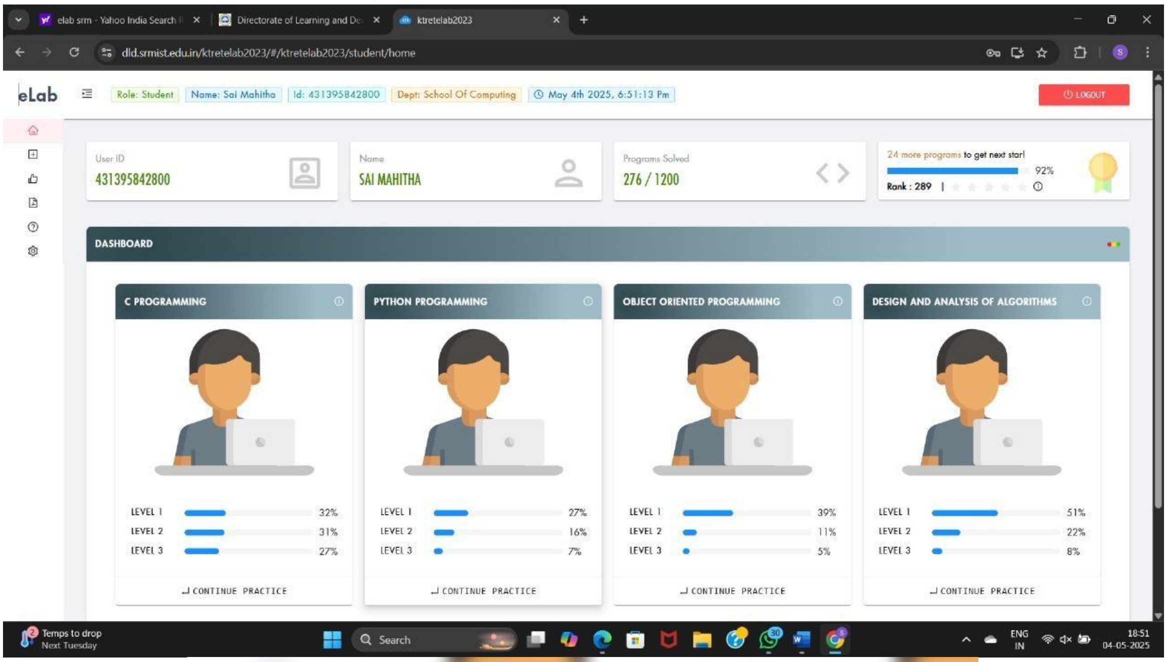
STUDENT PORTFOLIO

Name: Valiveti Sai Mahitha
Register Number: RA2311056010014
Mail ID: sv5259@srmist.edu.in
Department: DATA SCIENCE AND BUSINESS SYSTEMS
Semester: 4
Github: https:/_github.com/Valivetisaimahitha
Linkedin: www.linkedn.com/in/sai=mahitha-valiveti-1902smy

Subject Title: 21CSC204J Design Analysis and Algorithms
Handled By: Dr. Rajkumar K.

ELAB Completion Status
Completed 4-5 questions from all the topics



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eLab

Role: Student | Name: Sai Mahitha | Id: 431395842800 | Dept: School Of Computing | May 4th 2025, 6:51:13 Pm

