

**A
Project Report
On
“Stock Mate”**

(CE244 - Software Group Project - I 464-465)

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CERTIFICATE

This is to certify that the report entitled “**Stock Mate**” is a bonafied work carried out by **Tanmay Damle** (19DCE021), **Darshan Gupta** (19DCE036), **Priyanshu Kalambe** (19DCE052), **Yash Kavaia** (19DCE056) under the guidance and supervision of **Assistant Prof. Bhavika Patel** for the subject **CE244 Software Group Project-I** CE of 3rd Semester of Bachelor of Technology in **DEPSTAR** at Faculty of Technology & Engineering – CHARUSAT, Gujarat.

To the best of my knowledge and belief, this work embodies the work of candidate himself, has duly been completed, and fulfills the requirement of the ordinance relating to the B.Tech. Degree of the University and is up to the standard in respect of content, presentation and language for being referred to the examiner.

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DECLARATION BY THE CANDIDATE

We hereby declare that the project report entitled “**Stock Mate.**” submitted by us to **Devang Patel Institute of Advance Technology and Research (DEPSTAR), Changa** in partial fulfilment of the requirement for the award of the degree of **B.Tech** in Computer Engineering, from **Devang Patel Institute of Advance Technology and Research (DEPSTAR)**, is a record of bonafide CE244 - Software Group Project - I 464-465 (project work) carried out by us under the guidance of **Prof. Bhavika Patel**. We further declare that the work carried out and documented in this project report has not been submitted anywhere else either in part or in full and it is the original work, for the award of any other degree or diploma in this institute or any other institute or university.

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ABSTRACT

In today's world everyone wants to earn huge loads of money, that's where finance comes in. One of the best ways to earn money is through stock markets. In stock market people can invest in certain companies & can share the profit or sometimes loss. People sometimes invest according to trend which is not a proper way if we want profit in our investments. Hence, we made "**Stock Mate**". **Stock Mate** is a Back-tester for Stock Market Strategies.

ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our guide **Prof. Bhavika Patel** who gave us the golden opportunity to do this wonderful project on the topic '**Back-Testing for Stock Market Strategies**', and was made herself available for all the queries, questions and suggestions from her busy schedule We are really thankful to her for the same.

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CHAPTER 1: INTRODUCTION

1.1 Origin of this Idea

Priyanshu(19DCE052) is the leader of our group & has been interested in stock market for a year now. He found himself struggling through the web to find a back-tester for his strategies because not all of them were good or not working properly or were paid.

So, when he discussed this problem with us, we had a thought that we can make a strong back-tester by gaining knowledge about stock market, indicators which indicate different things in stock market, etc. by learning each day new things about stock market.

1.2 What is Stock Mate?

Stock Mate is a web application which takes an input - from the user, from the website about the indicators which the user wants to use for entry and exit of his stock journey along with the name of stock which he wants to back test his strategy in - and gives us output about how many percentage(%) profit he would have earned if he invested in a particular stock for a time period of past 5 years.

The main domain of our project is web application & data manipulation. Our application takes data from the web and

1.3 Who can it be useful to?

- People who invest in stock market.
- People who wants to check their strategy before investing so that they can avoid loss.

1.4 Why this project?

We chose this project for 2 reasons:

1. We want to know how stock market works; how can we use our programming skills to our benefit & others.
2. This project uses a number of technologies which we wanted to learn and implement simultaneously.

1.5 Keywords

Back-testing, stock, back-testing strategy.

CHAPTER 2: SOFTWARE AND HARDWARE

2.1 Python

Python is an interpreted, high-level and general-purpose programming language. Created by Guido van Rossum and first released in 1991.

Python is a multi-paradigm programming language, Object-oriented programming and structured programming are fully supported, and many of its features support functional programming and aspect-oriented programming.

We used Python in our project for coding the complex algorithms of different indicators of stock markets & the back-testing algorithm of each indicators.

We chose Python in our project because it is easy to understand & implement, it's a syntactical sugar language - that means the syntax is very convenient compared to other languages, the code becomes shorter because of less syntax and because of python's vast set of libraries and frameworks.

