Agenda → lookup various important & recently asked interview problems (online test & f2f)

→ lot of topics, LL, Stack, HM, DB, etc

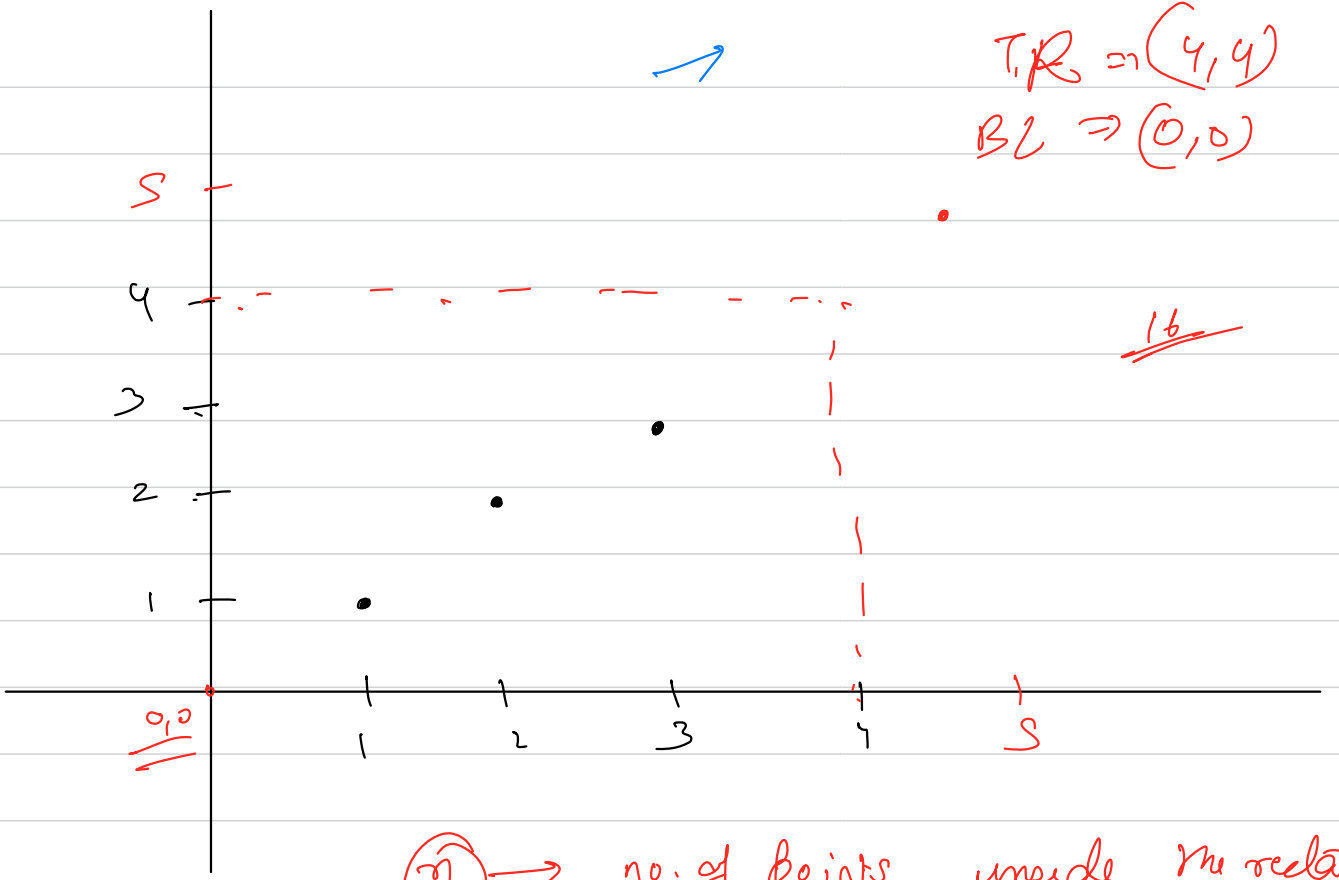
Pre-requisite → High level & basic knowledge of basic DSA