User ID: 431395842800

Name: SAI MAHITHA

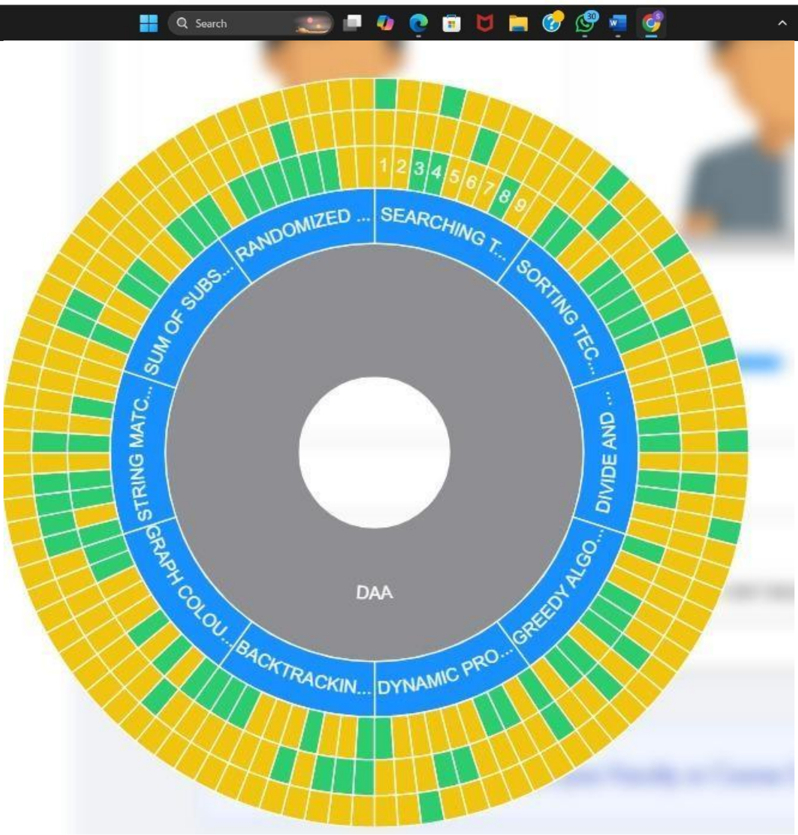
Programs Solved: 276 / 1200

24 more programs to get next star! 92%

Rank : 289

DASHBOARD

C PROGRAMMING		PYTHON PROGRAMMING		OBJECT ORIENTED PROGRAMMING		DESIGN AND ANALYSIS OF ALGORITHMS	
LEVEL 1	32%	LEVEL 1	27%	LEVEL 1	39%	LEVEL 1	51%
LEVEL 2	31%	LEVEL 2	16%	LEVEL 2	11%	LEVEL 2	22%
LEVEL 3	27%	LEVEL 3	7%	LEVEL 3	5%	LEVEL 3	8%
CONTINUE PRACTICE		CONTINUE PRACTICE		CONTINUE PRACTICE		CONTINUE PRACTICE	



Code Overview

This C++ program calculates the minimum amount of a mixture that can be made based on the input of ingredients and their respective proportions.

Header & Macros cpp

#include <bits/stdc++.h> using namespace std;
#define res cin>>a[i],num+=a[i]; #define f1 for(int i=1;i<=n;i++)

- #include <bits/stdc++.h>: Includes all standard libraries. Common in competitive programming.
- using namespace std;: Allows use of standard namespace without prefixing with std::.

- #define res ... and #define f1 ...: These are *macros* (shortcuts).
- res is not used in the program, though it's defined.
- f1 is a macro for for(int i=1;i<=n;i++) — simplifies loops.

Global Variables cpp

```
double n,v,a[25],b[25],sum,mx=1e9;
```

- n: Number of ingredients.
- v: Maximum volume we are allowed to use (capacity limit).
- a[25]: Array a[i] stores amount of ingredient i required *per unit of mixture*.
- b[25]: Array b[i] stores total amount of ingredient i available.
- sum: Total required amount (per unit) for all ingredients combined.
- mx: Initially set to a very large value (1e9). Will be updated with the *minimum limiting factor* for how much of the mixture we can make.

Main Logic cpp

```
int main()\
    { cin>>n>>v;
```

- Reads number of ingredients n and the maximum total volume v.
- Input a[i]

cpp

```
f1{
cin>>a[i];
sum+=a[i];
}
```

- Loops from i = 1 to n
- Reads how much of ingredient i is needed per unit of mixture
- Adds it to sum → sum = a[1] + a[2] + ... + a[n]

Input b[i]

cpp

```
for(int i=1;i<=n;i++)
cin>>b[i];
```

- Reads how much of ingredient i is available.

Calculate the limiting factor

cpp

```
for(int i=1;i<=n;i++)
mx = min(mx, b[i]/a[i]);
```

- For each ingredient, compute b[i] / a[i] → how many units of mixture we can make using only ingredient i.
- The minimum of these values across all ingredients is the maximum possible mixture units we can make.

Final Output

```
 cpp
cout << fixed<<setprecision(1)<<min(mx*sum,v);
return 0;
}
```

- mx sum gives the total amount of ingredients used for making mx units of mixture.
- We compare this with the maximum allowed volume v, and output the minimum of the two.
- The result is printed with 1 decimal precision.