Version used: 3.8.5 (latest stable version at this point)



Figure 1 Python

2.2 Pandas

Pandas is a software library written for the Python programming language for data manipulation and analysis. In particular, it offers data structures and operations for manipulating numerical tables and time series. It is free software released under the three-clause BSD license. The name is derived from the term "panel data", an econometrics term for data sets that include observations over multiple time periods for the same individuals. Its name is a play on the phrase "Python data analysis" itself.

Pandas is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language.

We used Pandas library to fetch the financial data of stock market from yahoo domain, because yahoo domain is the best to get data for financial analysis. Using Pandas, we also manipulated the data in our desired form so that we can use it further in the back-testing.

We chose Pandas in our project so that we can use its functionalities to fetch data in real time, so that when user enters a stock name it fetches data for past 5 years of that stock and makes that data useable for further back-testing process.

Version used: 1.1.2 (latest stable version at this point)



Figure 2 Pandas

2.3 Django

Django is a Python-based free and open-source web framework that follows the model-template-views (MTV) architectural pattern. It is maintained by the Django Software Foundation (DSF), an American independent organization established as a non-profit.

Django's primary goal is to ease the creation of complex, database-driven websites. The framework emphasizes reusability and "pluggability" of components, less code, low coupling, rapid development, and the principle of don't repeat yourself. Python is used throughout, even for settings files and data models. Django also provides an optional administrative create, read, update and delete interface that is generated dynamically through introspection and configured via admin models.

Django framework of python is the most famous technology to make a front-end for a code that's written in python. Django makes it so easy for us to use and manipulate different files simultaneously to get our desired output. Django makes server hosting and database management available to use very easily by just writing a few lines of code.

We chose to use Django framework for our project because it's so easy to learn, use, implement and understand.

Version used: 3.1.1 (latest stable version at this point)



Figure 3 Django

2.4 PyCharm

PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems, and supports web development with Django as well as data science with Anaconda.

PyCharm is cross-platform, with Windows, macOS and Linux versions. The Community Edition is released under the Apache License, and there is also Professional Edition with extra features – released under a proprietary license.

We chose PyCharm because it is one the best IDE's for Python and is easy to use, it can run complex algorithms easily while the Python's inbuilt IDE, IDLE shows errors while running.



Figure 4 PyCharm

2.5 GitHub

GitHub, Inc. is an American multinational corporation that provides hosting for software development and version control using Git. It offers the distributed version control and source code management (SCM) functionality of Git, plus its own features. It provides access control and several collaboration features such as bug tracking, feature requests, task management, continuous integration and wikis for every project. Headquartered in California, it has been a subsidiary of Microsoft since 2018.

We used GitHub to be able to easily organize our code, go back to a previous version of code if any mistakes are made, to work easily with groups.



Figure 5 GitHub

2.6 Front-End Technologies

Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser.

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML

JavaScript (JS), is a programming language that conforms to the ECMAScript specification. JavaScript is high-level, often just-in-time compiled, and multi-paradigm.

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

We used all the above technologies for the structure, styling and functionality of the website that we created.

Versions used:

HTML -5, CSS -3, JS- ECMA 2020, Bootstrap - 4.5.2 (latest stable version at this point)

