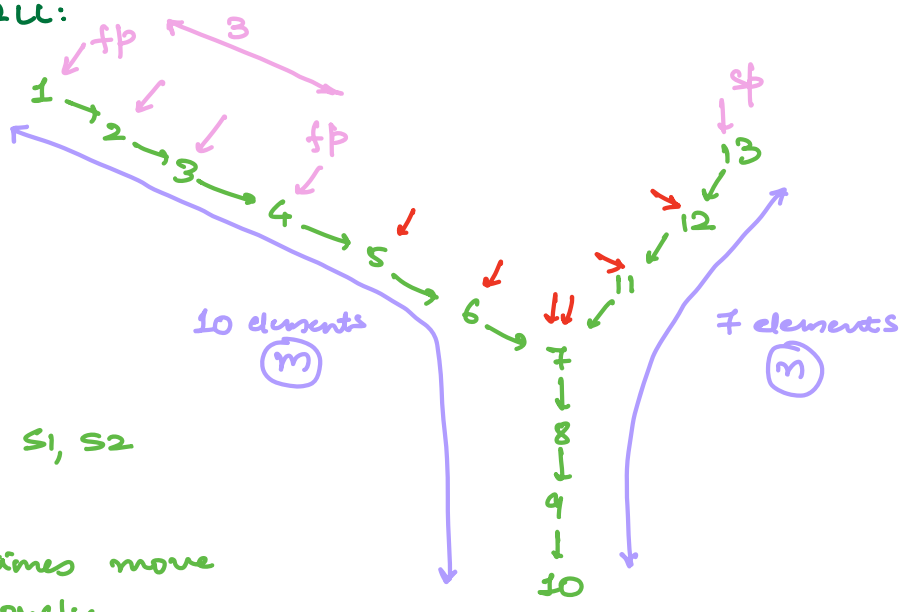
Intersection of 2 LL:



TC: $m+n+m+n$

$= O(m+n)$

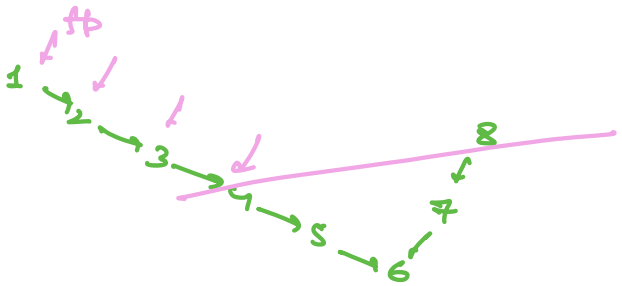
SC: $O(1)$

$10-7 = 3$

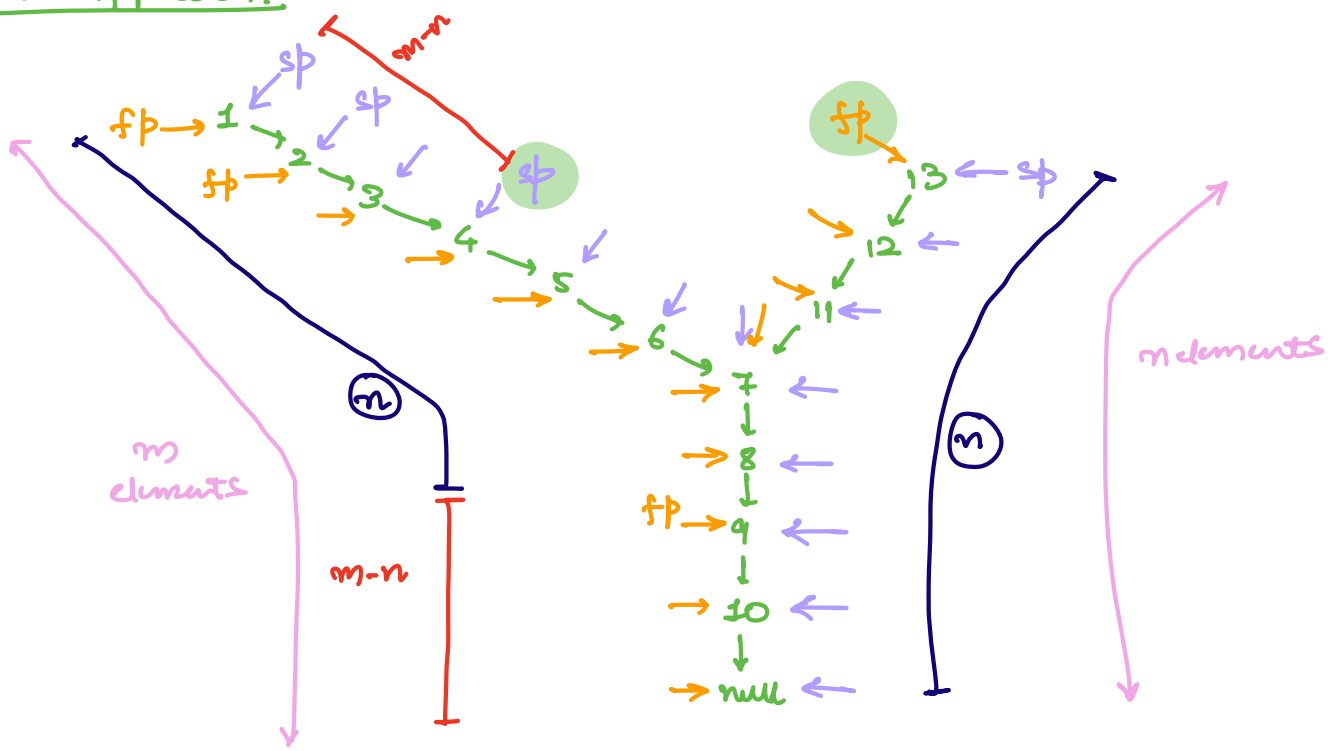
Size of both LL s_1, s_2

$s_1 - s_2 = 3$

bigger LL s_1-s_2 times move fp sp simultaneously.



Best Approach:

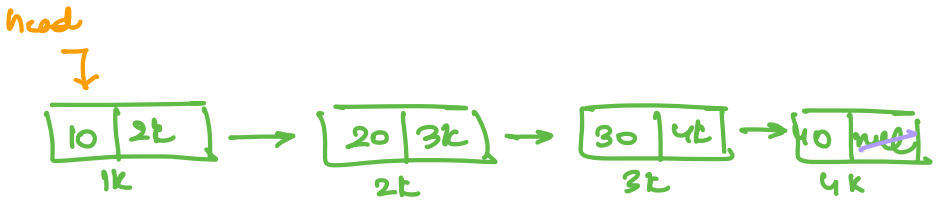


TC: $\underbrace{n+(m-n)}_{m} + m+n$ SC: $O(1)$

$= O(m+n)$

Time Complexity:

Head:

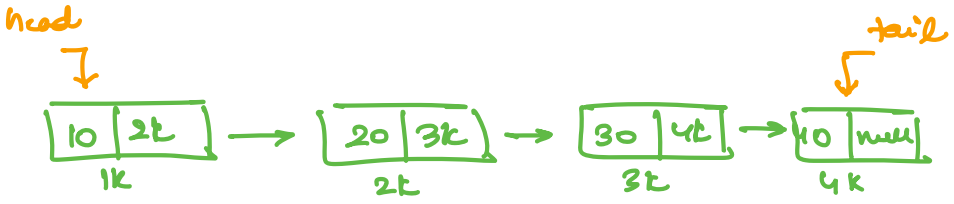


Display: O(n)
Size: O(n)
Get first: O(1)
Get last: O(n)
Get At: O(n)

Add first: O(1)
Add last: O(n)
Add At: O(n)

Remove first: O(1)
Remove last: O(n)
Remove At: O(n)

Head, Tail:

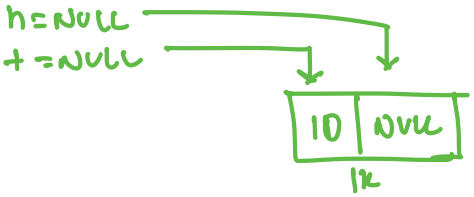


Display: O(n)
Size: O(n)
Get first: O(1)
Get last: ~~O(n)~~ O(1)
Get At: O(n)

Add first: O(1)
Add last: ~~O(n)~~ O(1)
Add At: O(n)

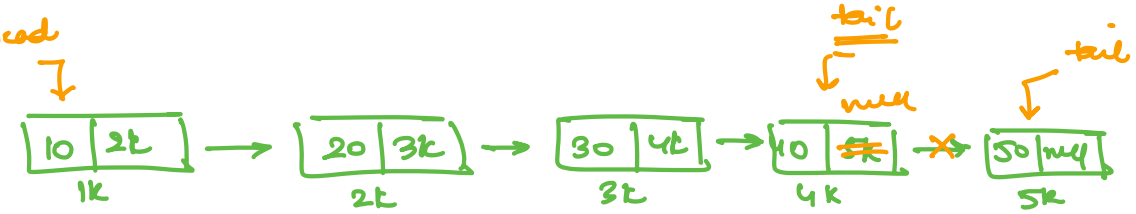
Remove first: O(1)
Remove last: O(n)
Remove At: O(n)

Add:

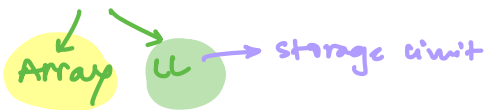


Remove last:

O(n)



Stack

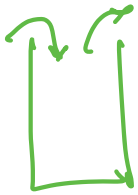


Case 1: LL Head

Gf : O(1)
Gl : O(n)

Af : O(1)
Al : O(n)

Rf : O(1)
Rl : O(n)



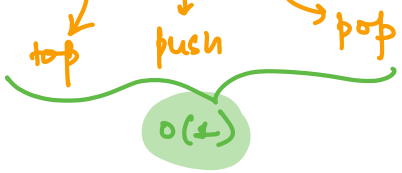
LIFO

same end

all works either from start or from last

Combination 1: GF, AF, RF ✓ O(1) TC

Combination 2: GL, AL, RL ✗ O(n) TC



Case 2: LL Head, Tail

GF: O(1) AF: O(1) RF: O(1)

GL: O(1) AL: O(1) RL: O(n)

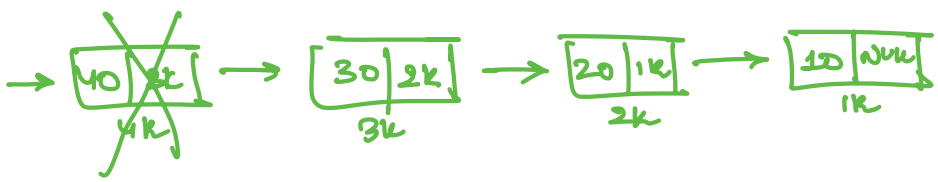
Combination 1: GF, AF, RF O(1) TC ✓

Combination 2: GL, AL, RL ✗

GL: O(1) ✓ AL: O(1) RL: O(n)

Eg:

Push(10)
Push(20)
Push(30)
Push(40)
Pop()



Queue using LL

FIFO

2 ends

Case 1: LL Head

GF: O(1) AF: O(1) RF: O(1)

GL: O(n) AL: O(n) RL: O(n)

	Add	Delete
Combination 1:	AF O(1)	RL O(n)
Combination 2:	AL O(n)	RF O(1)

You are not able to achieve O(1) TC for both add & delete

Case2: LL H, T

get_first()

Gf: O(1)
GL: O(1)

get_back()