- Example

Input:

```
2 10
1 2
6 8
```

Meaning:
- n = 2, v = 10
- a = [1, 2] → need 1 unit of 1st ingredient and 2 units of 2nd ingredient per mixture
- b = [6, 8] → 6 units of 1st ingredient and 8 units of 2nd ingredient available

Step-by-step:
- sum = 1 + 2 = 3
- mx = min(6/1, 8/2) = min(6, 4) = 4
- max total mixture amount we can prepare = 4 * 3 = 12
- final answer = min(12, 10) =

10.0 Output:

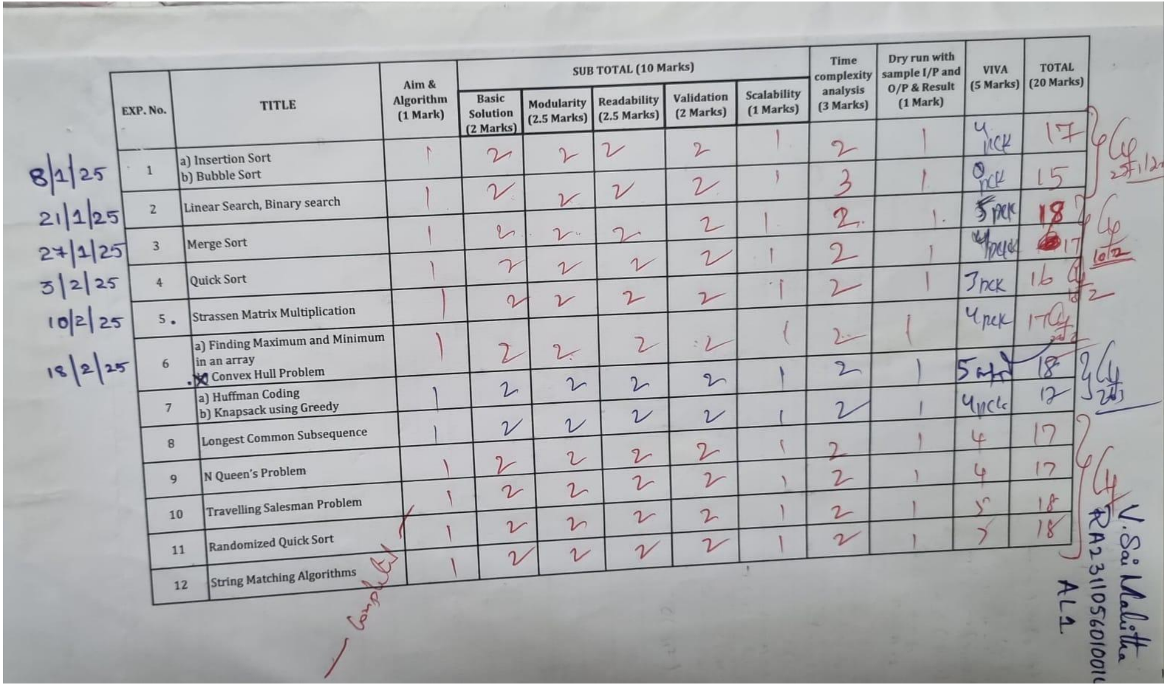
```
10.0
```

Summary

The code computes how much mixture you can make based on:
- Required ratio of ingredients
- Available amount of each ingredient
- Maximum volume limit v

And it outputs the *maximum total mixture quantity* you can make without exceeding any limits.

Lab Experiment Completion Status



	EXP. No.	TITLE	Aim & Algorithm (1 Mark)	SUB TOTAL (10 Marks)					Time complexity analysis (3 Marks)	Dry run with sample I/P and O/P & Result (1 Mark)	VIVA (5 Marks)	TOTAL (20 Marks)
				Basic Solution (2 Marks)	Modularity (2.5 Marks)	Readability (2.5 Marks)	Validation (2 Marks)	Scalability (1 Marks)				
8/1/25	1	a) Insertion Sort b) Bubble Sort	1	2	2	2	2	1	2	1	4 nck	17
21/1/25	2	Linear Search, Binary search	1	2	2	2	2	1	3	1	0 nck	15
27/1/25	3	Merge Sort	1	2	2	2	2	1	2	1	5 nck	18
3/2/25	4	Quick Sort	1	2	2	2	2	1	2	1	4 nck	17
10/2/25	5.	Strassen Matrix Multiplication	1	2	2	2	2	1	2	1	3 nck	16
18/2/25	6	a) Finding Maximum and Minimum in an array b) Convex Hull Problem	1	2	2	2	2	1	2	1	4 nck	17
	7	a) Huffman Coding b) Knapsack using Greedy	1	2	2	2	2	1	2	1	5 nck	18
	8	Longest Common Subsequence	1	2	2	2	2	1	2	1	4 nck	12
	9	N Queen's Problem	1	2	2	2	2	1	2	1	4	17
	10	Travelling Salesman Problem	1	2	2	2	2	1	2	1	4	17
	11	Randomized Quick Sort	1	2	2	2	2	1	2	1	5	18
	12	String Matching Algorithms	1	2	2	2	2	1	2	1	5	18