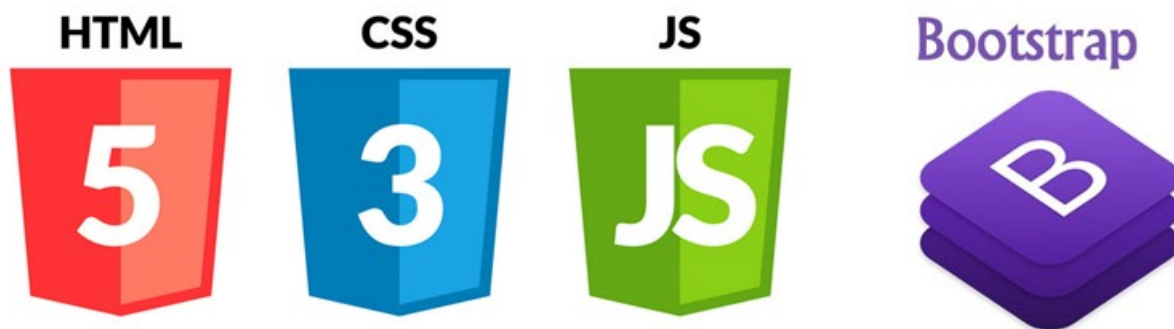


Figure 6 Front-End Technologies

2.7 Text Editors

We used different text editors -which were highly customized by adding desired settings to it - to write code. All the below mentioned text editors have different functionalities.



Figure 7 Text Editors

CHAPTER 3: FUNCTIONALITY

3.1 Back-Testing

Back-testing of stock market strategies means for a particular strategy, by how much percentage (%) profit or loss a user would have got if he invested in that stock in the past.

Back-testing of strategies is like having the partial answer sheet to the test you've never taken; you at least get a vague idea if your strategy would work based on the past data. Our system checks the strategy of user over the past 5 years of data for the particular stock, entry and exit points and cross checks if that strategy would have applied then by how much percentage (%) the user would have gained profit or loss.

3.2 Account Based System

User will **require** to make an account to be able to use that functionalities for back-testing. Without an account user can't back-test their strategies, we implemented this system using the auth configuration which is inbuilt in Django. As previously mentioned, Django has way too many ready-to-use functionalities which can be directly implemented using a few lines of code only.

CHAPTER 4: SYSTEM FLOW CHART

4.1 Work Flow

The basic flow chart, for our project work flow can be shown as in **Figure 8**. As we had no previous knowledge of Stock Market or the way it works or Python programming language or the Django Framework, we had to devoted our most of the time learning about all these technologies and gaining theoretical as well as practical knowledge.

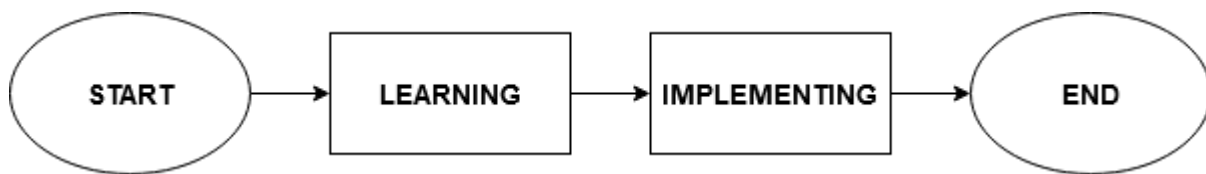


Figure 8 Project Flowchart

So, after learning we started with the back-end and slowly escalated towards the front-end as the time passed, we also divide the work equally for almost each and everything to save the time and after the prototype of website were ready, we designed it in our desired stage and polished it accordingly.



Figure 9 Implementation Flowchart

4.2 Project Planning

As mentioned earlier, we had no prerequisite knowledge required to get started, we learned all the necessary things required for almost 2 months; then we slowly escalated to move towards the end result by implementing all the things we learned one-by-one.

