Kickstart Competitive Programming With STL Vectors

Special class

Sanket Singh • Oct 7, 2020

Kickstart Competitive Programming With STL Vectors

Part Of: Course on Standard Template Library (STL) in C++

Starting From October 14

Let's crack Competitive Programming together!

Sanket Singh

- Software Development Engineer @ **LinkedIn**
- Former Software Developer @ **Interviewbit/Scaler**
- Former Product Engineer @ **Coding Blocks**
- Cracked Google Summer Of Code 2019 under **Harvard University**
- Former Research Intern @ **ISRO (Indian Space Research Organisation)**
- Taught 7,500+ programmers in Data Structures, Algorithms and Fundamentals of Computer Science
- Work experience with Startups like **Kakcho**, **Talview**, **FableHQ**
- Got **Rank 1** in Codechef Long Challenges
- Won **Infosys** Digital Make-a-thon And Codechef Rank 1 In Long Challenge

What we will discuss today??

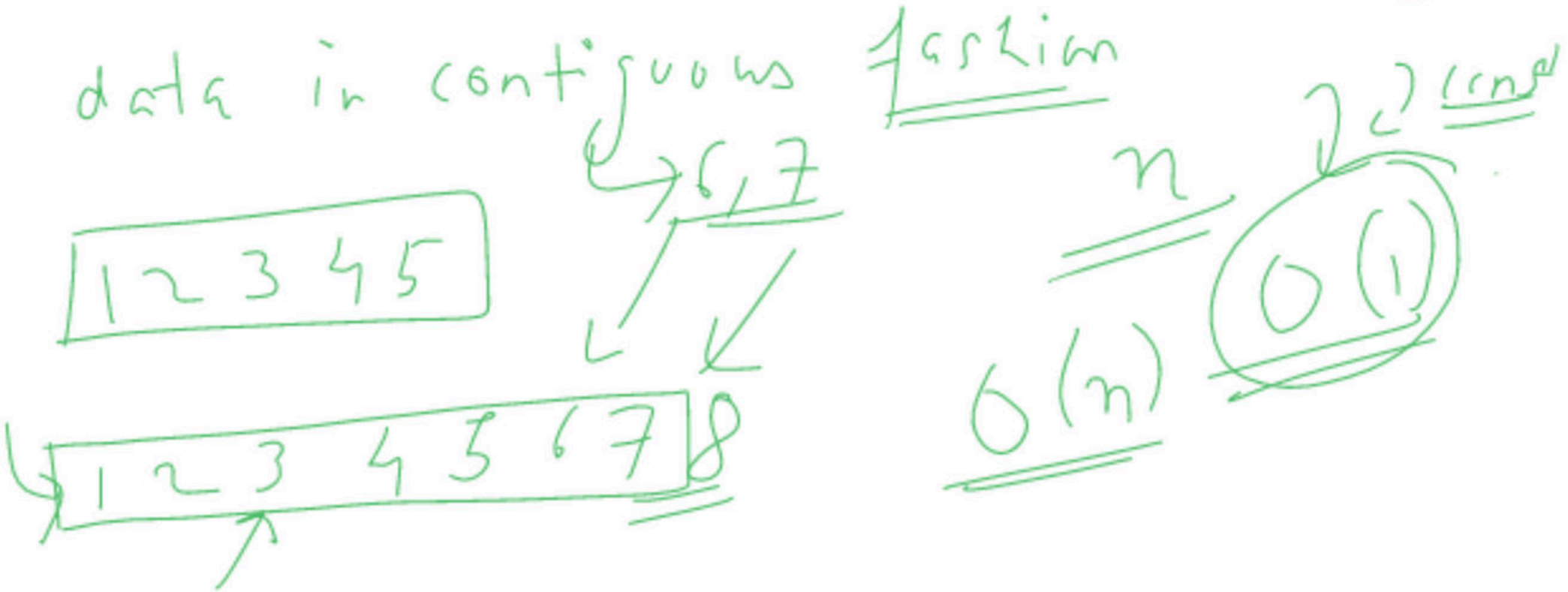
- Introduction to Vectors and their Importance
- Vector Operations Insertion, Deletion and Update
- Motivation Problem For Difference Vector Trick
- How to use Difference Vector Trick and Problems
- push_back vs emplace_back
- passing vectors in functions in efficient way
- Motivation Problem for two pointer approach
- Implementing Two Pointer trick in various problems

Introduction To Vectors → dynamic arrays

→ already had array

→ 0

Store data in continuous fashion



Operations Available For Vectors

Motivation Problem For Difference Arrays

You are given an array A of length N with all initial elements as zero. You are given Q queries. In each query you will be given two values L and R. For each query you need to increment the values of all the indexes in the range [L, R]. Print the final Array.