completed

10/2

V.Sai Malitha
RA2311056010010
AL1

All the 12 experiments were solved, run and executed successfully and took the completed sign from Faculty.

REAL WORLD APPLICATION IN DAA PPT VR/SIMULATION DEMO

PASSWORD STRENGTH CHECKER

- **Goal: Educate users on best practices for creating secure passwords.**
- **Objective: Evaluate Password Strength – Check passwords based on length, character variety, and common password lists.**

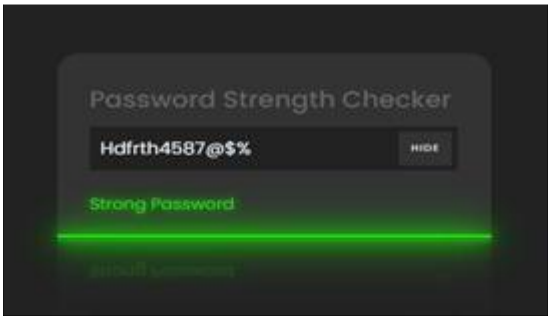
ALGORITHMS IMPLEMENTED

1. **Brute Force Algorithm**

PPT:

https://docs.google.com/presentation/d/1v4v5mWTTIUH6fmbA6eRQ8HBdgK4L9MrD/edit?usp=drivesdk&ouid=118410432497591221870&rtpof=true&sd=true

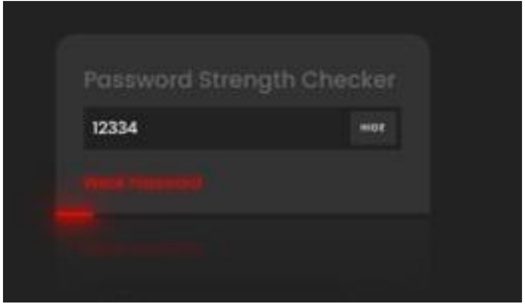
OUTPUT:



Password Strength Checker

Hdfrth4587@$%

Strong Password



Password Strength Checker

12334

Weak Password

NPTEL/HOTS Questions Solution.
Any other (Write if you registered or practise apart from Hackerrank, Leetcode, Github.etc Eg: Certification Programs related to DAA) Competitions Won related to DAA Any Presentations done for DAA with proof and explanation

