Interview में which DS use
then not given

Imp Points :- 9th Nov 2025 (Sunday) Sunday III Yr IIIP

1. ArrayList v/s LinkedList

insertion: TC = O(n) , O(1)

Search: TC = O(1) , O(n)

{ यहाँ से useCase वाला DS. जहाँ ज्यादा insertion का काम हो तो use prefer ~~Linked~~ LL and Vice-versa

prop of LL

1. [data | next] [1] → [2] → [3] → NULL

variable Size, Dynamic Memory ~~Loc~~ Allocation, Non-Contiguous Size

2. हम LL में Backward ~~~~ तरफ से Node को traverse नहीं कर सकते

So that we make a copy temp

LL is Linear D.S.

Operation

- push-front → pop-front
- push-back → pop-back
- void insert (int val, int position)
- int Search (int Key)

3.

3.

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Que:- (1773) Count Items matching a Rule

arr<int> items where items[i] = [$type_i$, $color_i$, $name_i$] describe i-th items. You also given a rule represent by two str 'ruleKey', 'ruleValue'.

The i-th item said to match rule if:

R1: ruleKey == "type" and ruleValue == $type_i$

R2: ruleKey == "color" and ruleValue == $color_i$

R3: ruleKey == "name" and ruleValue == $name_i$

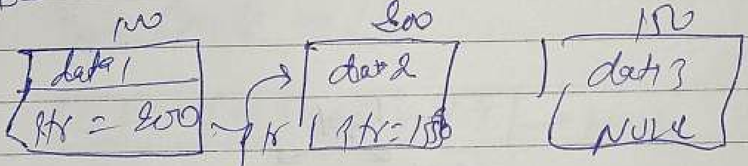
return no. of item match rule.

TestCase: items = [["phone", "blue", "pixel"], [
["computer", "silver", "lenovo"]
["phone", "gold", "iphone"]

ruleKey = "colour",
ruleValue = "silver"

Linkedlist: Linear   Arr [1 | 2 | 3 | 4] 100 104 108

dynamic DS [1] → [2] → [3] node

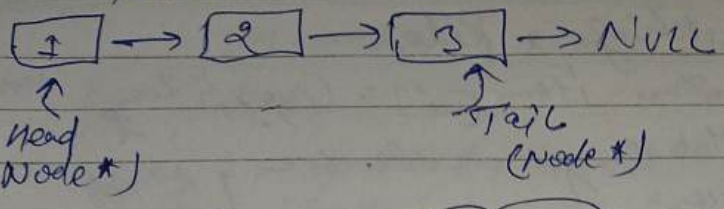


node: data, next Node*

इस LL में arr के तरह index से किसी O(1) से node को access नहीं कर सकते, इसमें O(n) से होगा T.C worst case में

```
class Node myLL {
  public
     int data;
     Node* next;
}
  Node(int val){
     data = val;
     next = NULL;
  }
```

LL implement



class Node {
public:
int data;
Node * next;

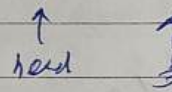
Node(int val) {
data = val;
next = NULL;
}
};

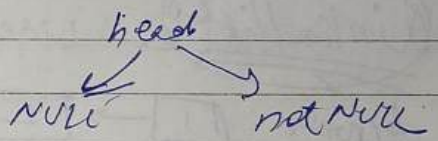
class List {
private:
Node * head;
Node * tail;
public;
List() {
head = tail = NULL;
}
};

LL functions

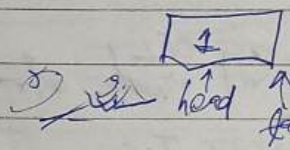
i) push_front() → pop_front
ii) push_back() → pop_back
iii)

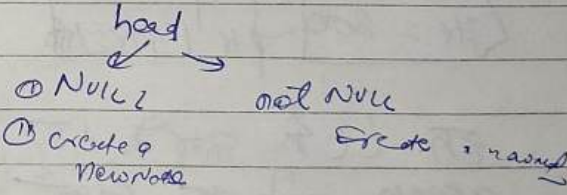
push_front(1)





push - front in LL





void push_front(int val) {
Node * newNode = new Node(val); //dynamic
Node newNode(val); //static
if (head == NULL) {
head = tail = newNode;
} else {
newNode->next = head;
head = newNode;
}

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[2] → [1]
head   tail

```
int main() {
    list L1;
    L1.push_front(1);
    L1.push_front(2);
    L1.push_front(3);

    return 0;
}
```