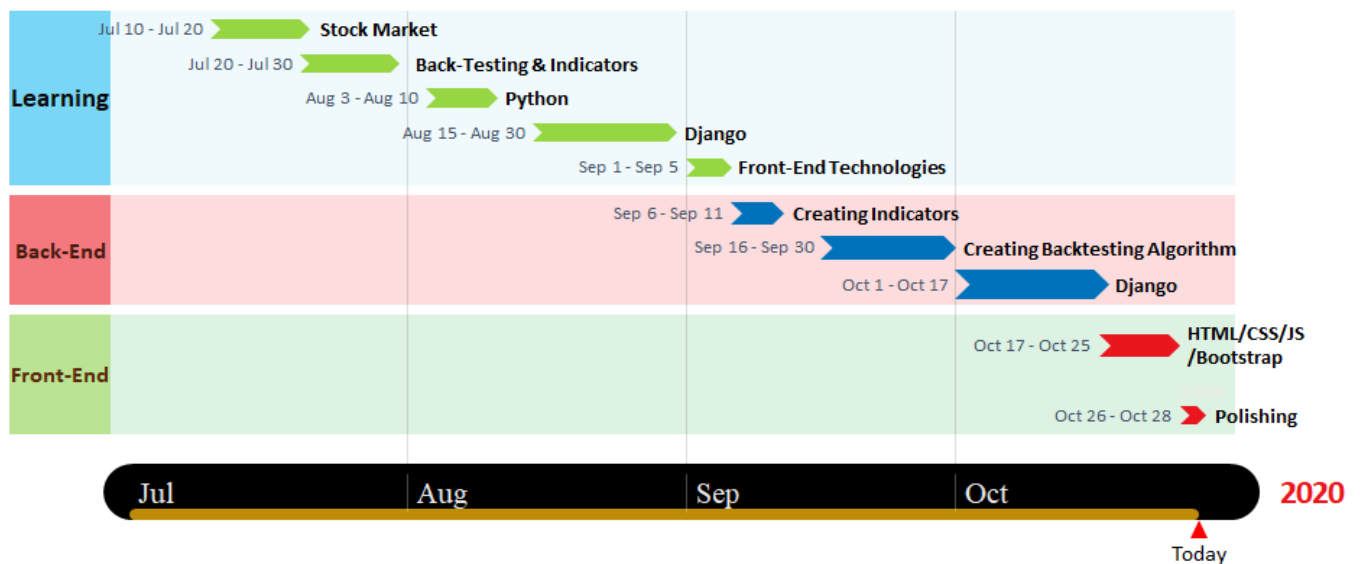


Figure 10 Project Planning

CHAPTER 5: SNAPSHOTS OF IMPLEMENTATION

5.1 Welcome Page

This is the home-page of our website, from which there are certain ways to go the page, to make an account or login into an already made account.