Q⇒ You have been given a 2D cartesian plane. Now this plane represents a sea and there are some ships in the sea.
Each ship is located at an integer point & each integer point contains atmost one ship.
You have a helper function hasships (topright, bottom left) & it returns 'true' if there is at least one ship in the rectangle represented by these 2 points
( )
Now you will get q queries, with each query we have TR, BL, we have to return the no. of ships present in the rectangle represented by query.
In any rectangle there are atmost 10 ships

$q \leq 4 \times 10^2$

$0 \leq TR.x, TR.y, BL.x, BL.y \leq 10^3$

$TR != BL$

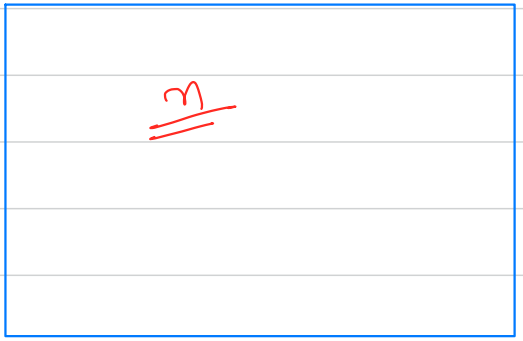


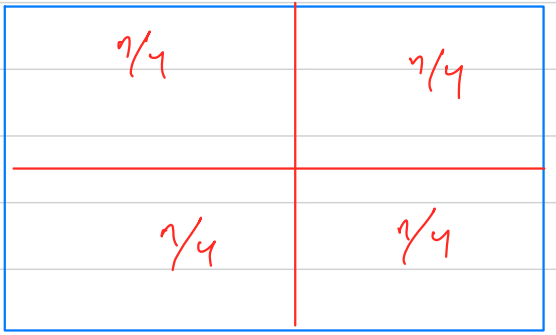
n → no. of points inside the rectangle

n → n−1 → n−2 → n−3 - - - - -

Divide and Conquer

4 equal bars





$$T(n) = 4 \times T(n/4) + \Theta(1)$$

$\Theta(n)$

$$T(n) = a\,T(n/b) + f(n)$$

↳ master theorem

n → total no. of point inside a rectangle

Using Approach (1)

$T(n) = T(n-1) + O(1)$

$T(n-1) = T(n-2) + O(1)$

$T(n-2) = T(n-3) + O(1)$

⋮

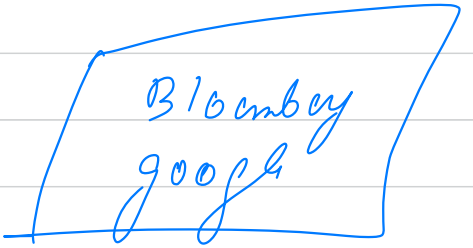
$T(2) = T(1) + O(1)$

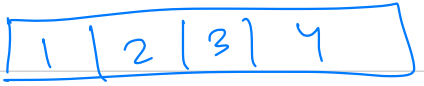
$\Rightarrow T(n) = T(1) + n \times 1 \rightarrow O(n)$

$O(n)$

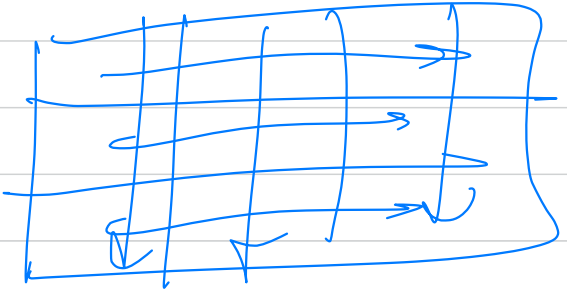
Using DNC we are able to perform some calls in best case we can perform a whole subpoch of size n/4

penguin → O(n)