Steps: head → next NULL
① create a new...
② newNode → next = head
③ head = newNode

[3] → [2] → [1]

क्योंकि (*newNode).next = head
या newNode → next = head

print LL

indexing इसमें head से किया जाता है, not tail, most case

[3] → [2] → [1] → NULL
head temp tail

```
Node* temp = head
while (temp != NULL) {
    cout << temp->data << " ";
    temp = temp->next
```

प्रश्न:- हम क्यों यहाँ temp बना रहे why not direct use head?
उत्तर:- क्योंकि LL में Backward traversal करना impossible है।
इसलिए copy बनाते हैं।

Push Back in LL

[3] → [2] → [1] → [4] → NULL
head   tail

head != NULL
① create newNode
② tail → next = newNode
③ tail = newNode

```
void push_back(int val) {
    Node* newNode = new Node(val);
    if (head == NULL) {
        head = tail = newNode;
    } else {
        tail -> next = newNode;
        tail = newNode;
```

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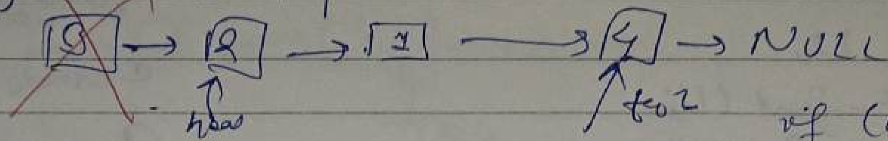
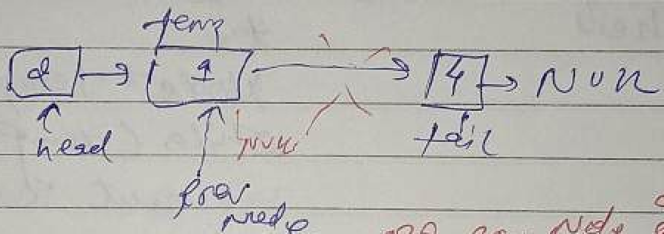
Pop-front & Pop Back




```
void pop-front() {
  if (head == NULL) {
     cout << "LL is empty \n";
     return;
  }
  Node* temp = head;
  head = head -> next;
  temp -> next = NULL;
  delete temp;
```

```
if (head == NULL)
Node* temp = head
head = head -> next
temp -> next = NULL
delete temp;
```

Pop Back



TC = O(n)

```
if (head == NULL)
      return;
Node * temp = head;
while (temp -> next != tail) {
         temp = temp -> next;
} // Break connect prev node
  temp -> next = NULL

delete tail
tail = temp;
```

यहाँ, prev Node को disconnect करें

temp -> next == tail)

या temp -> next -> next == NULL)

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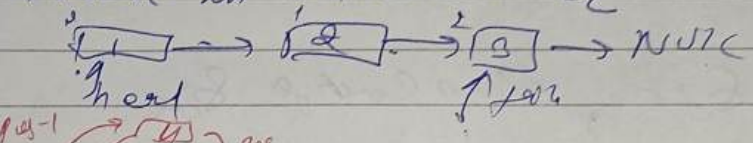
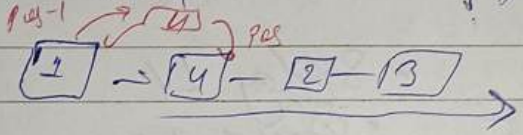
```
void pop_back() {
    if (head == NULL) {
        cout << "LL is empty";
        return;
    } else {
        Node* temp = head;
        while (temp->next != tail) {
            temp = temp->next;
        }
        temp->next = NULL;
        delete tail;
        tail = temp;
    }
}
```

Insert in Middle in LL

insert(val, pos);

insert(4, 2)





① Create newNode

Node* temp = head

```
void insert(int val, int pos) {
    if (pos < 0) {
        cout << "Invalid";
        return;
    }
    if (pos == 0) {
        push_front(val);
        return;
    }
    Node* temp = head;
    for (int i = 0; i < pos-1; i++) {
        temp = temp->next;
    }
    Node* newNode = new Node(val);
    newNode->next = temp->next;
    temp->next = newNode;
}
```

for (int i=0; i<pos-1; i++) {
    temp = temp->next;
} temp;

new Node ->next = temp->next

temp->next = new Node

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Contig → (ArrayList) V/S LinkedList → non contig mem

Insert - O(n) O(1)

Search - O(1) O(n) search (key)

SEARCH in LL

[1] → [2] → [3] → NULL

0 1 2

temp idx = 0

Key = 2 → (1)

