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TECHNOLOGY AND SCIENCES

A Software Development Project On CP Plus Plus

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CERTIFICATE

This is to certify that the project titled “**CP Plus Plus**” has been done by **Md. Imran Mir** and **Olin Akon Chumky** Student of Year 2019 as per The project requirement for semester for the academic year 2023(Spring) under the guidance of **Mr. Al-Imtiaz (Assistant Professor & Head, Department of CSE & IT, UITS)** and **Shamima Nasrin (Lecturer, Dept of CSE,UITS)**.

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Acknowledgement

We are thankful to **Mr. Al-Imtiaz sir** and **Shamima Nasrin** mam for the help and support rendered to us during the entire project. Without their help and guidance, this project would not have taken any form. We are thankful to the Department of Computer Science and Engineering, especially the reviewers, for giving us valuable feedback after each review, without which we won't be able to take it forward. This project would not have been possible if we did not have the support of many individuals, persons and organizations. Therefore, we would like to extend our sincere gratitude to all of them.

Privacy Policy

CP++ will keep Your Personal Data only as long as necessary for the stated purposes. We'll retain and use it to comply with legal obligations, resolve disputes, and enforce agreements. We'll also retain Usage Data for internal analysis, security, and functionality improvement, unless legally required to keep it longer.

Chapter 1: INTRODUCTION

CP++ is a comprehensive learning-based website designed to help individuals master competitive programming, regardless of their starting level. With a structured approach, CP++ offers a three-stage learning process, catering to beginners, intermediate learners, and advanced programmers.

1.1 Abstract: CP++ is a learning-based website where people can learn competitive programming from scratch to advance. We have divided the learning process into three stages such as beginner, intermediate and advanced. There are also some other sections like Challenge section where we will give challenge to the user such as learn 15 algorithms in 30 days and solve problem using those algorithms. If they can complete the challenge, they will earn points. We will store the points into the user profile. There is also a Quiz section where users can take a test after learning a particular topic and get points. We also arrange contests for the beginner programmers. From the Contest section users can find the schedule of the contest

Keywords: CP++, Competitive programming, learning process, Challenge section, Profile section, Quiz section, Contest section

1.2 Overview of the Study: The website features various sections and resources to support users in their learning journey. In the Challenge section, users can participate in engaging challenges, such as mastering 15 algorithms in 30 days and solving problems using those algorithms. Successful completion of these challenges rewards users with points, which are stored in their user profiles.

Key areas of focus in the study of CP++ projects include:

- Learning Sections: We have divided the learning process into three stages such as beginner, intermediate and advanced. Users can earn points by completing lessons, tutorials, or modules within each learning stage. Each completed lesson could be worth a certain number of points, which are added to the user's profile upon completion.
- Challenge Section: Users can participate in challenges such as learning 15 algorithms in 30 days and solving problems using those algorithms. Upon successfully completing a challenge, users earn points that are added to their profile.
- Quiz Section: After learning a particular topic, users can take quizzes to test their understanding and knowledge. Points are awarded based on the performance in the quiz. Higher scores could result in more points added to the user's profile.
- Contest Section: Users can participate in contests specifically designed for beginner programmers. Points are awarded based on performance in the contest. Higher rankings or scores could result in more points added to the user's profile. The contest schedule can be accessed by users to stay informed about upcoming contests.

1.3 Limitation of Existing System: On the internet there are many websites, such as BeeCrowd, HackerRank, Codeforces, LeetCode, Kaggle, CodeChef, AtCoder, Topcoder, and others, primarily focus on solving programming problems and hosting online contests. While these platforms offer valuable resources for honing programming skills and participating in competitive programming, they may not prioritize comprehensive learning or in-depth topic coverage. In contrast, CP++ distinguishes itself by providing a dedicated focus on learning competitive programming from scratch to advance. CP++ breaks down the learning process into three stages: beginner, intermediate, and advanced. This structured approach allows users to progress gradually and build a solid foundation before advancing to more complex topics. Additionally, CP++ offers sections such as Challenges and Quizzes, which provide users with hands-on practice and assessment opportunities. The Challenge section sets specific goals, such as learning a certain number of algorithms within a given timeframe, and rewards users with points upon completion. The Quiz section allows users to test their knowledge and understanding of specific topics, with points being awarded based on performance. By combining learning materials, practice challenges, quizzes, and contests, CP++ aims to offer a more holistic approach to competitive programming education, catering to individuals who not only want to solve problems but also want to acquire a comprehensive understanding of various topics within the field.

1.4 Existing website list:

- <https://www.becrowd.com.br/judge/en/login>
- <https://www.hackerrank.com/>
- <https://codeforces.com/>
- <https://atcoder.jp/>
- <https://www.topcoder.com/>
- <https://leetcode.com/>
- <https://www.codechef.com/>

1.5 Objective of Project:

- ❖ Comprehensive Learning: CP++ aims to provide a platform where individuals can learn competitive programming from scratch to an advanced level. The website offers structured learning materials and resources that cover a wide range of topics related to competitive programming. The focus is on helping beginners understand the fundamental concepts and gradually progress to more advanced topics.
- ❖ Problem Solving: In addition to learning materials, CP++ emphasizes the practical application of learned concepts through problem-solving. Users can access a collection of programming problems, challenges, and practice sets to improve their problem-solving skills. By solving

problems, users can reinforce their understanding of the topics and gain hands-on experience.

- ❖ Online Programming Contests: CP++ organizes online programming contests for competitive programmers. These contests provide a platform for participants to test their skills, compete with other programmers, and apply their knowledge in a competitive setting. By participating in these contests, users can gain real-world experience, improve their problem-solving speed, and earn recognition for their achievements.
- ❖ Accelerated Learning for Beginners: CP++ focuses on providing effective learning resources and support for beginner programmers. The website is designed to help beginners grasp programming concepts faster and gain proficiency in competitive programming. By offering structured learning paths, clear explanations, and practice opportunities, CP++ aims to accelerate the learning process for beginners.
- ❖ Points System: CP++ implements a points system to track users' progress and achievements. Users can earn points by completing learning modules, solving problems, participating in challenges, and performing well in contests. The points serve as a measure of progress and proficiency, motivating users to continue learning and improving their skills.

1.6 Our Project Specialities :

- Comprehensive Learning Approach: CP++ stands out by placing equal emphasis on both learning topics and solving specific problems related to those topics. While many other websites primarily focus on problem-solving and contests, CP++ recognizes the importance of a well-rounded learning experience and provides resources for users to understand and grasp the underlying concepts behind competitive programming.
- Structured Learning Paths: CP++ offers structured learning paths divided into beginner, intermediate, and advanced stages. This organized approach enables users to progress systematically, starting from foundational concepts and gradually advancing to more complex topics. By following these learning paths, users can build a strong foundation and steadily enhance their skills.
- Practice Challenges: In addition to learning materials, CP++ provides practice challenges and problem sets that are directly related to the topics covered. This allows users to apply their newly acquired knowledge and reinforce their understanding through practical problem-solving exercises. By integrating learning with hands-on practice, CP++ enhances the learning experience and promotes skill development.
- Online Programming Contests: CP++ arranges online programming contests specifically designed for competitive programmers. These contests provide users with an opportunity to put their skills to the test in a competitive environment. By participating in these contests, users can gauge their progress, challenge themselves, and gain valuable experience in real-world programming scenarios.
- Accelerated Learning for Beginners: CP++ recognizes the needs of beginner programmers

and focuses on helping them learn topics faster. The website offers clear explanations, simplified examples, and a supportive learning environment to accelerate the learning process for beginners. By providing resources tailored to their needs, CP++ aims to bridge the gap between beginner and advanced levels.