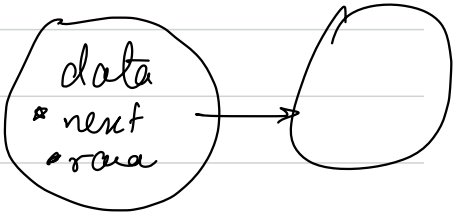




cumulative sum

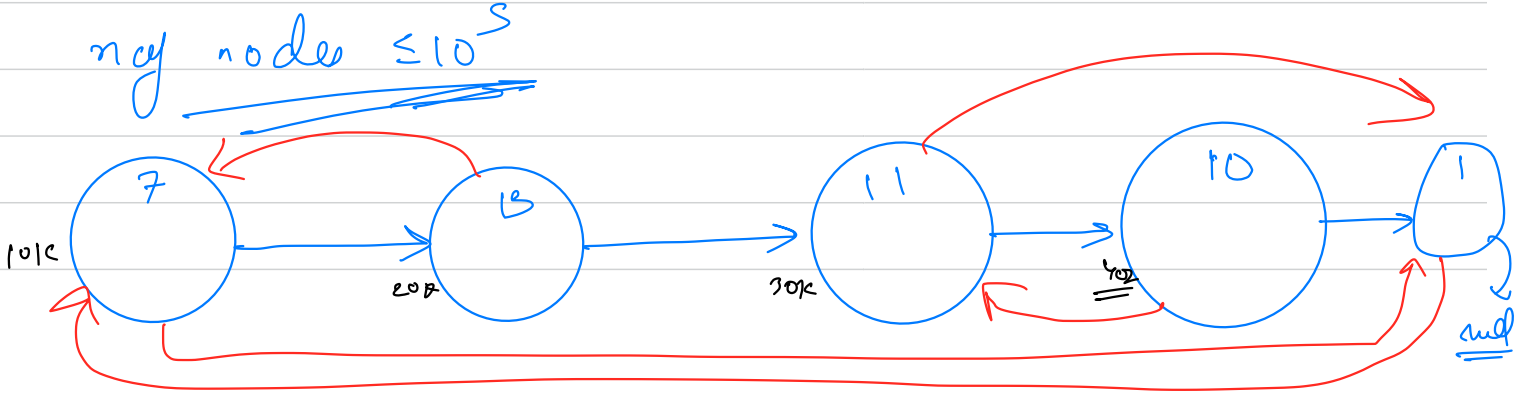


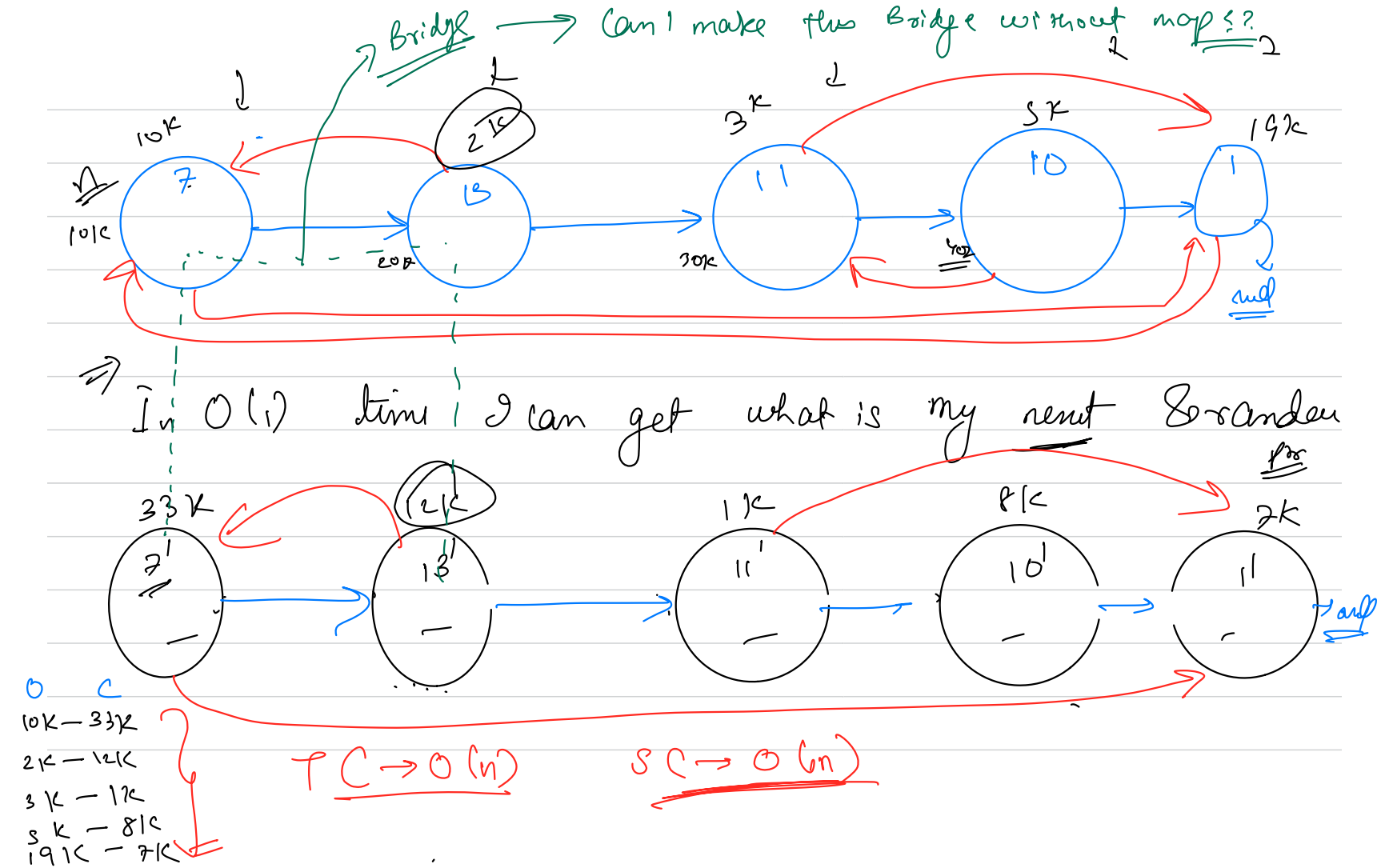
Q: You have a linked list, where every node has a data value, a next pointer and a random pointer