Ex- A = [0,0,0,0,0]

Q = 3

0 3

1 1

1 2

Ans - [1,3,2,1,0,0]

1 <= N <= 10^7 , 1 <= Q <= 10^7

O(Q×N) Brute force

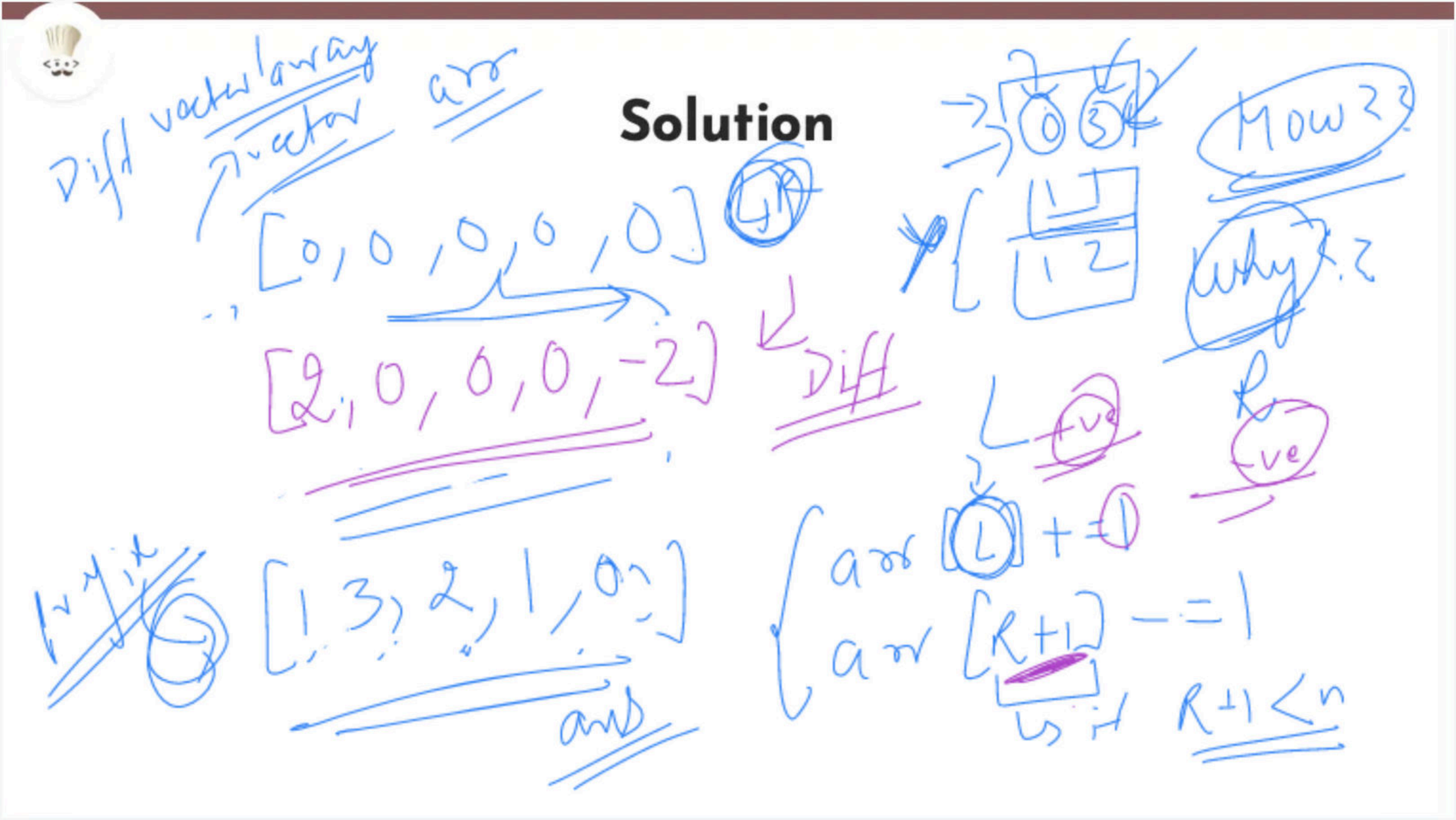
1 3 2 1 0

O(N)