- Points and Progress Tracking: CP++ implements a points system that allows users to track their progress and achievements. By earning points through completing learning modules, solving problems, participating in challenges, and performing well in contests, users can see tangible evidence of their growth. This motivates users to stay engaged, set goals, and continuously improve their skills.

1.7 About this website:

- Learning Stages
- Challenge Section
- Quiz Section
- Beginner Contest Arrangements
- Points and User Profiles

Chapter 2: TECHNOLOGY CONCEPTS

2.1 Introduction: The successful execution of CP Plus Plus projects relies heavily on the effective utilization of technology concepts. Integrating technology into CP Plus Plus processes offers numerous advantages, including streamlined operations, enhanced attendee experiences, improved marketing strategies, and data-driven decision-making. This introduction provides an overview of the key technology concepts utilized in event management projects.

2.2 Front-End:

- Html: HTML (Hypertext Markup Language) is the standard markup language used for creating web pages and applications. It provides the structure and content of a web page, defining the elements and their relationships.
- Css: CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation and formatting of a document written in HTML (Hypertext Markup Language). It provides a way to control the appearance of web pages, including the layout, colors, fonts, and other visual aspects. CSS works by selecting HTML elements and applying styles to them. Selectors are used to target specific elements, and declarations specify the styles to be applied.
- Bootstrap: Bootstrap is a popular open-source front-end framework used for developing responsive and mobile-first websites and web applications. It provides a collection of pre-designed CSS and JavaScript components that can be easily integrated into web projects to streamline the development process and ensure consistent and visually appealing designs.
- Javascript: JavaScript is a widely-used programming language that is primarily used for client-side web development. It allows you to add interactivity, dynamic behavior, and logic to web pages. JavaScript is supported by all modern web browsers and is an essential component of web development.
- jQuery: jQuery is a fast, small, and feature-rich JavaScript library that simplifies HTML document manipulation, event handling, and animation. It provides a concise and efficient way to interact with the Document Object Model (DOM) and perform common tasks in web development.
- React JS: ReactJS is a JavaScript library used for building user interfaces (UI) for web applications. It was developed by Facebook and is widely used in the industry for creating dynamic and interactive UI components. ReactJS is widely used in front-end development for building single-page applications, complex user interfaces, and mobile applications. It has a large and active community, extensive documentation, and a rich ecosystem of libraries and tools that make development with ReactJS efficient and enjoyable.

2.3 Back-End:

- Node.js: Node.js is an open-source, cross-platform JavaScript runtime environment built on Chrome's V8 JavaScript engine. It allows developers to execute JavaScript code outside of a web browser, enabling server-side and command-line application development. Node.js has gained significant popularity among developers and is widely used in a range of applications, from small-scale projects to large-scale enterprise systems. Its robust ecosystem, vast library support, and ability to handle concurrent connections make it a powerful tool for building high-performance server applications.
- Express.js: Express.js is a minimalistic, fast, and unopinionated web application framework for Node.js. It provides a set of flexible features and utilities that make it easier to build web applications and APIs. Express.js is widely used in building web applications, RESTful APIs, and microservices using Node.js. Its simplicity, flexibility, and extensive community support have made it one of the most popular frameworks in the Node.js ecosystem.
- Javascript: JavaScript is a high-level programming language that is primarily used for client-side web development. It allows you to add interactivity, dynamic behavior, and logic to web pages. JavaScript is supported by all modern web browsers and has become an essential component of web development.
- MongoDB: MongoDB is a popular open-source NoSQL database management system. It is designed to handle large volumes of unstructured and semi-structured data in a flexible and scalable manner. MongoDB has gained significant popularity due to its scalability, flexibility, and ease of use. It provides developers with a powerful and feature-rich database solution for handling diverse data types and large-scale applications.

2.4 Database:

MongoDB is a non-relational (NoSQL) database. Unlike traditional relational databases, such as MySQL or PostgreSQL, MongoDB does not use tables, rows, and columns to store data. Instead, it uses a document-oriented model where data is stored in flexible JSON-like documents, typically in BSON format (Binary JSON).

- Document-Oriented Database: MongoDB is a document-oriented database, which means it stores data in a flexible, JSON-like format called BSON (Binary JSON). Data is stored in documents, which can vary in structure and contain nested fields, arrays, and key-value pairs.
- NoSQL: MongoDB falls under the category of NoSQL databases, which diverge from traditional relational databases. It does not use tables, rows, and columns like SQL databases but instead focuses on providing high-performance, scalable storage for unstructured and semi-structured data.
- Scalability and Performance: MongoDB is built to scale horizontally across multiple servers and handle large amounts of data. It supports automatic sharding, allowing data to be

distributed across multiple machines, which enables high availability and improved performance for read and write operations

- **Flexible Schema:** MongoDB offers a flexible schema model, allowing for dynamic and evolving data structures. It does not enforce a predefined schema, so documents within a collection can have different fields and structures. This flexibility makes it suitable for use cases where data schemas may change frequently or have varying structures.
- **Querying and Indexing:** MongoDB provides a powerful and expressive query language for retrieving data. It supports a wide range of query operators and indexing options to optimize query performance. MongoDB's indexing capabilities allow for efficient searching and retrieval of data based on various criteria.
- **Replication and High Availability:** MongoDB supports replication, allowing for the automatic synchronization of data across multiple servers. This ensures data redundancy and high availability, minimizing the risk of data loss or service interruption in case of server failures.
- **Rich Ecosystem:** MongoDB has a vibrant and active community, providing a rich ecosystem of tools, libraries, and frameworks that integrate with MongoDB. These include popular Object-Document Mappers (ODMs) like Mongoose, which simplify data modeling and interaction with MongoDB in application development.
- **Use Cases:** MongoDB is suitable for a wide range of use cases, including content management systems, real-time analytics, social media applications, IoT platforms, and more. It is particularly well-suited for scenarios where data structures are dynamic and evolving, and horizontal scalability and high performance are essential.

2.5 Key Features:

MongoDB's non-relational approach provides advantages for certain use cases, such as applications dealing with large volumes of unstructured or rapidly changing data, real-time analytics, content management systems, and more.

- **Flexible Schema:** Documents in MongoDB can have varying structures, allowing for easy modification and adaptation of data models. This flexibility is particularly useful in scenarios where data schemas evolve over time or when dealing with semi-structured or unstructured data.
- **Horizontal Scalability:** MongoDB is designed to scale horizontally by distributing data across multiple servers or shards. This architecture enables efficient scaling and handling of large amounts of data and high traffic loads.
- **High Performance:** MongoDB's document model and indexing capabilities offer fast and efficient read and write operations. It can retrieve and manipulate complex data structures without requiring joins or complex transactions.
- **Agile Development:** MongoDB's flexible schema and dynamic data model make it well-suited for agile development practices. Developers can easily iterate and adapt their data models as application requirements evolve.

Chapter 3: PROPOSED SOLUTION ARCHITECTURE

3.1 Introduction: The Model-View-Controller (MVC) architecture is a software design pattern that separates the concerns of an application into three interconnected components: the Model, View, and Controller. The MVC pattern provides a structured and organized approach to developing applications, promoting code reusability, maintainability, and scalability.

Here's an introduction to the three components of the MVC architecture:

1. Model: The Model represents the application's data and business logic. It encapsulates the data and provides methods to manipulate and access that data. In other words, the Model represents the application's data structure, database interactions, and business rules. It is responsible for managing the state and ensuring the consistency of the data.
2. View: The View is responsible for presenting the data to the user and providing the user interface. It displays the information from the Model in a user-friendly format. Views can be HTML templates, XML files, or any other presentation format. They are typically passive and do not contain complex business logic. Instead, they focus on rendering the data received from the Controller and providing a visually appealing and interactive user interface.
3. Controller: The Controller acts as an intermediary between the Model and the View. It receives user input from the View, processes it, and interacts with the Model accordingly. It is responsible for updating the Model based on user actions and managing the flow of data between the Model and the View. The Controller also handles any necessary validation, manipulation, or transformation of the data before sending it to the View for display.