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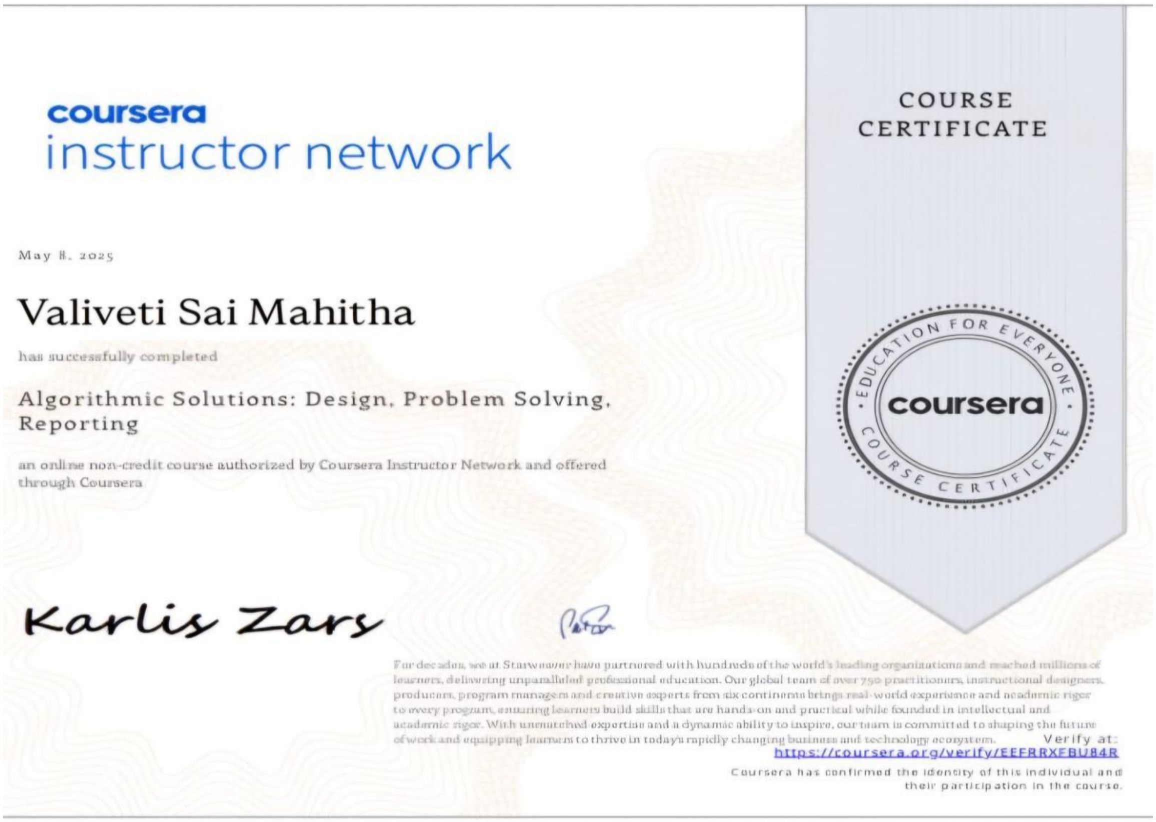

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COURSE CERTIFICATE

May 8, 2025

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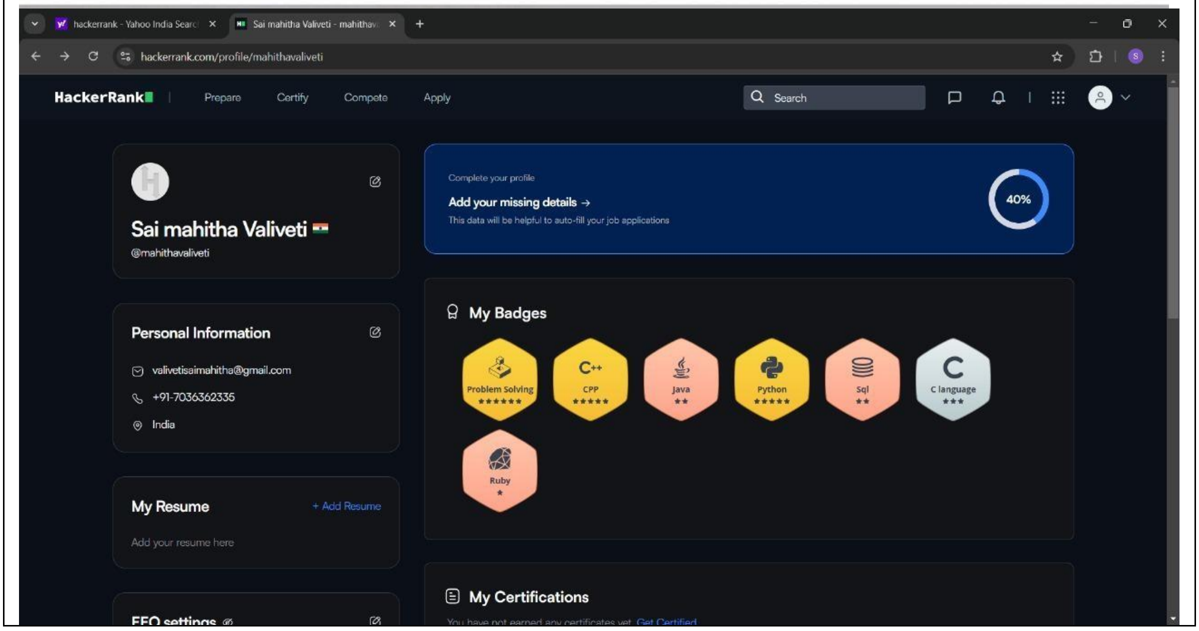

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