Project Synopsis

on

Codeforces Analyser

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# Bachelor of Technology

in

# Computer Science



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**DECLARATION**

We hereby declare that this submission is our work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

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**ABSTRACT**

The "Codeforces Analyser" project offers a robust solution for Codeforces users, enabling them to gain deeper insights into their coding performance. By harnessing the capabilities of the Codeforces API, this tool provides a seamless interface for visualizing and analyzing user profiles. It empowers users to not only compare ratings and track contest participation but also delve into the execution of their code on test cases. Through this visual representation, users can identify errors, inefficiencies, and areas for optimization in their algorithms.

Furthermore, Codeforces Analyser serves as a valuable resource for both seasoned programmers and newcomers alike. Seasoned programmers can fine-tune their skills and benchmark themselves against their peers, while newcomers can use it as a learning tool to understand their progress and improve their coding abilities.

In essence, Codeforces Analyser stands at the intersection of analytics and visualization, offering a comprehensive solution for users to comprehend and enhance their journey in the competitive coding arena.

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## CHAPTER 1

**INTRODUCTION**

## BACKGROUND

The genesis of the "Codeforces Analyser" project stems from a recognition of the challenges and opportunities inherent in the Codeforces online judge platform. As a premier destination for competitive programming enthusiasts, Codeforces provides a rich ecosystem of challenges, competitions, and user interactions. However, amidst the myriad of features and complexities, users often find themselves grappling with the need for enhanced tools and insights to optimize their performance and navigate the platform effectively.

Against this backdrop, the Codeforces Analyser project emerges as a pioneering initiative aimed at addressing these needs and empowering users to unlock their full potential on the Codeforces platform. At its core, the project is driven by a commitment to leveraging the robust capabilities of the Codeforces API to develop a comprehensive suite of tools and functionalities that cater to the diverse needs of Codeforces users.

The primary purpose of Codeforces Analyser is to provide users with a streamlined and intuitive solution for visualizing and understanding the execution of their code on test cases for problems hosted on Codeforces. By offering a user-friendly interface that seamlessly integrates input and output visualization for each test case, the project aims to bridge the gap between code execution and comprehension. This not only enables users to better understand how their algorithms perform in various scenarios but also facilitates iterative improvement and optimization.

Furthermore, Codeforces Analyser goes beyond code execution visualization by offering a range of analytics and visualization tools tailored to the specific needs of Codeforces users. From comparing maximum and minimum ratings to tracking contest participation and identifying highest positive ratings achieved, these features empower users to gain deeper insights into their coding journey and benchmark themselves against their peers.

In essence, the background of the Codeforces Analyser project is rooted in a deep understanding of the challenges and opportunities inherent in the Codeforces platform. By harnessing the power of the Codeforces API and embracing a user-centric approach, the project seeks to revolutionize the way users interact with the platform, fostering a culture of continuous improvement and growth within the Codeforces community.

## PROBLEM STATEMENT

To create a robust analytics and visualization tool for users of the Codeforces online judge platform, aimed at developing a code repository that utilizes the Codeforces API to provide users with the ability to visualize, analyze, and compare Codeforces user profiles, thereby enhancing their competitive programming experience and fostering a sense of community engagement and growth within the platform.

## OBJECTIVES

### There are four objectives that need to be achieved in this project:

1. Develop a user-friendly interface and robust backend functionality for the Codeforces Analyser tool, ensuring accessibility and seamless integration with the Codeforces platform.
2. Provide comprehensive data visualization features, allowing users to analyze and compare Codeforces user profiles, track contest participation, and identify performance trends.
3. Enhance user experience and engagement by offering actionable insights and recommendations for performance improvement based on data analysis, fostering a supportive and competitive coding environment within the Codeforces community.

## PROJECT SCOPE

This project needs a coordinated scope of work. These scopes will help to focus on this project. The scopes are:

i. Develop a tool for visualizing code execution on test cases for Codeforces problems..

ii. Integrate with the Codeforces API for real-time access to user data and problem information.