3.2 Design Principle:

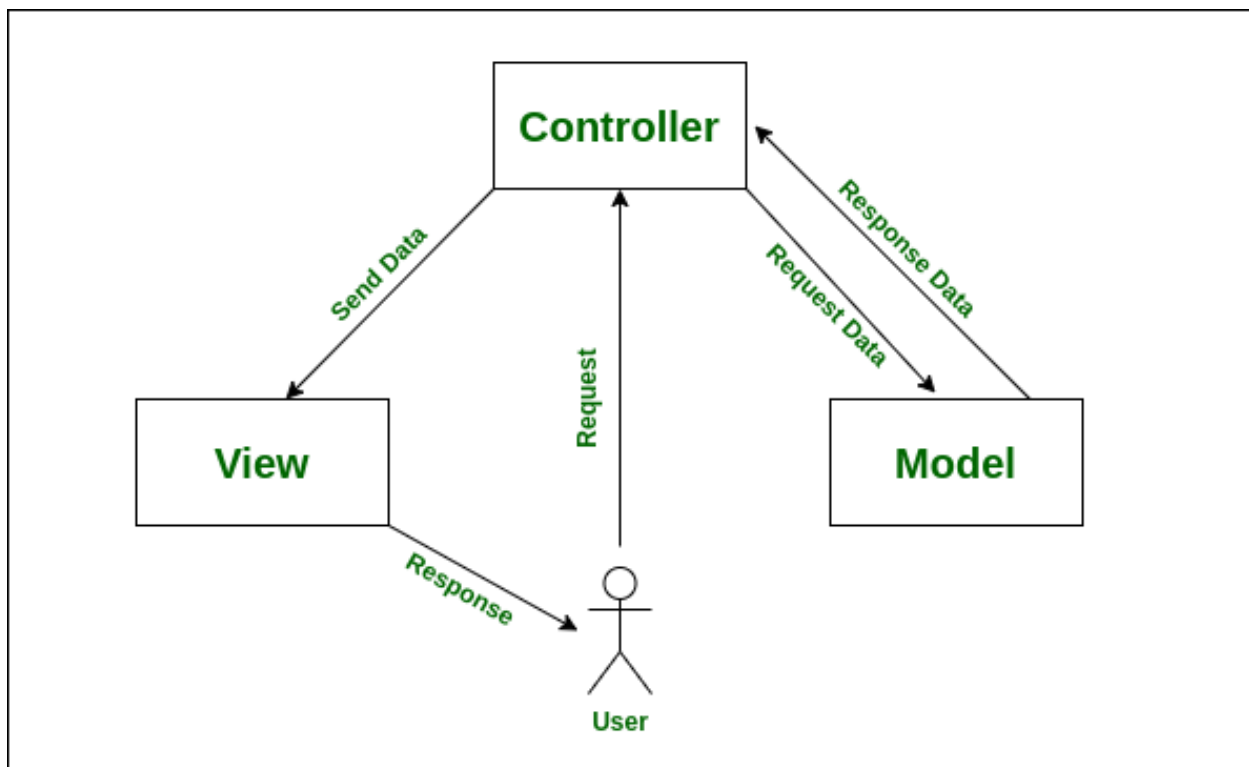
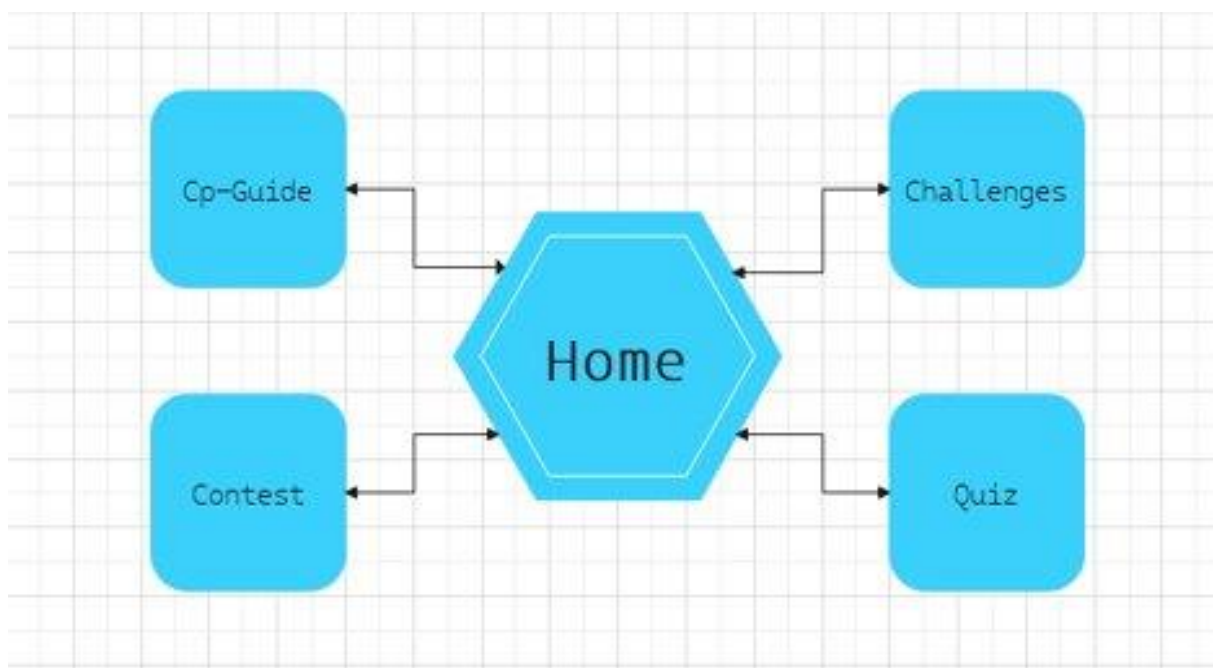


Figure: MVC architecture model

3.3 Block Diagram of Our Project:



3.4 ER Diagram Of our Project:

ER DIAGRAM FOR STUDENT ENROLLMENT SYSTEM

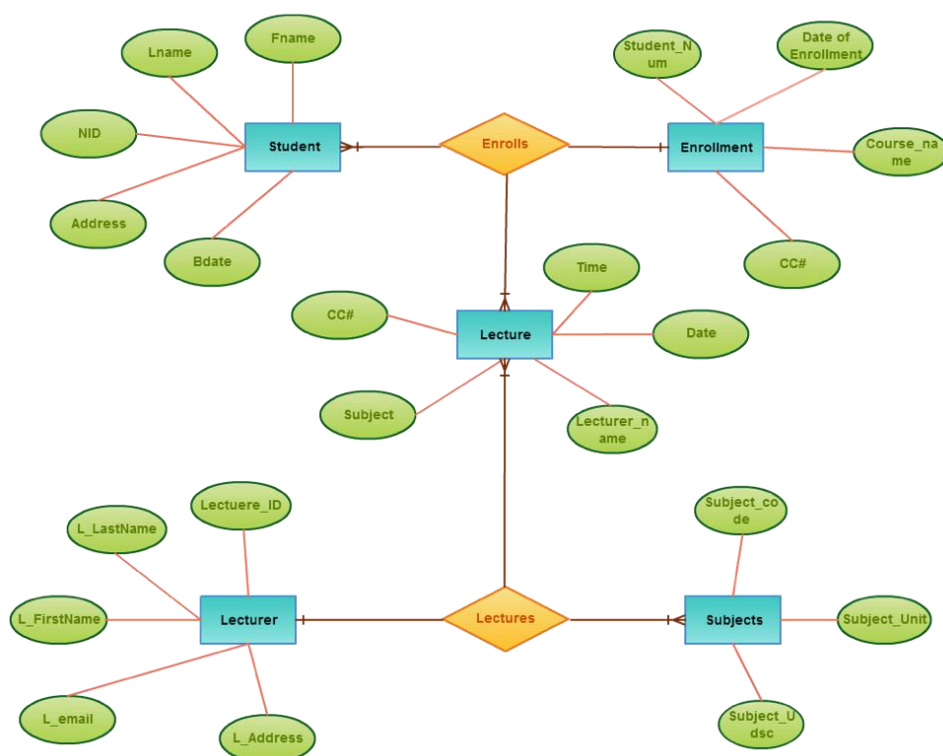


Figure: ER Diagram.