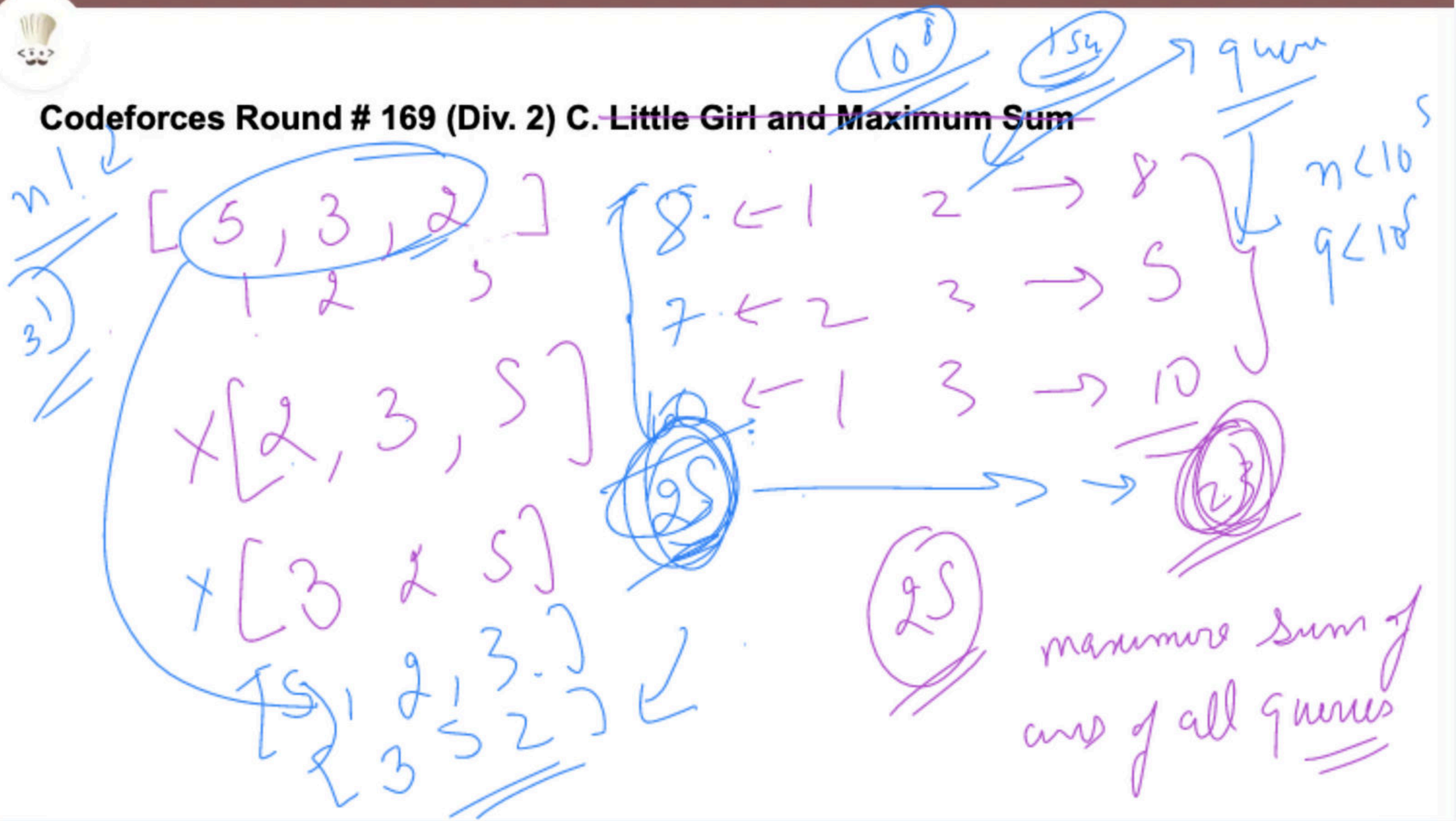
L = 0

R = N-

Solution


Diff vector/array
arr
[0,0,0,0,0]
[2,0,0,0,-2]
Diff
[1,3,2,1,0]
ans
0 3
1 1
1 2
How?
why?
L
+ve
R
-ve
arr[L] += 1
arr[R+1] -= 1
L < R
R+1 < n

Codeforces Round # 169 (Div. 2) C. Little Girl and Maximum Sum



Brute force [5 3 2] 105

Doubt?

intuition

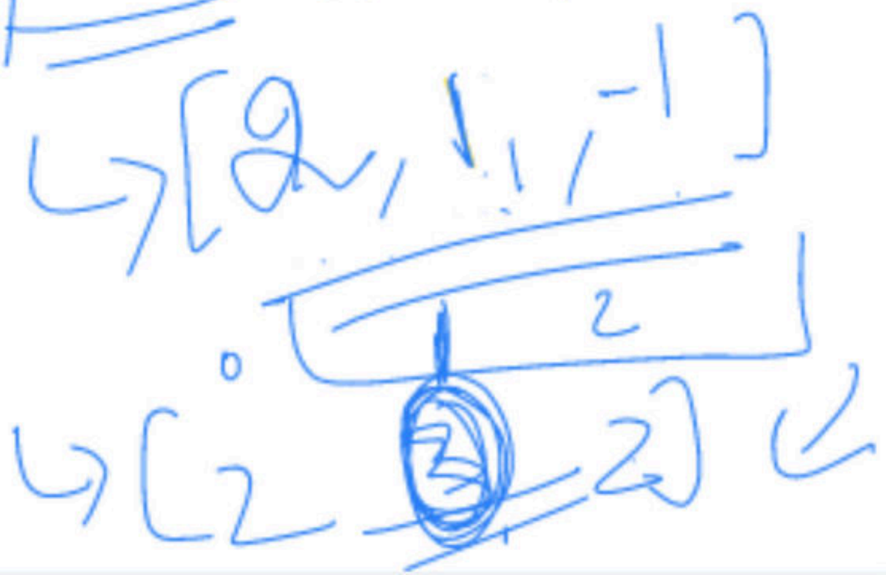
Doubt?