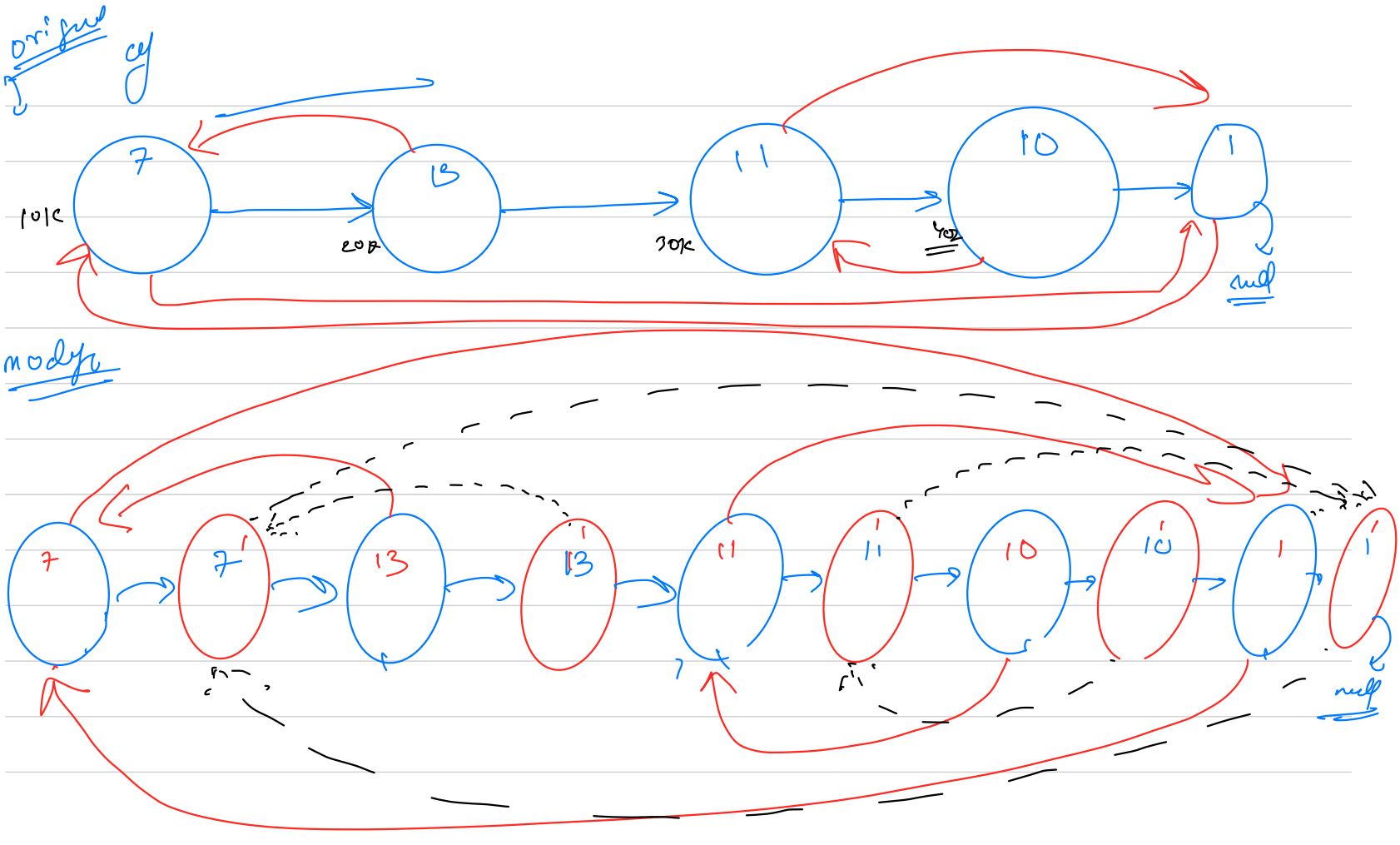


Random pointer can be "null" or can point to any node of ll.

You have to return a new fresh deep copy of ll.




Bridge → Can I make this Bridge without map ??
10K
2K
3K
5K
19K
7
13
11
10
1
101C
20K
30K
4K
null
In O(1) time I can get what is my next Srandom
33K
12K
1K
8K
2K
21
131
111
101
11
null
O C
10K — 33K
2K — 12K
3K — 1K
5K — 8K
19K — 7K
TC → O(n)
SC → O(n)


original
cp
7
13
11
10
1
null
modify
7
7'