-1

```
int search (int key) {
    Node* temp = head;
    int idx = 0;
    while (temp != NULL) {
        if (temp→data == key) {
            return idx;
        }
        temp = temp→next;
        idx++;
    }
    return -1;
}
```

prog of LL → Variable size, Non Contig size

train दिब्बा eg -

- Singly LL
- Doubly LL
- Circular LL

नोट:- जहाँ indexing का काम आता है LL वहाँ यूज़ नहीं कर सकते search करने के लिए O(1)

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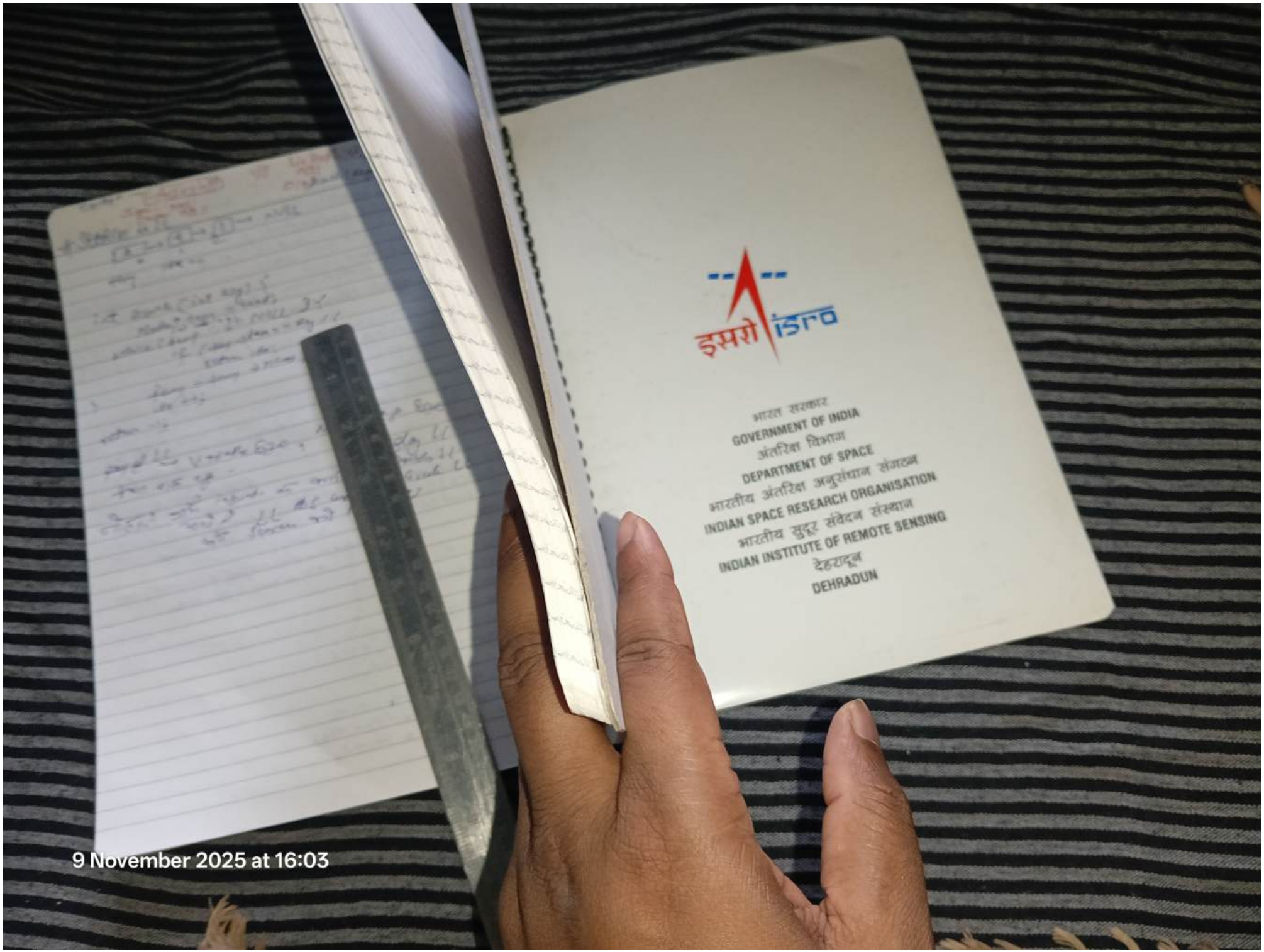
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