→ ans will vary acc to queries and $\sum_{i=0}^{n-1} A[i] * B[i]$

$2 \times 2 + 3 \times 2 + 5^{\wedge}3$

$= 4 + 6 + 15 = 25$

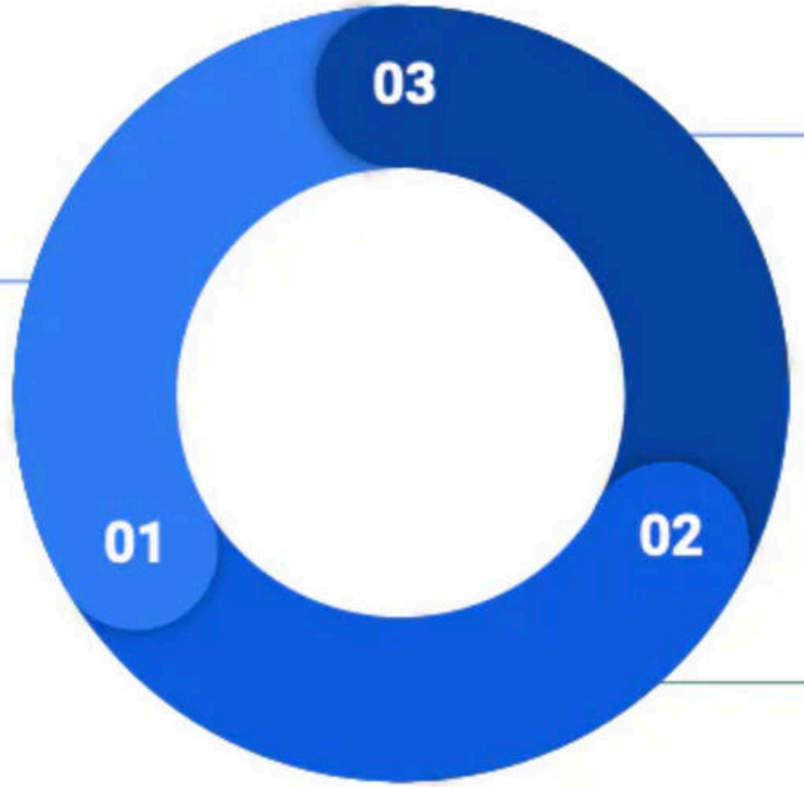
Q :→ How many queries per index?



What you will get

Live Interactive Classes

Attend live interactive classes with our top educators.



Doubt Support

Get your doubts resolved by our expert panel of teaching assistants and community members

Practice Relevant Problems @ CodeChef

Each class comes with a set of curated practice problems to help you apply the concepts in real time.

Educators

- **Curated faculty** with a strong **background in competitive programing** & hands on experience of educational training.
- Highly competent technical minds with **ICPC world finals, IOI medals,** IOI team training experience and Codeforces Grandmasters as accolades.
- Alumni of the most respected technology teams from around the world. (Google, Flipkart, Linkedin, Facebook, Amazon, Goldman Sachs, AppDynamics)
- Young & dynamic faculty to make each class as engaging as they are informative.

Educators

Deepak Gour

ICPC World Finalist 2020 | Former Instructor @InterviewBit | Software Engineer at AppDynamics

Himanshu Singh

World Finalist ICPC 2020, Winner Techgig Code Gladiators 2020, Winner TCC '19, 2020 CSE Graduate from IIT BHU, Works at Nutanix

Arjun P

I am an IOI 2015 bronze medallist, and my team qualified for the upcoming ICPC 2020 World Finals to be held in Moscow, Russia.

Murugappan S

Software engineer at Google. Have won many programming contests. Max Rating of 2192 in codeforces and 2201 in codechef.

Triveni Mahatha

Qualified ICPC 2016 World Final. Won multiple Codechef Long Challenges (India). ICPC Onsite Regionals' Problem setter and Judge. IIT Kanpur.

Tanuj Khattar

ACM ICPC World Finalist - 2017, 2018. Indian IOI Team Trainer 2016-2018. Worked @ Google, Facebook, HFT. Quantum Computing Enthusiast.

Educators

Riya Bansal

Software Engineer at Flipkart | Former SDE and Instructor @ InterviewBit | Google Women TechMakers Scholar 2018

Nishchay Manwani

Hey I am Nishchay Manwani from CSE, IIT Guwahati and I'm a Seven star on Codechef and International Grandmaster on Codeforces.

Sanket Singh

Software Development Engineer @ LinkedIn | Former SDE @ Interviewbit | Google Summer of Code 2019 @ Harvard University | Former Intern @ISRO

Pulkit Chhabra

Codeforces: 2246 | Codechef: 2416 | Former SDE Intern @CodeNation | Former Intern @HackerRank

and many more joining soon...