3.5 Component Description: In the context of software development, a component refers to a modular, self-contained unit of functionality within a larger system or application. Components are designed to be independent and reusable, making them a fundamental building block for creating complex software systems. Each component encapsulates specific functionality and can be easily integrated with other components to create a cohesive and scalable software architecture.

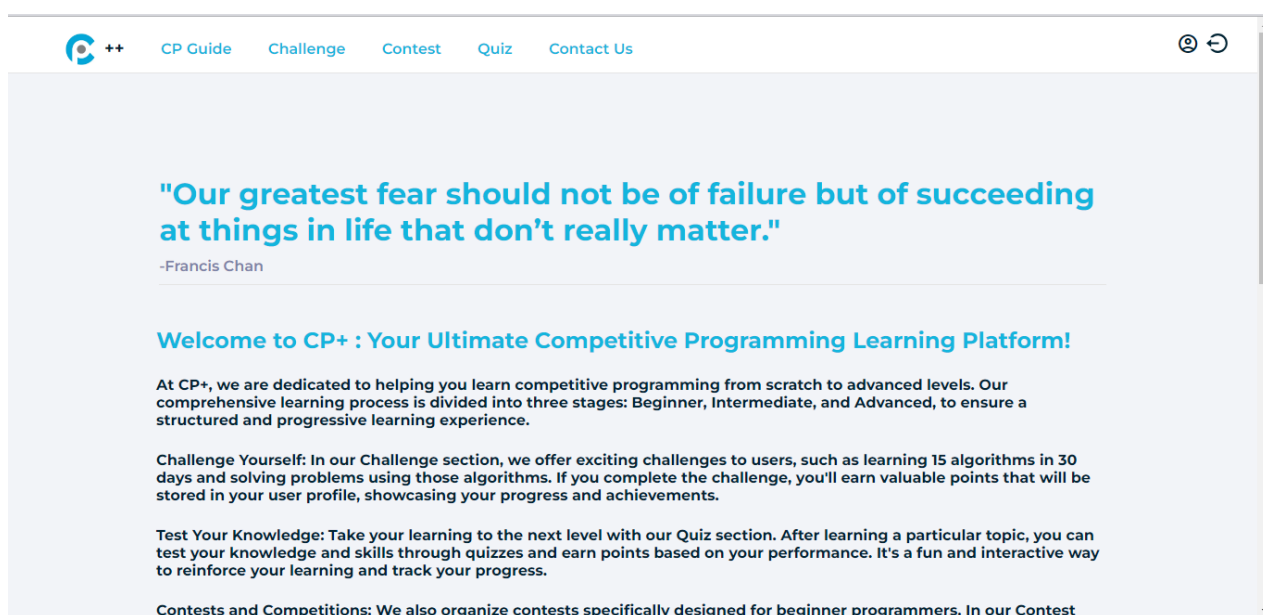
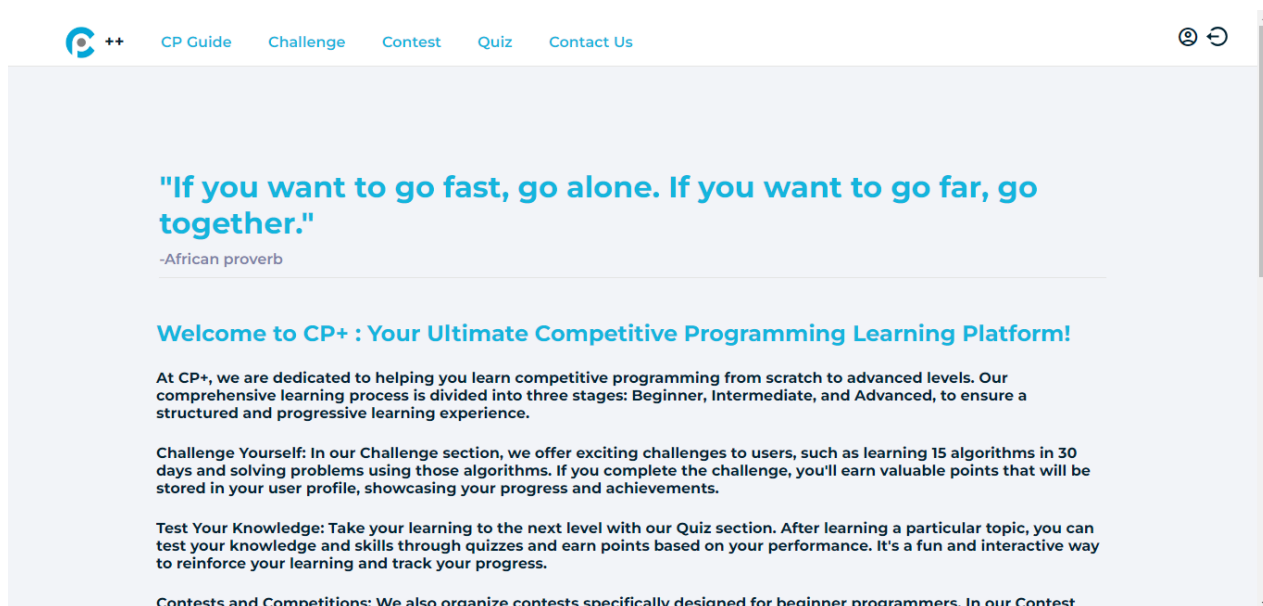
Chapter 4: IMPLEMENTATION AND RESULT

4.1 Introduction:


In this chapter, we will discuss the implementation details of the project and present the results obtained from the implementation. We will cover the steps taken to develop the software, any challenges encountered, and the final outcome of the project.



- **System Architecture** Provide an overview of the system architecture used for the implementation. Describe the different components, their interactions, and how they contribute to the overall functionality of the software system.
- **Development Process** Explain the development process followed during the implementation phase. Discuss the methodologies, tools, and technologies utilized for coding, testing, and version control. Mention any specific coding standards or guidelines adhered to.
- **Implementation Details** Provide a detailed explanation of the implementation of key features and functionalities. Describe any algorithms, data structures, or external libraries used. Include code snippets or pseudocode to illustrate the implementation.
- **Challenges and Solutions** Discuss any challenges or obstacles faced during the implementation process. Explain how these challenges were addressed and the solutions that were implemented to overcome them. This could include technical challenges, design considerations, performance optimizations, or integration issues.