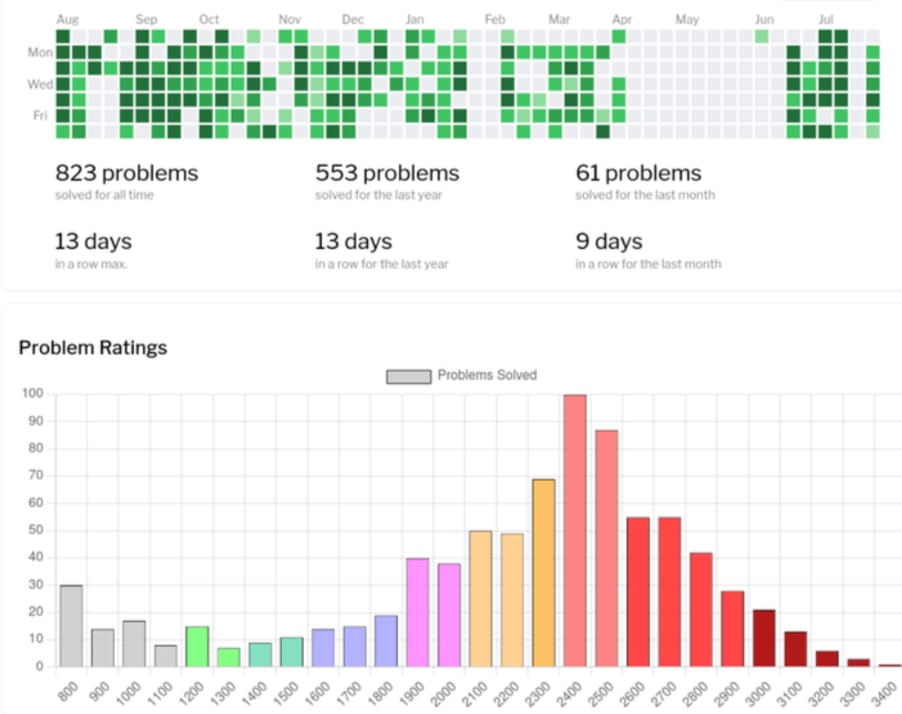
iii. Foster user engagement and growth within the Codeforces community through features that encourage performance comparison and improvement.

## LIMITATION OF WORK

1. This project can only show detailed explaination of variety problem solved.
2. It focuses on filtering, analyzing and classifying the stats of user.
3. Can compare two user profiles at one time.

## CHAPTER : 2

**METHODOLOGY**



## IMPLEMENTATION AND CODING PHASE

This project is implemented using a combination of HTML, CSS, and JavaScript to create the frontend interface. The Material Design Lite (MDL) framework provides a sleek and responsive design for the user interface. Google Charts and jQuery are integrated into the frontend to facilitate dynamic visualization of data and enhance user interaction. JavaScript is utilized for client-side scripting to handle user inputs, process data, and interact with the backend. The backend functionality, which includes data processing and analysis, may be implemented using server-side languages such as Python or Node.js, depending on project requirements. The frontend and backend components are seamlessly integrated to create a cohesive and interactive user experience, allowing users to visualize and analyze data effectively.

## PROJECT REQUIREMENT AND SPECIFICATION

System requirement is needed in order to accomplish the project goals and objectives and to assist in development of the project that involves the usage of hardware and software. Each of these requirements is related to each other to make sure that system can be done smoothly.

## HARDWARE

**The usage of hardware is as below**

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Hardware | Type | Description |
| 1. | Laptop | Acer Aspire E 14 |  Processor: Intel Core i5, 7th Gen   OS version: Windows 64 bit   RAM: 8 GB |
| 2. | Printer | HP Deskjet 2135 |  Printing document |
| 3. | Printed paperwork | A4 paper |  Used to study on how to implement this project from past paperwork |

*Table 3.1: Hardware used*

## SOFTWARE

**The usage of software in this project is as below**

|  |  |  |
| --- | --- | --- |
| No. | Software | Description |
| 1. | Microsoft Azure |  Machine learning platform   Deploy models   Run models in cloud |
| 2. | Google Chrome |  Used to run web-based system |
| 3. | Microsoft Word 2016 |  Creating and editing report |
| 4. | Microsoft PowerPoint 2016 |  For presenting finding and result of the project |
| 5. | Github |  Get dataset |
| 6. | Snipping Tool |  Captures and screenshot images |
| 7. | WinZip |  Extract the data |
| 8. | Visual Studio |  Implementation and deployment |