13
13'
11
11'
10
10'
1
1'
null

True → code

false → new problem

DNC → code

Q> You have to design a browser prev & next button

→ string prev(int steps)

string forward(int steps)

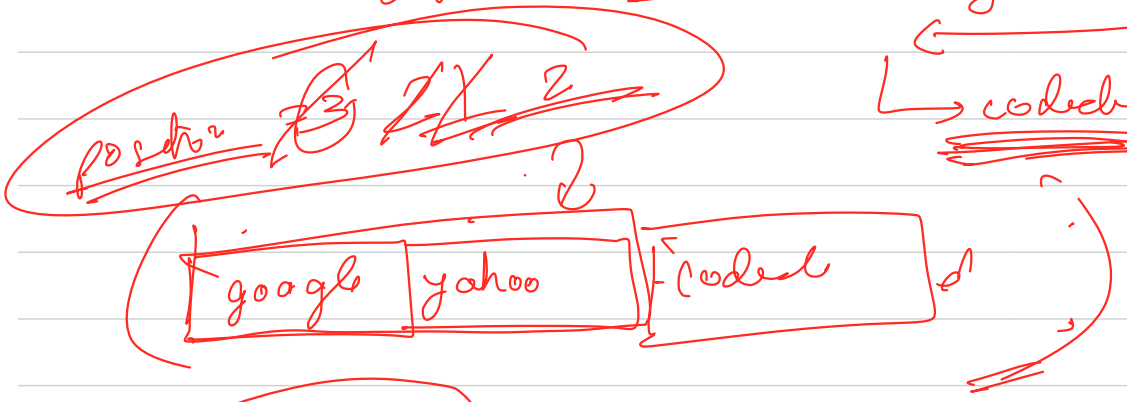
void visit(string URL)

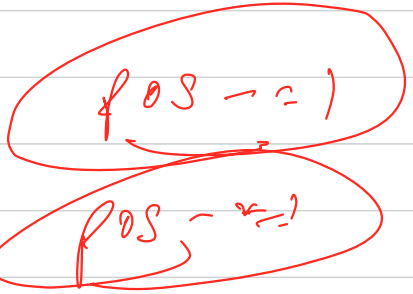
O(n) O(1) DLL

→ as soon as you make a custom visit remove forward link

vector / arrayList / list

google → yahoo → rediff → increase





vim

resize

v.resize(pos)