4.2 Design View of Front End:

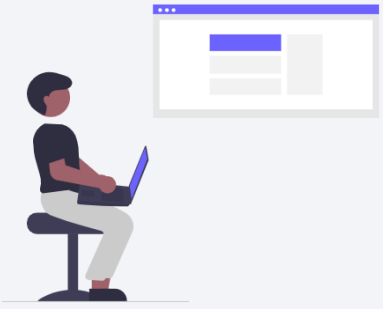


Home Page

 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)

Create an account



Name


Email



Hackerrank Id


Mobile number

Password

Confirm Password

 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)




Hackerrank Id



Mobile number

Password

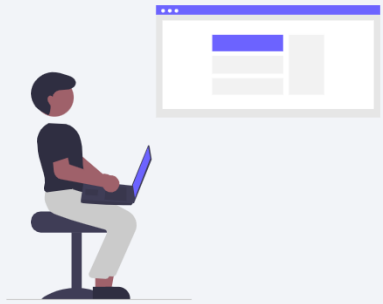
Confirm Password

Already have an account? [Login](#) instead.

 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)

Create an account



Name

name must be at least 4 characters

Email

Please enter a valid email

Hackerrank Id

HackerrankId is a required field

Mobile number

Enter a valid phone number

The image displays two screenshots of a web application's sign-up page. The top screenshot shows a form with the following fields and errors:


- Hackerrankid**: A required field (indicated by a red error message).
- Mobile number**: Contains the value 'a', with a red error message: "Enter a valid phone number".
- Password**: Contains a single dot, with a red error message: "password must be at least 5 characters".
- Confirm Password**: Contains a single dot.



The bottom screenshot shows the same form with the following input and a warning message:

- Email**: imran@gmail.com (A warning message states: "Email is already used try another email !").
- Hackerrank Id**: imran32
- Mobile number**: 01866078475
- Password**: (masked)
- Confirm Password**: (masked)

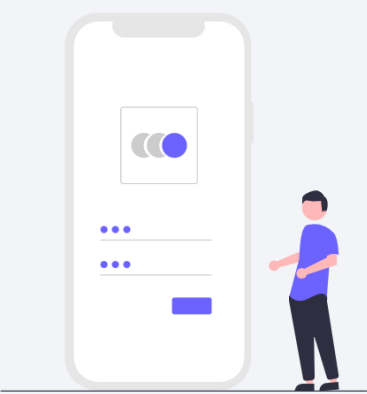
Both screenshots include a navigation bar with links: CP Guide, Challenge, Contest, Quiz, and Contact Us. The bottom screenshot also features an illustration of a person sitting at a desk with a laptop.

Sign-Up Page

 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)


Login to your account





Email

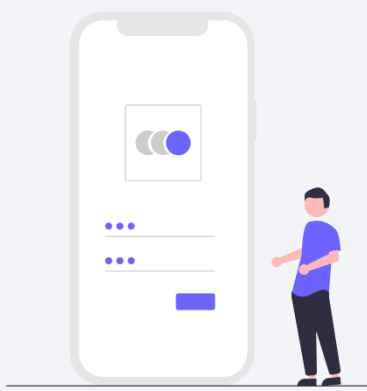
Password

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 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)

Login to your account




Email



Required

Password

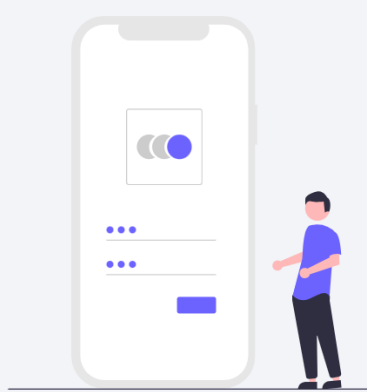
Required

Don't have an account? [Signup](#) instead.

 ++ [CP Guide](#) [Challenge](#) [Contest](#) [Quiz](#) [Contact Us](#)

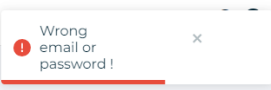
Login to your account



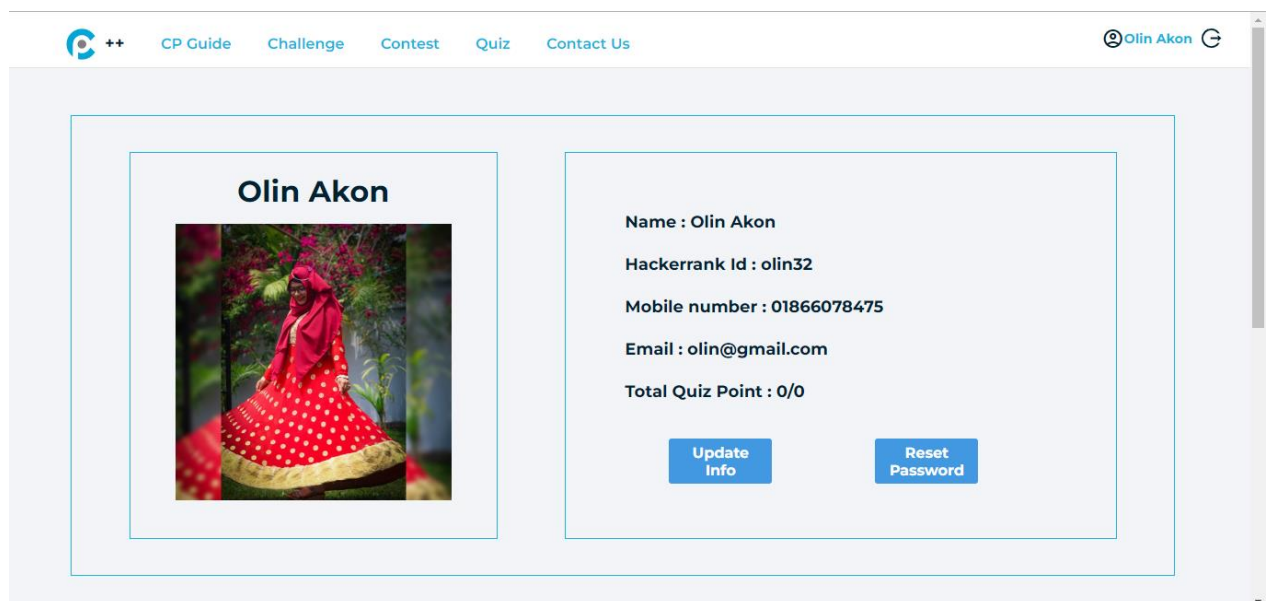
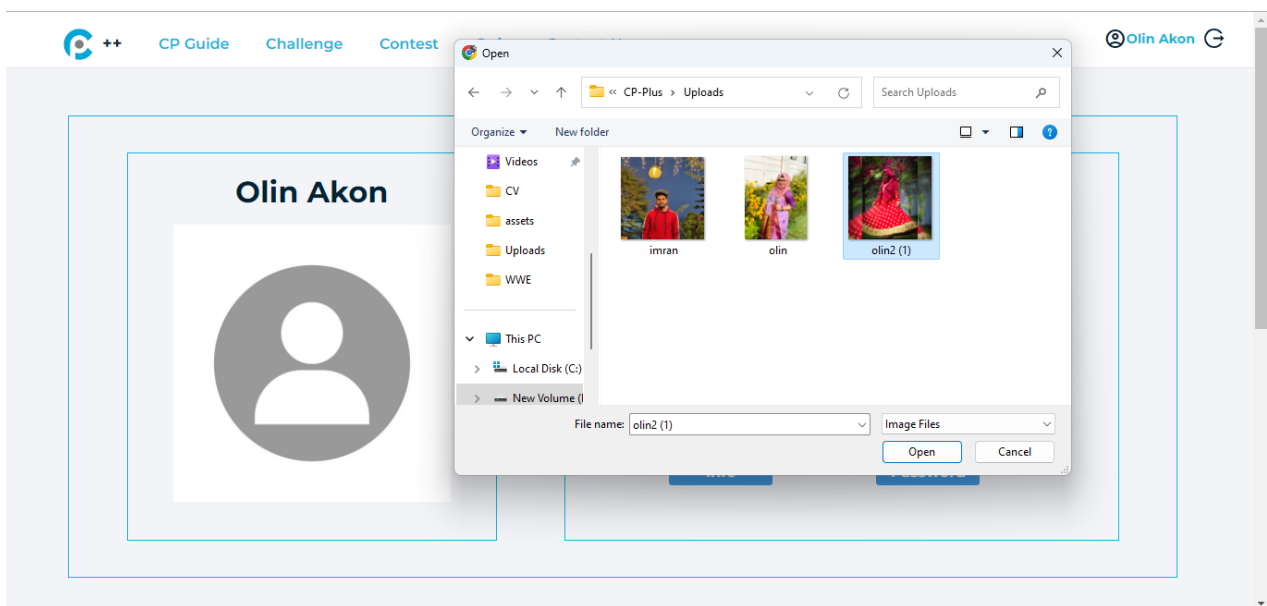
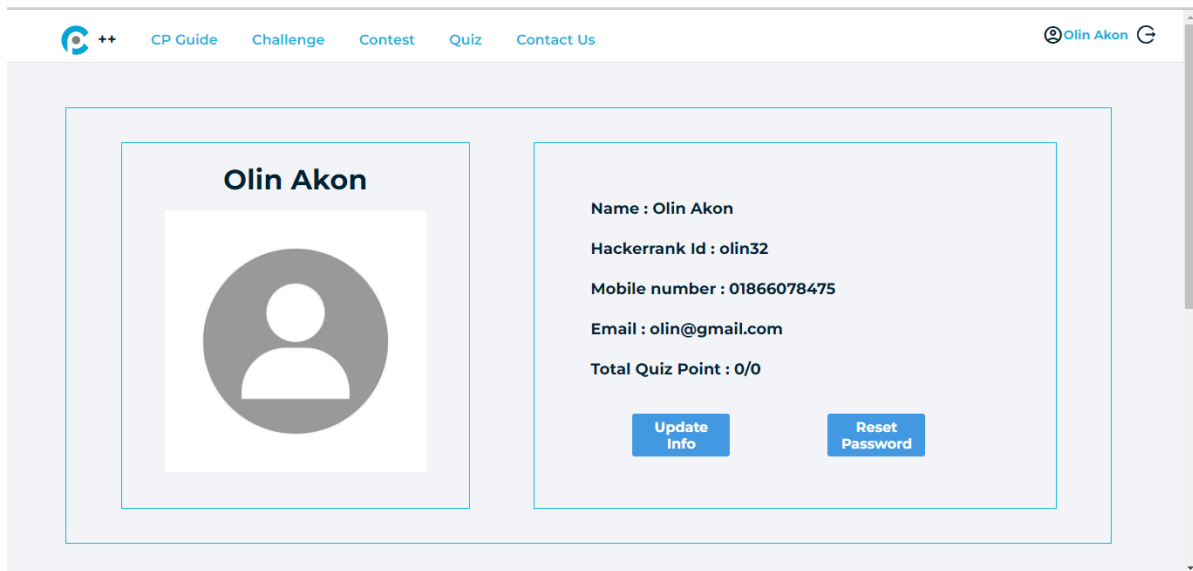
Email