Topic-wise structure

Beginner	• Introduction to programming • C++ Foundation	• Java Foundation • Python Foundation
Intermediate	• Basic Data Structures • STLs • Sorting and Searching • Greedy Algorithms	• Basic Data Structures 2 • Number Theory • Recursion and DP
Advanced	• Segment Trees • Trees and Graphs • Advanced Dynamic Programming	• Graphs 2 • Computational Geometry
Misc	• ICPC Regionals + World Finals problem solving	

Upcoming Courses

ENGLISH INTERMEDIATE

Course on Greedy Algorithms

Starts on Sep 21, 2020 • 8 lessons

Murugappan S

HINDI ADVANCED

Detailed Course on Graphs - I

Starts on Sep 21, 2020 • 9 lessons

Pulkit Chhabra

HINDI INTERMEDIATE

Course on Introduction to Number Theory

Starts on Sep 22, 2020 • 8 lessons

Nishchay Manwani

Upcoming Courses

ENGLISH BEGINNER

Course on Recursion and Dynamic Programming

Starts on Sep 22, 2020 • 12 lessons

Arjun P

ENGLISH INTERMEDIATE

Course on Sorting and Searching

Starts on Sep 22, 2020 • 10 lessons

Riya Bansal

HINDI INTERMEDIATE

Course on Standard Template Library (STL) in C++

Starts on Sep 23, 2020 • 11 lessons

Sanket Singh

Upcoming Courses

HINDI INTERMEDIATE

Course on Basic Data Structures - I

Starts on Sep 26, 2020 • 11 lessons

Deepak Gour

HINDI INTERMEDIATE

Course on Data Structures (Square Root Decomposition)

Starts on Sep 26, 2020 • 5 lessons

Tanuj Khattar

HINDI BEGINNER

Course on Introduction to Competitive Programming with C++

Starts on Sep 26, 2020 • 10 lessons

Triveni Mahatha

Teaching Assistants support on chat and Doubts Forum

CODECHEF Discuss

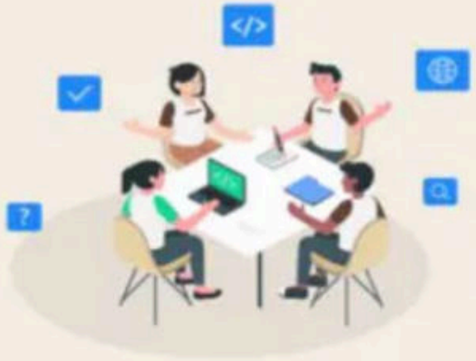
You may face issue with markdown in posts. In such cases, report it here along with the post link.

unacademy Live Classes / CodeChef Practice & Doubts / CodeChef Doubt Forum

Clear your Doubts with our Expert Panel of Teaching Assistants & Community Members

Leave no room for doubts. Create a topic.