**DESCRIPTION**

The "Codeforces Analyser" project represents a comprehensive and innovative solution tailored to meet the needs of users within the Codeforces online judge platform. By leveraging the robust capabilities of the Codeforces API, this project offers a streamlined and intuitive interface enriched with HTML, CSS, and JavaScript technologies, alongside MDL, Google Charts, and jQuery functionalities. Through this amalgamation of cutting-edge tools and technologies, users are provided with a seamless experience, enabling them to effortlessly visualize, analyze, and compare various aspects of their coding performance. From tracking maximum and minimum ratings to monitoring contest participation and identifying highest positive ratings achieved, the Codeforces Analyser empowers users of all skill levels to gain valuable insights into their competitive programming journey. Whether you're a seasoned programmer refining your skills or a newcomer assessing your progress, this tool serves as an indispensable resource, facilitating performance evaluation, identifying areas for improvement, and fostering healthy competition among peers. In essence, the Codeforces Analyser project embodies a commitment to enhancing user experience and promoting growth within the competitive coding arena, ultimately contributing to the advancement of the Codeforces community as a whole.

## SUMMARY

The Codeforces Analyser project is dedicated to creating a user-friendly web application tailored specifically for Codeforces enthusiasts, providing comprehensive analytics and visualizations to enrich their competitive programming journey. By harnessing the Codeforces API, users will have access to a suite of tools to visualize and compare key performance metrics, enabling them to set achievable goals, pinpoint areas for growth, and foster a more collaborative and competitive community. This platform will serve as an invaluable resource for both novice programmers seeking motivation and seasoned professionals craving detailed insights. The anticipated outcome of this project is to deliver a robust and feature-rich tool that empowers users to track their progress, identify strengths and weaknesses, and engage in healthy competition with their peers. Ultimately, the Codeforces Analyser project aspires to make a significant contribution to the growth and enhancement of the competitive coding ecosystem on Codeforces, fostering a community-driven culture of continuous improvement and excellence.

## CHAPTER **: 3** LITERATURE REVIEW

**1: Introduction to Codeforces Analyser Project**

The inception of the "Codeforces Analyser" project stems from a profound understanding of the challenges and opportunities inherent in the Codeforces online judge platform. As a premier destination for competitive programming enthusiasts, Codeforces provides a rich ecosystem of challenges, competitions, and user interactions. However, amidst the myriad of features and complexities, users often find themselves grappling with the need for enhanced tools and insights to optimize their performance and navigate the platform effectively.

Against this backdrop, the Codeforces Analyser project emerges as a pioneering initiative aimed at addressing these needs and empowering users to unlock their full potential on the Codeforces platform. At its core, the project is driven by a commitment to leveraging the robust capabilities of the Codeforces API to develop a comprehensive suite of tools and functionalities that cater to the diverse needs of Codeforces users.

**2: Understanding User Needs**

Central to the development of Codeforces Analyser is a deep comprehension of the needs and aspirations of users on the Codeforces platform. Through careful observation and analysis, the project identifies the challenges users encounter and the gaps in existing tools. By understanding these needs, Codeforces Analyser aims to tailor its features and functionalities to address them effectively, ensuring a more fulfilling and productive experience for users.

**3: The Genesis of Codeforces Analyser**

The Codeforces Analyser project finds its origins in a profound understanding of the evolving terrain of competitive programming and the myriad opportunities it offers. This understanding stems from a deep recognition of the dynamic ecosystem within Codeforces—a platform bustling with challenges, contests, and interactions, serving as a fertile ground for enthusiasts eager to hone their programming skills. Drawing inspiration from the vibrant Codeforces community, the project is fueled by a commitment to innovation and empowerment.

At its core, Codeforces Analyser is driven by a belief in the transformative potential of technology to empower individuals on their coding journey. Leveraging the robust capabilities of the Codeforces API, the project aspires to develop a comprehensive suite of tools tailored to the diverse needs of users. Whether users are seasoned competitors seeking to refine their skills or newcomers navigating the complexities of competitive programming, Codeforces Analyser aims to provide the resources necessary for success.