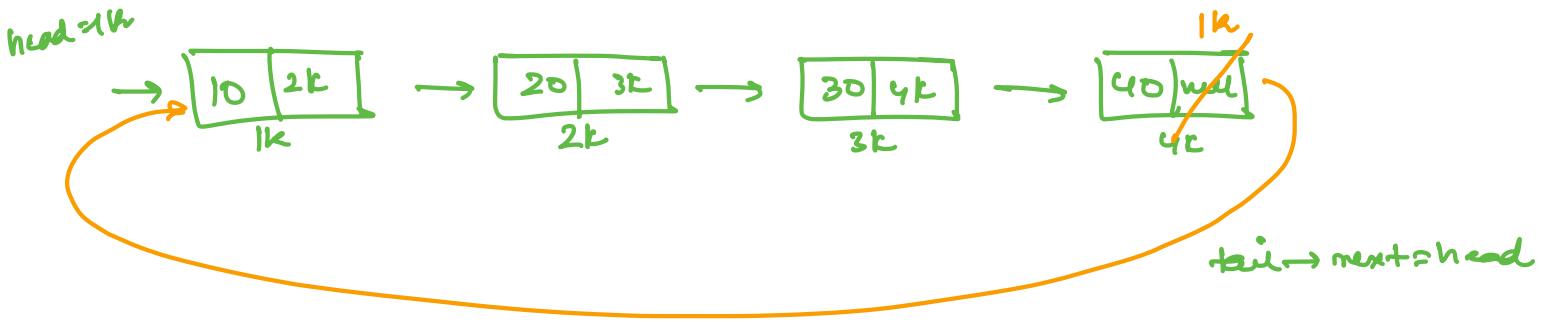
Af: O(1)
AL: O(1)

Rf: O(1)
RL: O(n)

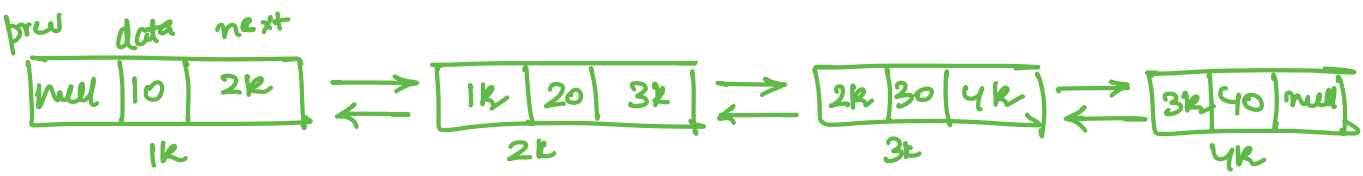
	Add	Delete	
Combination 1:	Af O(1)	RL O(n)	✗
Combination 2:	AL O(1) → push	Rf O(1) → pop	✓

Singly linked list → H
→ H, T

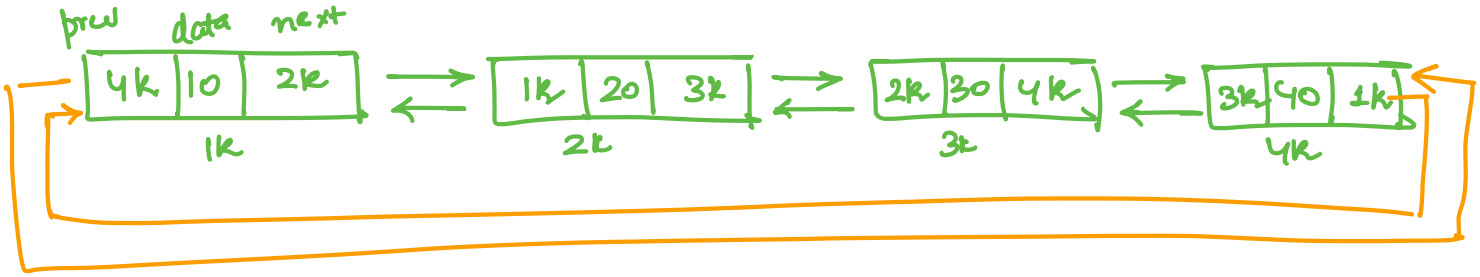
Circular linked list:



Doubly linked list



Doubly Circular linked list



LL Q's.

→ Detect Remove loop, Intersection, kReverse, LL Palindrome

K Reverse:

K=3