CODECHEF unacademy

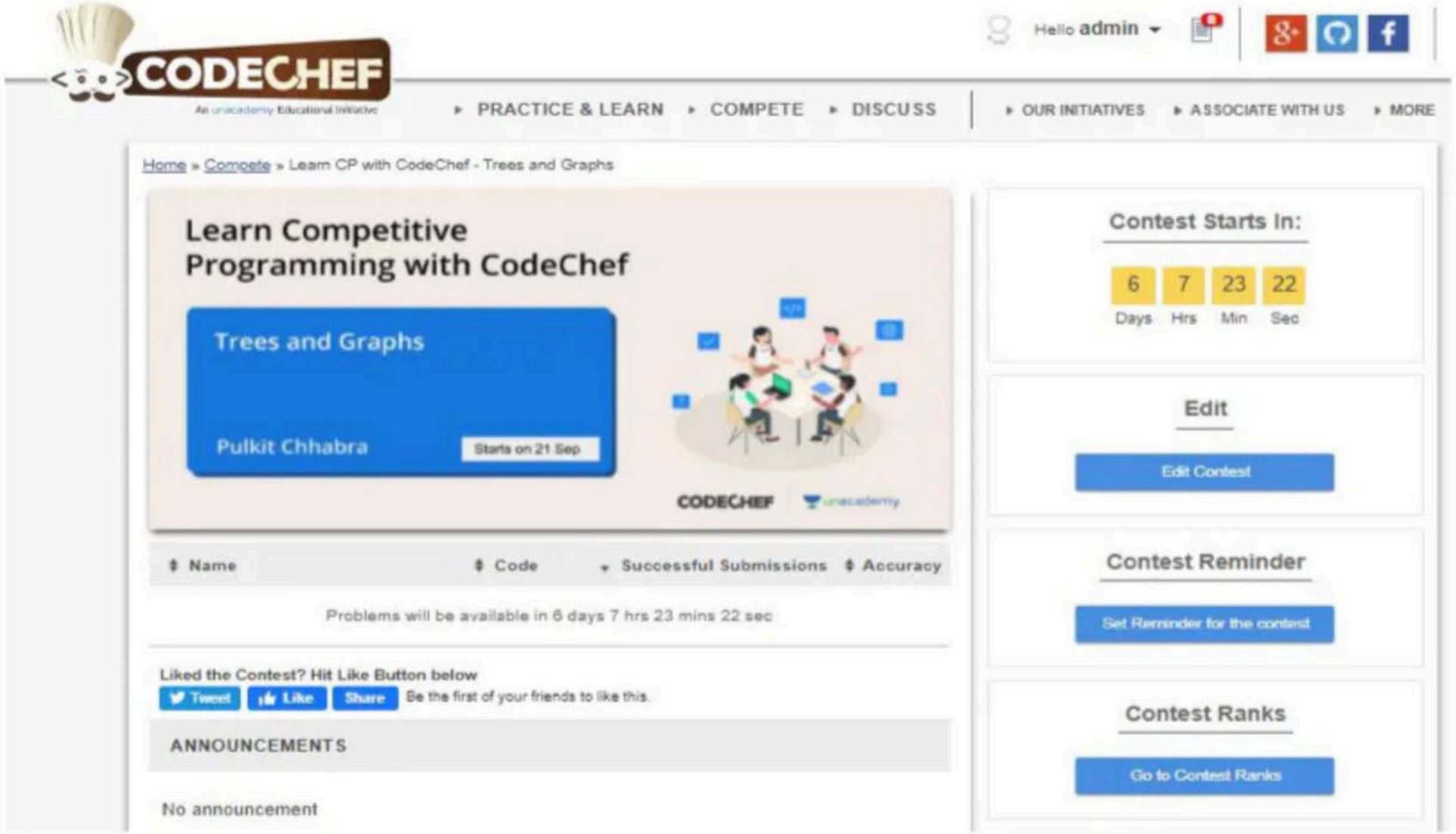


Learn CP on Unacademy Plus | all tags | Latest | Top | Bookmarks | Edit | + New Topic

Topic	Replies	Views	Activity
About the Learn CP on Unacademy Plus category	1	6	2d

There are no more Learn CP on Unacademy Plus topics. Why not create a topic?

Course-wise Practice Problems



Flexible Subscription Plans

1 month		₹6,000 per month	₹6,000 Total (Incl. of all taxes)
6 months	25% OFF	₹4,500 per month	₹27,000 Total (Incl. of all taxes)
12 months	54% OFF	₹2,750 per month	₹33,000 Total (Incl. of all taxes)

SANKET10

Proceed to pay

Upcoming Free Classes Schedule on website

FREE

Live Classes

Experience Plus for free and start learning from the best

See all

Disjoint Set Union - II

Today, 7:00 PM

Pulkit Chhabra

Discussion on Merge Sort &...