The journey of Codeforces Analyser is marked by exploration and innovation—a relentless pursuit of excellence and a dedication to pushing the boundaries of what is achievable. As the project evolves, it adapts to the ever-changing needs of users, striving to remain at the forefront of the competitive programming landscape.

In essence, the genesis of Codeforces Analyser epitomizes the power of community, innovation, and technology. It serves as a testament to the collective vision of Codeforces enthusiasts—a vision of empowerment, growth, and success. As the project continues to grow, it stands as a beacon of inspiration, reminding individuals that with the right tools and support, they can achieve anything in the world of competitive programming.

**4: Core Functionality of Codeforces Analyser**

At its essence, Codeforces Analyser is crafted to offer users a streamlined approach to visualize and grasp their code execution on test cases for problems hosted on Codeforces. Through seamless integration with the Codeforces API and a user-friendly interface, the project effectively closes the gap between code execution and comprehension. However, its functionality transcends mere visualization, extending to a suite of tailored analytics and visualization tools. These tools are meticulously designed to cater to the specific needs of Codeforces users, enabling them to delve deeper into their coding journey. By providing these insightful resources, Codeforces Analyser empowers users to not only understand their code execution but also gain valuable insights that contribute to their growth and success on the platform.

**5: User-Centric Approach**

Codeforces Analyser adopts a user-centric philosophy, where the focal point of its development is the satisfaction of user needs and preferences. This approach underscores the significance of usability, accessibility, and engagement throughout the project's lifecycle. By placing users at the forefront, Codeforces Analyser endeavors to fashion a platform resonant with individuals of varied skill levels.

Whether users are seasoned programmers refining their craft or newcomers navigating the intricacies of competitive programming, Codeforces Analyser aims to furnish a supportive and enriching environment conducive to growth and learning. This commitment is evident in the creation of a user-friendly interface, facilitating seamless navigation and comprehension.

Furthermore, the project prioritizes accessibility, ensuring that individuals from diverse backgrounds and abilities can readily engage with its features and functionalities. Through intuitive design elements and comprehensive documentation, Codeforces Analyser seeks to lower barriers to entry and foster inclusivity within the competitive programming community.

Additionally, Codeforces Analyser fosters a culture of engagement by actively soliciting feedback and participation from its users. By incorporating user insights into its development process, the project remains agile and responsive to evolving user needs, thereby enhancing the overall user experience.

In essence, Codeforces Analyser's user-centric approach underscores its commitment to empowering individuals on their coding journey, irrespective of their proficiency level or background. Through a focus on usability, accessibility, and engagement, the project endeavors to cultivate an environment where users can flourish, learn, and excel in competitive programming.

**6: Project Objectives and Scope**

The Codeforces Analyser project sets out with a multi-faceted approach to achieve its objectives. These encompass the development of a user-friendly interface, comprehensive data visualization features, and actionable insights for performance enhancement. Through a coordinated scope of work, the project aims to deliver a robust analytics and visualization tool. This tool is designed to empower users, enabling them to track their progress, identify areas for improvement, and engage actively in healthy competition within the Codeforces community. By focusing on these key objectives, Codeforces Analyser endeavors to provide users with the necessary resources to navigate their coding journey effectively and foster a supportive and competitive environment within the platform.

**7: Technological Framework**

Codeforces Analyser operates within a sophisticated technological framework, harnessing HTML, CSS, and JavaScript technologies in conjunction with MDL, Google Charts, and jQuery functionalities. This amalgamation of cutting-edge tools and technologies forms the backbone of the project, enabling a seamless and immersive user experience. By leveraging these resources, Codeforces Analyser empowers users to visualize, analyze, and compare various facets of their coding performance with unparalleled ease and efficiency.