Password

Don't have an account? [Signup](#) instead.



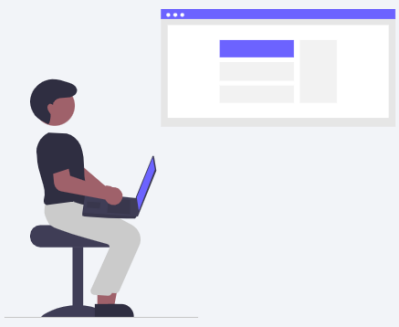
Sign-In page




[++](#)
[CP Guide](#)
[Challenge](#)
[Contest](#)
[Quiz](#)
[Contact Us](#)

Olin Akon

Update Profile




Name

Hackerrank Id

Mobile number

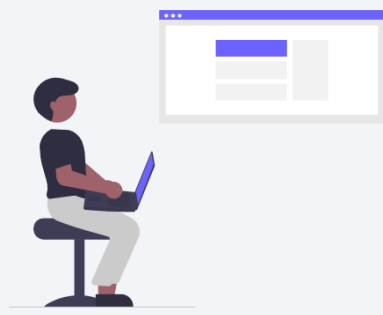
Password

SUBMIT


[++](#)
[CP Guide](#)
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Wrong Password!

Update Profile




Name

Hackerrank Id


Mobile number

Password

SUBMIT


[++](#)
[CP Guide](#)
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[Quiz](#)
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Olin



Name : Olin

Hackerrank Id : olin_akon32


Mobile number : 01866078475


Email : olin@gmail.com

Total Quiz Point : 0/0

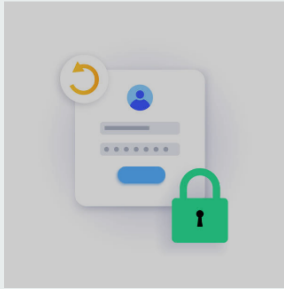
Update Info

Reset Password


[CP Guide](#)
[Challenge](#)
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Reset Password :




Current Password

New Password

Confirm Password

User Profile


[CP Guide](#)
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Beginner section

- Programming Languages
- Data Types and Variables
- Operators and Expressions
- Input/Output
- If Else
- Loops
- Array
- String
- Function
- Recursion
- Time complexity and Big O notation
- Bit manipulation


Searching and Sorting


Programming Languages

Programming languages are a set of rules, syntax, and grammar that allow developers to write instructions that can be understood and executed by computers. Each programming language has its own syntax, semantics, and features that make it unique and suited for particular types of tasks.

There are many programming languages available, and each has its own strengths and weaknesses. Here are a few examples of popular programming languages:

- C++:** C++ is a low-level programming language that is used for developing operating systems, device drivers, and system software. It is known for its efficiency, performance, and control over system resources.
- Python:** Python is a high-level programming language that is easy to learn and has a simple syntax. It is widely used for data analysis, artificial intelligence, and web development.
- Java:** Java is an object-oriented programming language that is widely used for developing desktop, web, and mobile applications. It is known for its portability, scalability, and security features.
- JavaScript:** JavaScript is a scripting language that is commonly used to create interactive web pages and dynamic user interfaces. It is known for its versatility, flexibility, and compatibility with multiple platforms.
- Ruby:** Ruby is an object-oriented programming language that is used for web development, scripting, and automation. It is known for its expressiveness, readability, and simplicity.


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Beginner section

- Programming Languages
- Data Types and Variables
- Operators and Expressions
- Input/Output
- If Else
- Loops
- Array
- String
- Function
- Recursion
- Time complexity and Big O notation
- Bit manipulation

Searching and Sorting

If Else

The if-else statement is a fundamental control structure in programming that allows the program to make decisions based on certain conditions. The if-else statement is used in C++ to execute a block of code if a certain condition is true, and another block of code if the condition is false.

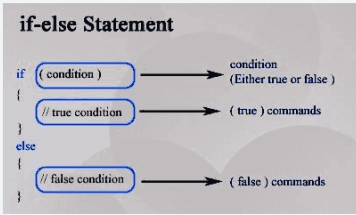
The basic syntax of the if-else statement in C++ is as follows:

if-else Statement


```

if ( condition )
{
    // true condition
}
else
{
    // false condition
}

```



In this syntax, the condition is a Boolean expression that evaluates to either true or false. If the condition is true, then the code block within the if statement is executed. If the condition is false, then the code block within the else statement is executed.