Today, 9:00 PM

Riya Bansal

Headstart to Strings in STL

Today, 10:00 PM

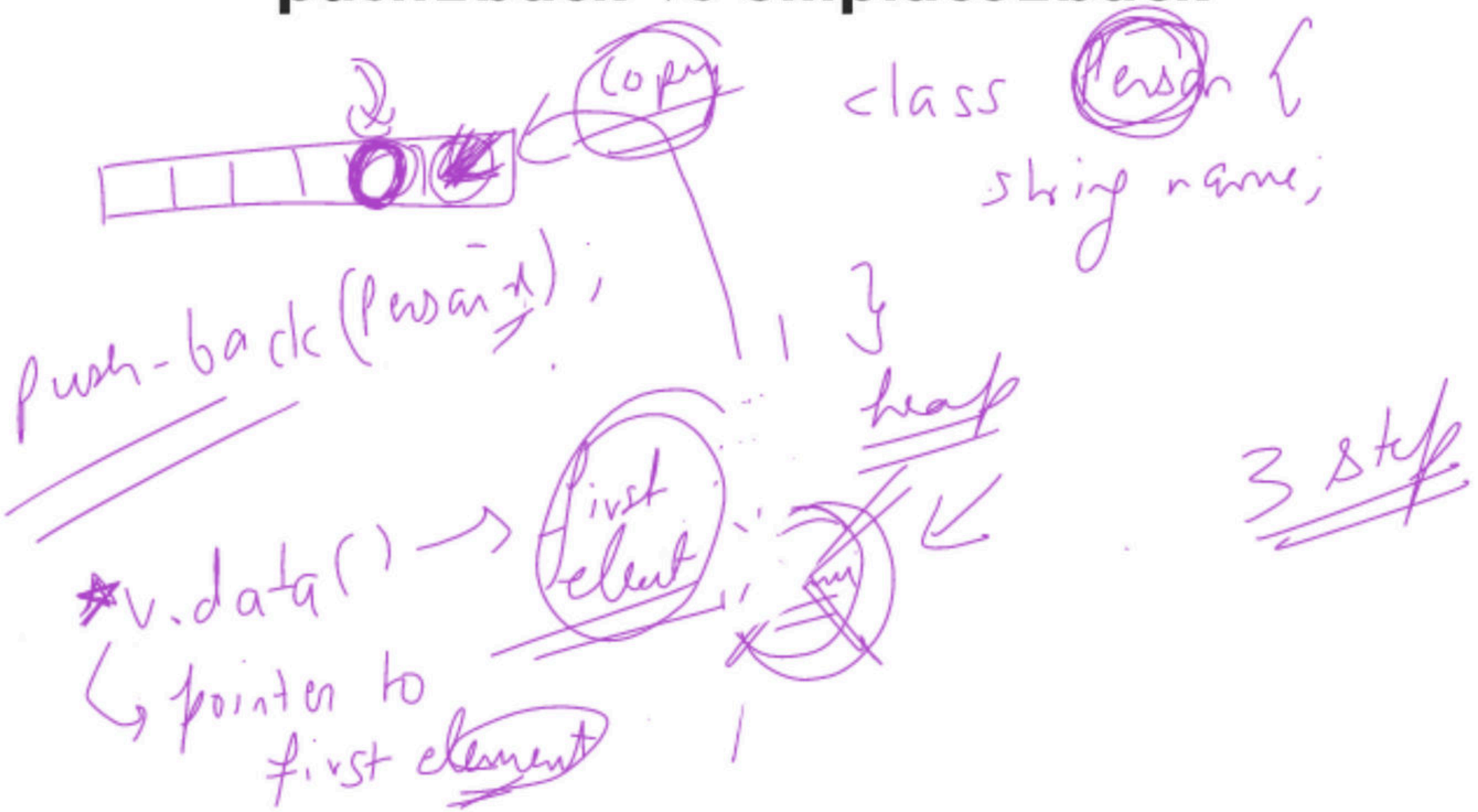
Sanket Singh

ICPC past problems

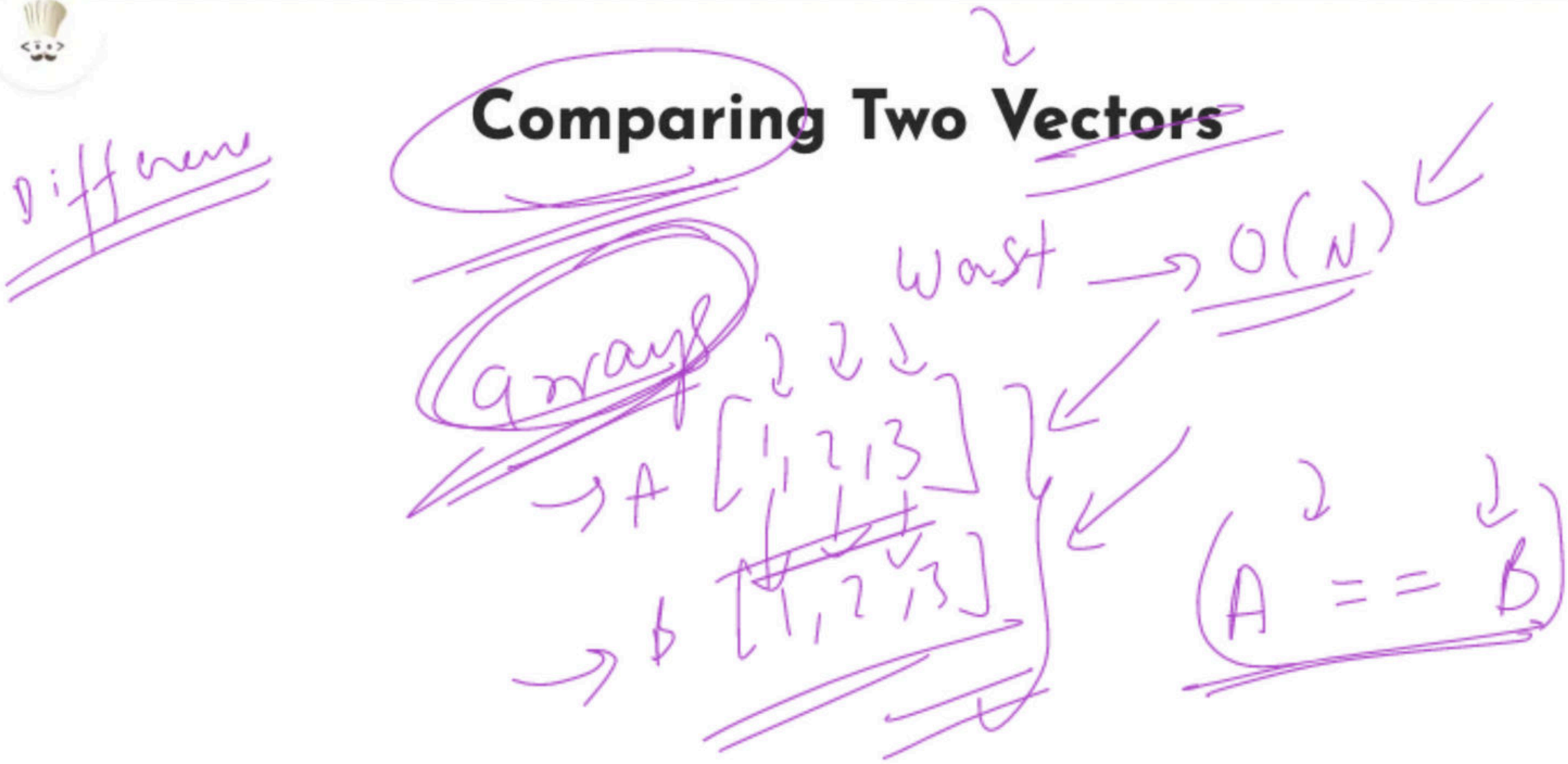
Sep 19, 2020, 3:30 PM