The utilization of HTML, CSS, and JavaScript ensures the creation of a dynamic and responsive user interface, facilitating intuitive navigation and interaction. Additionally, the integration of MDL (Material Design Lite) enhances the visual appeal and consistency of the platform, contributing to an enhanced user experience. Meanwhile, Google Charts and jQuery functionalities provide robust data visualization capabilities, allowing users to glean valuable insights from their coding journey. In essence, the technological framework of Codeforces Analyser is meticulously designed to optimize user engagement and facilitate meaningful interactions with coding data.

**8: Features and Functionalities**

Codeforces Analyser offers a comprehensive array of features and functionalities tailored to address the varied needs of Codeforces users. These encompass a wide range of capabilities, from tracking maximum and minimum ratings to monitoring contest participation and identifying performance trends. By providing a holistic suite of tools and analytics, the project empowers users to delve deeply into their competitive programming journey.

Through Codeforces Analyser, users can gain invaluable insights into their coding performance, facilitating the setting of achievable goals and the identification of areas for growth. Moreover, the platform fosters a more collaborative and competitive community by offering tools for users to compare their progress with peers and engage in healthy competition.

With its diverse set of features and functionalities, Codeforces Analyser serves as an indispensable resource for Codeforces users of all skill levels. Whether users are seasoned competitors seeking to refine their strategies or newcomers looking to navigate the platform effectively, Codeforces Analyser provides the tools necessary to thrive in the competitive programming arena.

## 9: Empowering Users of All Skill Levels

Codeforces Analyser is dedicated to empowering individuals across all proficiency levels in programming. From beginners seeking inspiration to experienced practitioners hungering for in-depth analyses, our commitment remains steadfast. Through a range of accessible tools and resources, our project endeavors to democratize access to learning opportunities and foster an inclusive environment for skill development.

For those embarking on their coding journey, we offer motivation and guidance to navigate the initial hurdles. Meanwhile, for seasoned professionals, we provide intricate insights to fuel their continuous growth. Regardless of where you stand on your programming path, Codeforces Analyser is your steadfast companion, supporting you through every challenge and triumph.

Our mission is to level the playing field, ensuring that everyone has the chance to thrive and excel in the realm of coding. Whether you're aiming to grasp the basics or aiming for mastery, our platform is tailored to meet your needs. Join us on this journey of exploration and advancement, as we pave the way for a more inclusive and empowered coding community.

**10: Impact on Codeforces Community**

Codeforces Analyser leaves an indelible mark on the Codeforces community, transcending individual achievements to nurture a collective spirit of advancement. It serves as a catalyst for community growth, instilling a shared commitment to perpetual refinement and excellence. By promoting a culture of continuous learning and innovation, the project ignites the ambition of users, encouraging them to push boundaries and pursue greatness.

Moreover, Codeforces Analyser fosters a sense of camaraderie and collaboration among community members. Through shared insights, constructive feedback, and mutual support, users engage in fruitful exchanges that enrich their learning journeys and bolster their coding prowess. This collaborative ethos not only strengthens individual skills but also fosters a sense of belonging and interconnectedness within the Codeforces ecosystem.

Furthermore, the project injects a new dynamism into the Codeforces experience, infusing it with renewed vigor and purpose. Through friendly competition and collective aspirations, users are inspired to surpass their limits and achieve remarkable feats. This collective pursuit of excellence propels the entire community to ascend to unprecedented levels of success and accomplishment, ensuring that the Codeforces community evolves into a vibrant hub of innovation and achievement.

**11: Summary of Codeforces Analyser**

The Codeforces Analyser project is a dedicated effort to create a user-friendly web application tailored specifically for Codeforces enthusiasts, aiming to enhance their competitive programming journey through comprehensive analytics and visualizations. With a focus on harnessing the power of the Codeforces API, this project endeavors to provide users with a suite of tools that facilitate the visualization and comparison of key performance metrics, thereby empowering them to set achievable goals, identify areas for growth, and contribute to a more collaborative and competitive community environment.

At its core, the Codeforces Analyser project seeks to address the diverse needs of both novice programmers seeking motivation and seasoned professionals craving detailed insights into their performance and progress. By leveraging the wealth of data available through the Codeforces API, users will have access to a range of analytical features designed to cater to their individual skill levels and objectives.