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Blog Links :

https://www.w3schools.com/cpp/cpp_conditions.asp

<https://www.programiz.com/cpp-programming/if-else>

Video Links :

<https://www.youtube.com/watch?v=cyB3HNIQyY>

<https://www.youtube.com/watch?v=AY96XFqb934>

Problem and Solution Links :

- Write a program to find maximum between two numbers.
Solution : <https://pastebin.ubuntu.com/p/ntfMtjGf8j/>
- Write a program to find maximum between three numbers.
Solution : <https://pastebin.ubuntu.com/p/KNK5Qyqng8/>
- Write a program to check whether a year is leap year or not.
Solution : <https://pastebin.ubuntu.com/p/DRrfzcZVjx/>
- Write a program to check whether a character is alphabet or not.
Solution : <https://pastebin.ubuntu.com/p/Z326v2FWvh/>
- Write a program to input any alphabet and check whether it is vowel or consonant

```

1  #include<bits/stdc++.h>
2  using namespace std;
3
4  int main() {
5      int num1, num2;
6
7      cout << "Enter the first number: ";
8      cin >> num1;
9
10     cout << "Enter the second number: ";
11     cin >> num2;
12
13     if (num1 > num2) {
14         cout << "Maximum number is " << num1 << endl;
15     } else {
16         cout << "Maximum number is " << num2 << endl;
17     }
18
19     return 0;
20 }

```

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Subarray

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Problem

Given a binary array, Find the minimum number of swap operations to be performed such that the Bitwise *AND* of any subarray of size > 1 is equal. If it can't be done, print -1 . Swap can be defined as interchanging array values at any two indices i and j .

Input:

The first line contains T , the number of test cases.

The first line of each test case contains N , the number of elements in the array.

The second line of each test case contains N integers ($0 \leq a[i] \leq 1$).

Output:

Print T lines.

Enter your code or Upload your code as file.
 Save
C++17 (g++ 10.3.0)

```

1 #include <iostream>
2 using namespace std;
3 int main() {
4     int num;
5     cin >> num; //Reading input from STDIN
6     cout << "Input number is " << num << endl; // Writing output to STDOUT
7 }
            
```

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Problem Solving Challenge



- 3 days Problem Solving
- 7 days Problem Solving**
- 15 days Problem Solving
- 30 days Problem Solving

Learn Algorithm Challenge

- 3 days Basic Algorithm
- 7 days Math Algorithm
- 15 days Math and String Algorithm
- 30 days DSA Algorithm

7 days Problem Solving

- Day 1
- Day 2
- Day 3
- Day 4
- Day 5
- Day 6
- Day 7


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- 30 days DSA Algorithm

7 days Problem Solving

Day 1

Problem Link : <https://codeforces.com/problemset/problem/1426/A>

Problem Link : <https://codeforces.com/problemset/problem/1426/A>

Problem Link : <https://codeforces.com/problemset/problem/1426/A>



Problem Link : <https://codeforces.com/problemset/problem/1426/A>

Problem Link : <https://codeforces.com/problemset/problem/1426/A>

Day 2

Day 3

Day 4


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7 days Math Algorithm

Day 1

Day 2


Day 3


Hashing :

Hashing is a technique used to quickly locate data within a collection, such as an array or a hash table, based on a key or search value. It involves applying a hash function to the key, which converts it into an index or location within the data structure.

Here's a brief explanation of how hashing works:

- Hash Function: A hash function takes an input (the key) and computes a numerical value (the hash code or hash value). The hash function should generate a unique hash value for each unique key, but collisions (different keys producing the same hash value) are possible.
- Hash Table: A hash table is a data structure that uses an array to store key-value pairs. The array is


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7 days Math Algorithm

Day 4

Day 5

Binary Links :

<https://www.programiz.com/dsa/binary-search>
<https://www.geeksforgeeks.org/binary-search/>



Video Links :

<https://www.youtube.com/watch?v=I3ocRMSJy5M>
<https://www.youtube.com/watch?v=ApvI7QUqGzI>

Problem and Solution Links :

- Problem Link : <https://www.hackerearth.com/practice/algorithms/searching/linear-search/practice-problems/algorithm/adjacent-sum-greater-than-k-f41e3ec4/>
- Problem Link : <https://www.hackerearth.com/practice/algorithms/searching/linear-search/practice-problems/algorithm/adjacent-sum-greater-than-k-f41e3ec4/>
- Problem Link : <https://www.hackerearth.com/practice/algorithms/searching/linear-search/practice-problems/algorithm/adjacent-sum-greater-than-k-f41e3ec4/>

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Quiz Topic
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 Heap
 Graph
 Dynamic Programming
 Number Theory
 Sorting Algorithms
 Searching Algorithms
 String Algorithms
 Geometry Algorithms

Quiz on Array



Question 1: Every element in an array is searched against some searching key, special for ?

☐ Linear search
☐ Bubble sort
☐ All of them
☐ Binary search

Question 2: A one-dimensional array contains one-dimensional arrays is called ?

☐ Two-dimensional array
☐ Multi-casting array
☐ Multi-dimensional array
☐ Three-dimensional array

Question 3: With the help of which character array can be initialized using ?

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☐ None of them



Question 4: Consecutive group of memory locations contains all same name and same type, is called as?

☐ Structures
☐ Arrays
☐ Classes
☐ Functions

Question 5: For finding value in an array which of the following technique is used?

☐ Binary search algorithm
☐ Bubble sort
☐ Linear search algorithm
☐ All of them



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Quiz on Array

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Quiz on Array

Question 1: Every element in an array is searched against some searching key, special for ?



☒ Linear search
☐ Bubble sort
☐ All of them
☐ Binary search

Answer : Linear search

Question 2: A one-dimensional array contains one-dimensional arrays is called ?

☒ Two-dimensional array
☐ Multi-casting array
☐ Multi-dimensional array
☐ Three-dimensional array

Answer : Two-dimensional array

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☐ None of them

Answer : A string literal

Question 4: Consecutive group of memory locations contains all same name and same type, is called as?




☐ Structures
☒ Arrays
☐ Classes
☐ Functions

Answer : Arrays


Question 5: For finding value in an array which of the following technique is used?