Himanshu Singh

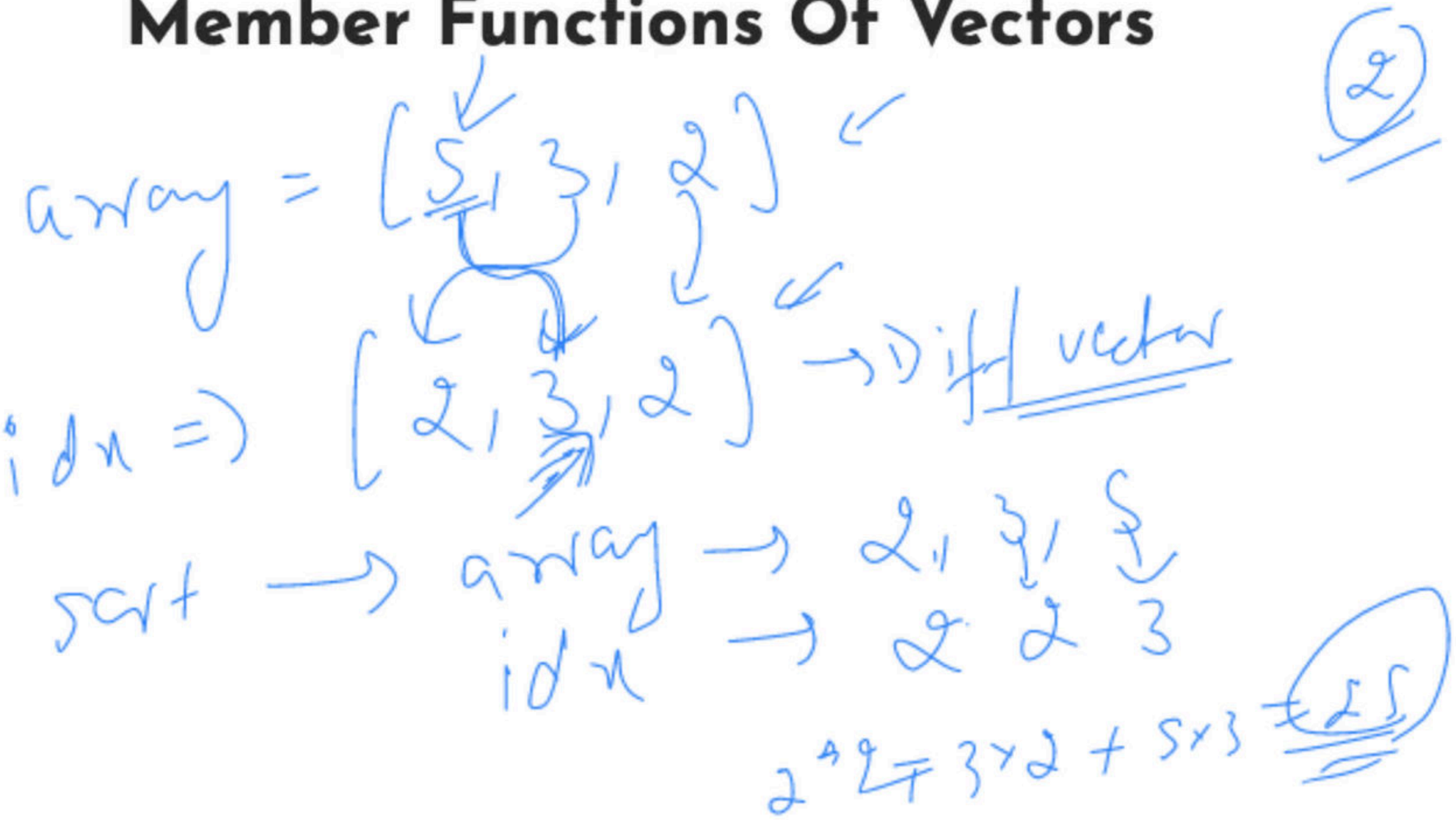
push_back vs emplace_back



Comparing Two Vectors



Member Functions Of Vectors



Karen And Coffee - Codeforces

Chef and Minimum Colouring