For novice programmers, the Codeforces Analyser platform will serve as a valuable resource for finding inspiration and guidance as they navigate the early stages of their coding journey. Through intuitive visualizations and personalized recommendations, users will be able to gain valuable insights into their performance, identify areas for improvement, and chart a course for their continued growth and development.

For seasoned professionals, the Codeforces Analyser project offers a sophisticated set of analytical tools aimed at providing detailed insights into their competitive programming performance. From advanced metrics tracking to comparative analysis with peers, users will have access to the data-driven insights they need to refine their skills, stay ahead of the competition, and continue pushing the boundaries of their capabilities.

Central to the mission of the Codeforces Analyser project is the goal of fostering a more collaborative and competitive community environment on Codeforces. By providing users with the means to easily visualize and compare their performance metrics, the project aims to encourage healthy competition and facilitate meaningful interactions among community members.

Looking ahead, the anticipated outcome of the Codeforces Analyser project is the delivery of a robust and feature-rich web application that empowers users to track their progress, identify their strengths and weaknesses, and engage in healthy competition with their peers. By providing a comprehensive suite of analytical tools and fostering a collaborative community environment, the project aims to make a significant contribution to the growth and enhancement of the competitive coding ecosystem on Codeforces, ultimately fostering a culture of continuous improvement and excellence among its users.

## 12: Conclusion and Future Directions

In conclusion, the Codeforces Analyser project represents a pivotal development in the landscape of competitive programming within the Codeforces community. Its innovative approach, coupled with a commitment to user-centric design and continuous enhancement, underscores its potential to shape the future trajectory of this vibrant ecosystem.

By providing a platform that offers intuitive features and insightful analytics, the project stands as a beacon of empowerment for users across all skill levels. Whether you're a novice programmer seeking motivation or a seasoned professional striving for excellence, the Codeforces Analyser project endeavors to meet your needs and propel you towards your goals.

As we reflect on the journey thus far, it's evident that the Codeforces Analyser project has already made significant strides towards its mission of fostering a more collaborative and competitive community environment. Through features like performance benchmarks, comparative analysis, and collaborative challenges, users have been able to engage with one another in meaningful ways, sharing insights, strategies, and achievements.

Looking ahead, the future of the Codeforces Analyser project holds boundless opportunities for growth and innovation. Our team remains committed to listening to the feedback and evolving in tandem with the evolving needs of our users. We are dedicated to delivering new and exciting functionalities that further enrich the competitive programming experience, ensuring that the Codeforces community continues to thrive and flourish.

As we embark on this journey together, let us embrace the spirit of innovation, collaboration, and growth that defines the Codeforces Analyser project. Together, we have the power to shape the future of competitive programming on the Codeforces platform and chart a course towards a brighter and more inclusive community for all. With your support and engagement, we are confident that the best is yet to come.

## CHAPTER : 4 TECHNOLOGY USED

The project leverages a combination of cutting-edge web technologies to achieve its objectives.