☒ Binary search algorithm
☐ Bubble sort
☐ Linear search algorithm
☐ All of them

Answer : All of them

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Olin



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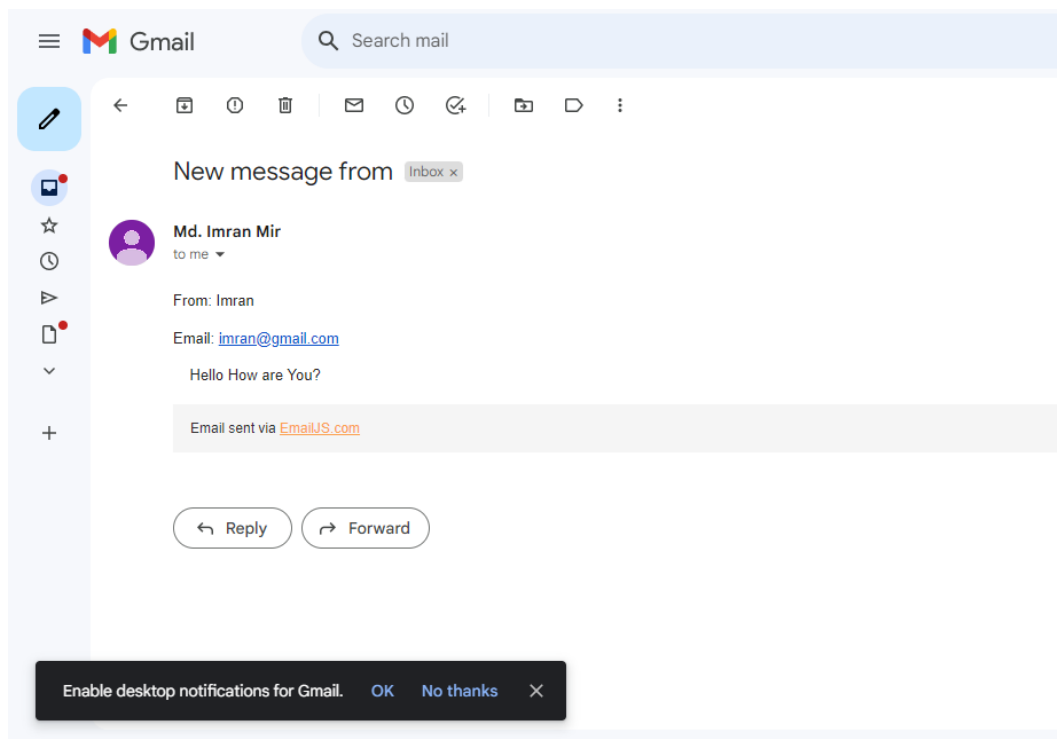
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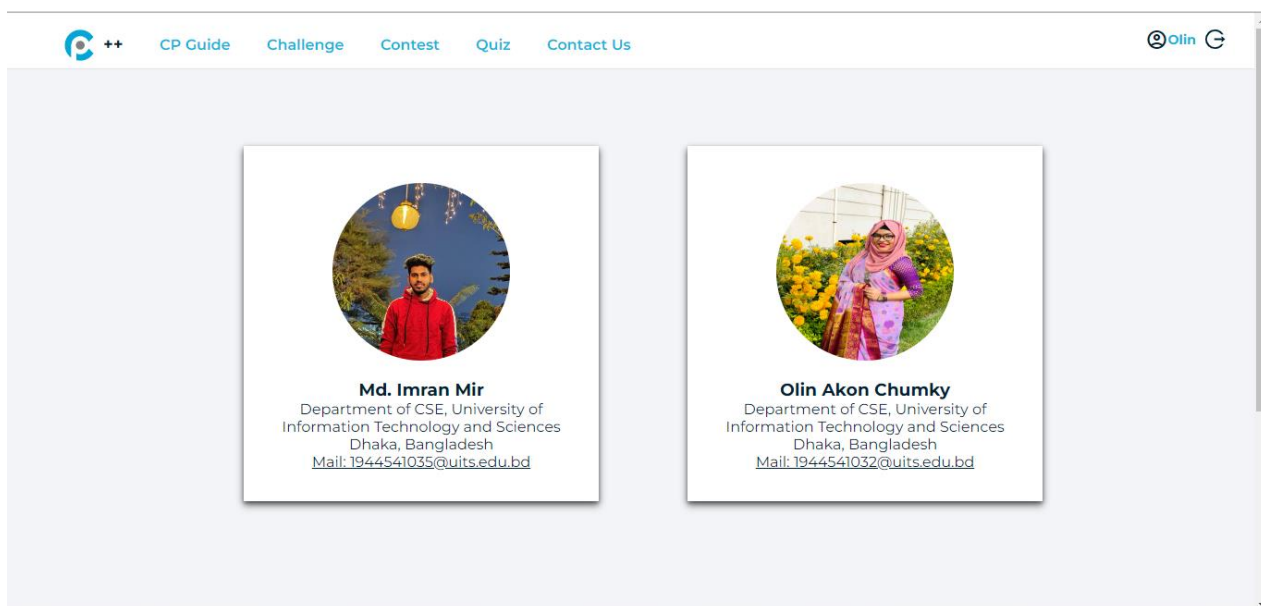
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- Improve, personalize, and expand our website: This involves enhancing the website's features and functionality to provide a better user experience. It may also involve personalizing content based on user preferences.
- Communicate with you, either directly or through one of our partners: This involves reaching out to users to provide updates, support, and other relevant information related to the website.
- Develop new products, services, features, and functionality: This involves using insights gained from analyzing user behavior and feedback to create new products, services, features, and functionality that better meet user needs.
- Send you emails: This is a specific communication channel that may be used to provide updates, promotions, and other information to users.

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Chapter 5: CONCLUSION AND FUTURE WORK

5.1 Major Findings of the Work:

The major findings of the work are the key discoveries or insights obtained through the research or implementation process. These findings often contribute to the knowledge base in the specific field or provide valuable information for decision-making or further research.

Here are some examples of major findings:

1. Learning-Based Approach: The implementation of a structured learning process with beginner, intermediate, and advanced stages has proven effective in helping users progress in their competitive programming skills. This approach ensures that users can start from scratch and gradually advance their knowledge.
2. Gamification and Challenges: The inclusion of a Challenge section with algorithm-based challenges has been successful in engaging users and motivating them to apply their learning. The concept of earning points upon completing challenges has proven to be an effective way to track progress and incentivize learning.
3. Quizzes for Self-Assessment: The implementation of quizzes after learning specific topics provides users with an opportunity to evaluate their understanding and knowledge retention. Quizzes serve as a valuable tool for self-assessment and reinforcement of learned concepts.
4. Contests for Beginner Programmers: Organizing contests specifically designed for beginner programmers has created a supportive and competitive environment. This initiative encourages participation and growth among users at an early stage of their competitive programming journey.
5. Attention to Data Security: Ensuring data security and privacy has been a priority throughout the project. Implementing robust security measures to protect user information and securely store their points in their profiles has been a crucial aspect of the website's development.
6. System Performance and Compatibility: Addressing system performance and compatibility issues across different devices and browsers has resulted in an improved user experience. Optimizing the website to ensure smooth performance and compatibility has enhanced accessibility and usability for a wider range of users.

5.2 Future Works:

- ⊘ Advanced Topics and Stages: Consider adding more advanced topics and stages to cater to experienced programmers who want to further enhance their competitive programming skills. This would provide a continuous learning path for users beyond the intermediate level.
- ⊘ Additional Challenge Types: Expand the Challenge section by introducing different types of challenges, such as coding puzzles, algorithmic competitions, or collaborative coding

projects. This variety would offer users diverse learning experiences and opportunities to apply their skills.

- € Interactive Learning Resources: Enhance the learning experience by incorporating interactive resources such as video tutorials, coding simulations, or interactive coding exercises. These resources can help users grasp complex concepts more effectively and provide hands-on practice.
- € Social Features: Introduce social features to foster a sense of community among users. This could include discussion forums, mentorship programs, or the ability to connect and collaborate with other users. Encouraging interaction and knowledge sharing can further enhance the learning experience.
- € Analytics and Progress Tracking: Implement more comprehensive analytics and progress tracking features. This could include detailed insights into users' performance, strengths, and areas for improvement. Personalized recommendations for topics or challenges based on individual progress can also be beneficial.
- € Integration with Coding Platforms: Explore integration with popular coding platforms such as HackerRank or Codeforces. This would allow users to practice coding challenges directly within the CP++ platform and synchronize their progress between the platforms.

5.3 Conclusion: In conclusion, the CP++ website has proven to be a successful and comprehensive learning platform for competitive programming. The website's three-stage learning process, beginner, intermediate, and advanced, provides a structured approach for users to progress and improve their skills. Overall, the CP++ website effectively combines learning, problem-solving, and competition to provide a comprehensive platform for individuals interested in competitive programming. With the potential for further enhancements and scalability, the website can continue to meet the evolving needs of its user base and contribute to their growth and success in the field of competitive programming.