1: MDL

2: Google Charts

3: jQuery

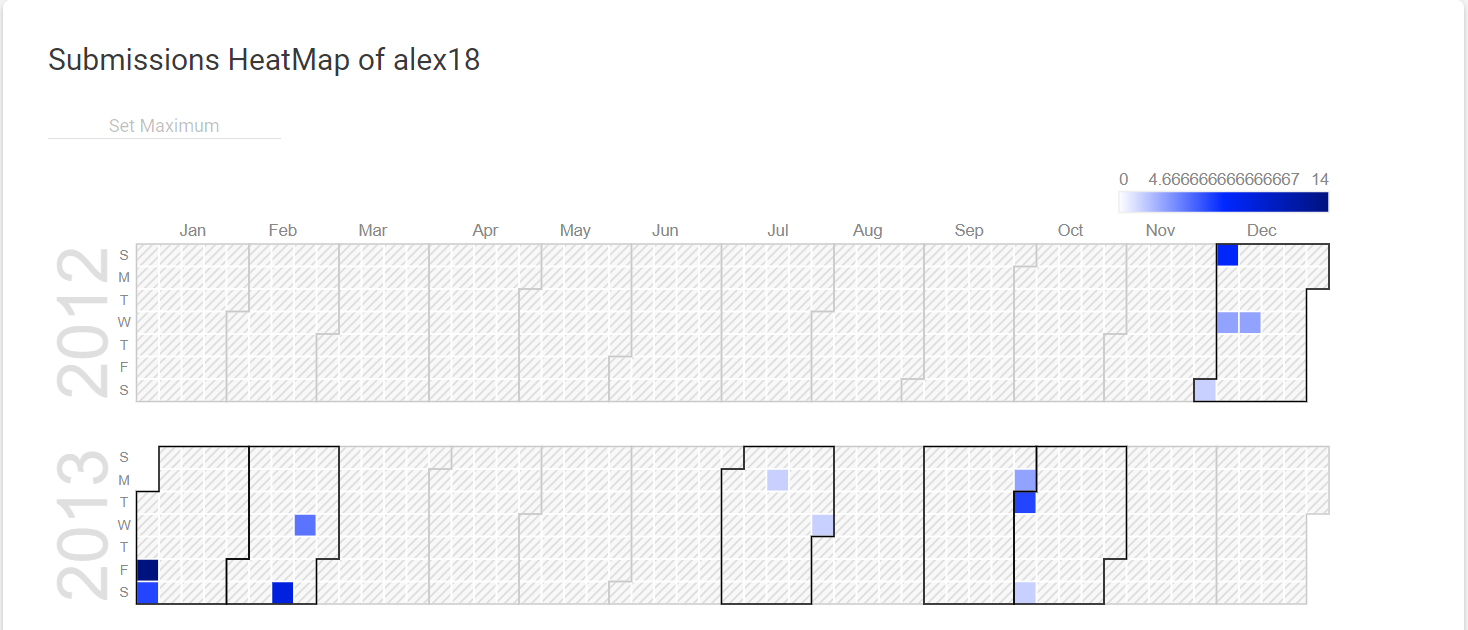
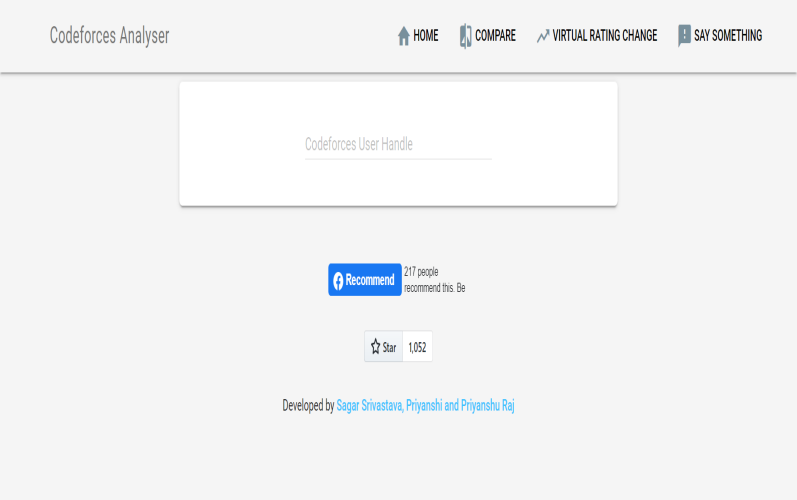
4: Javascript

**CHAPTER:5**

**DIAGRAMS**

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# 



# CHAPTER: 6

## CONCLUSION

The Codeforces Analyser project will result in a user-friendly web application or platform that empowers Codeforces enthusiasts to gain deeper insights into their competitive programming journey. By visualizing and comparing key performance metrics, users can set goals, identify areas for improvement, and foster a more competitive and informed community on Codeforces.

This tool will cater to both beginners seeking motivation and experienced programmers looking for detailed analytics to enhance their Codeforces experience. Ultimately, the Codeforces Analyser project aims to contribute to the growth and improvement of the competitive coding community on Codeforces.

It is a code repository for a simple analytics visualization site for Codeforces online judge users using Codeforces API. It can be used to visualize, analyze, and compare Codeforces user profiles. The project is still under development, but it has the potential to be a valuable tool for Codeforces users who want to track their progress, identify their strengths and weaknesses, and compare themselves to other users.

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