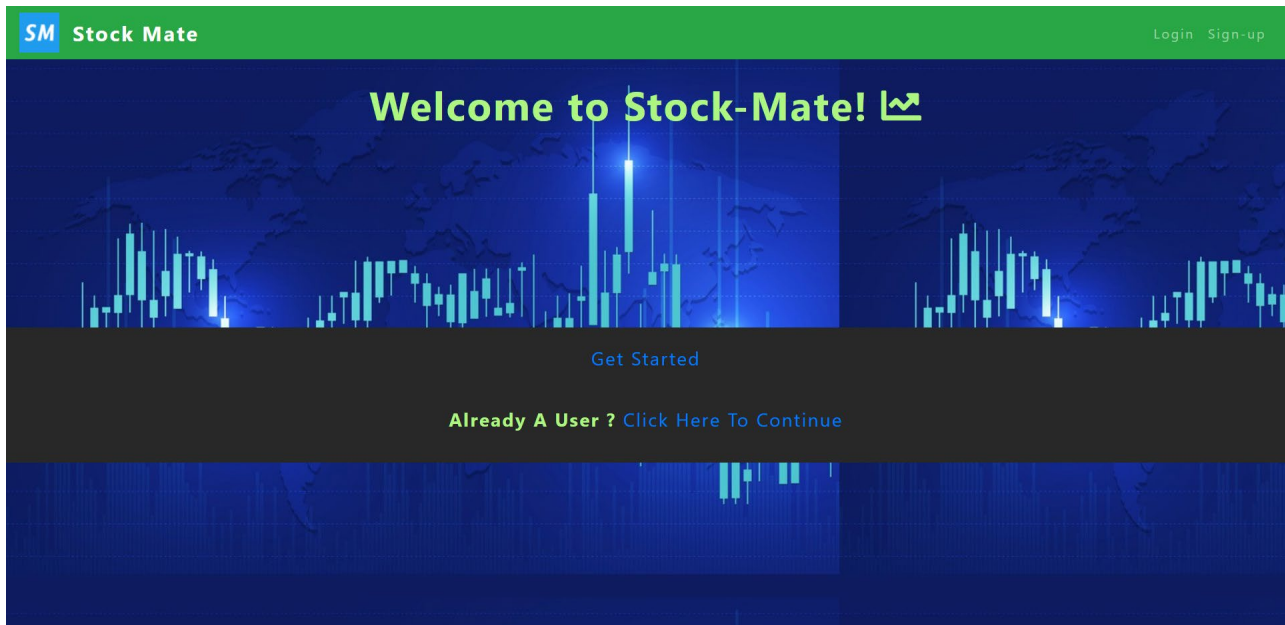
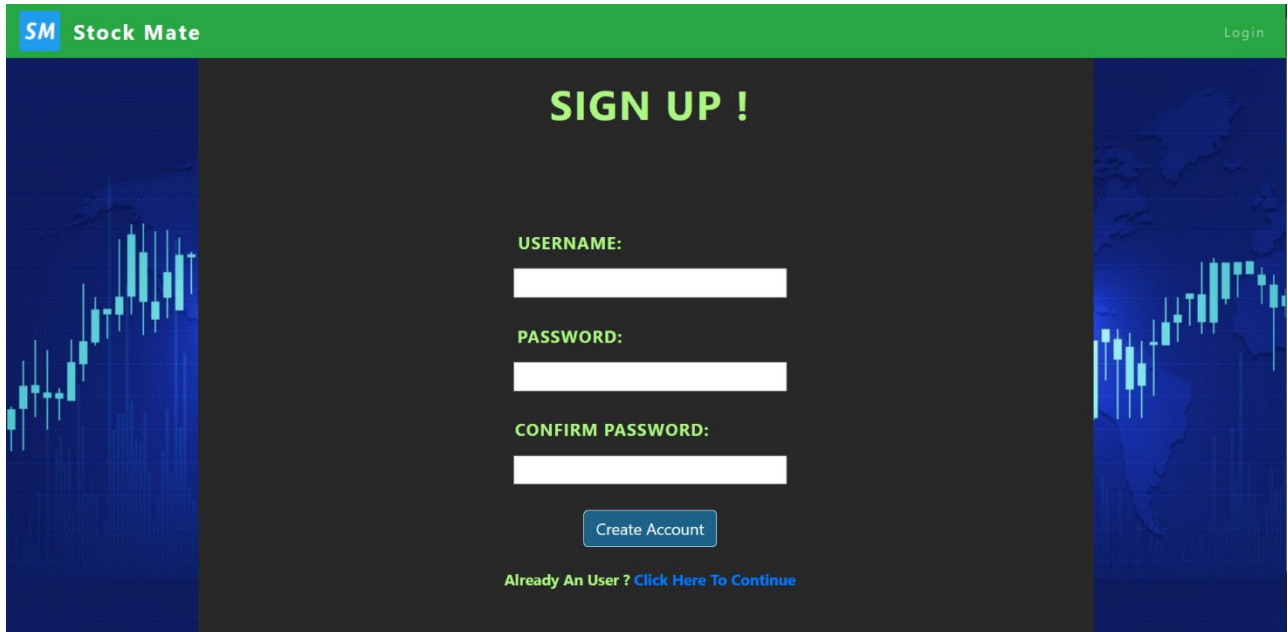


Figure 11 Welcome Page

5.2 Sign-up Page

This is the sign-up page from where users can create an account in order to use back-test functionality.



The screenshot shows the 'Sign Up' page for 'Stock Mate'. The page has a green header bar with the 'SM Stock Mate' logo on the left and a 'Login' link on the right. The main content area has a dark background with the text 'SIGN UP !' in large green letters. Below this, there are three input fields labeled 'USERNAME:', 'PASSWORD:', and 'CONFIRM PASSWORD:' in green. Each field is a white rectangular box. Below the input fields is a blue button with the text 'Create Account'. At the bottom, there is a link that says 'Already An User ? Click Here To Continue' in green. The page is flanked by two vertical panels on the left and right, each showing a blue background with a white candlestick chart and a world map.

Figure 12 Sing-up Page

5.3 Login Page

This is the login page from where users can login into their existing account.

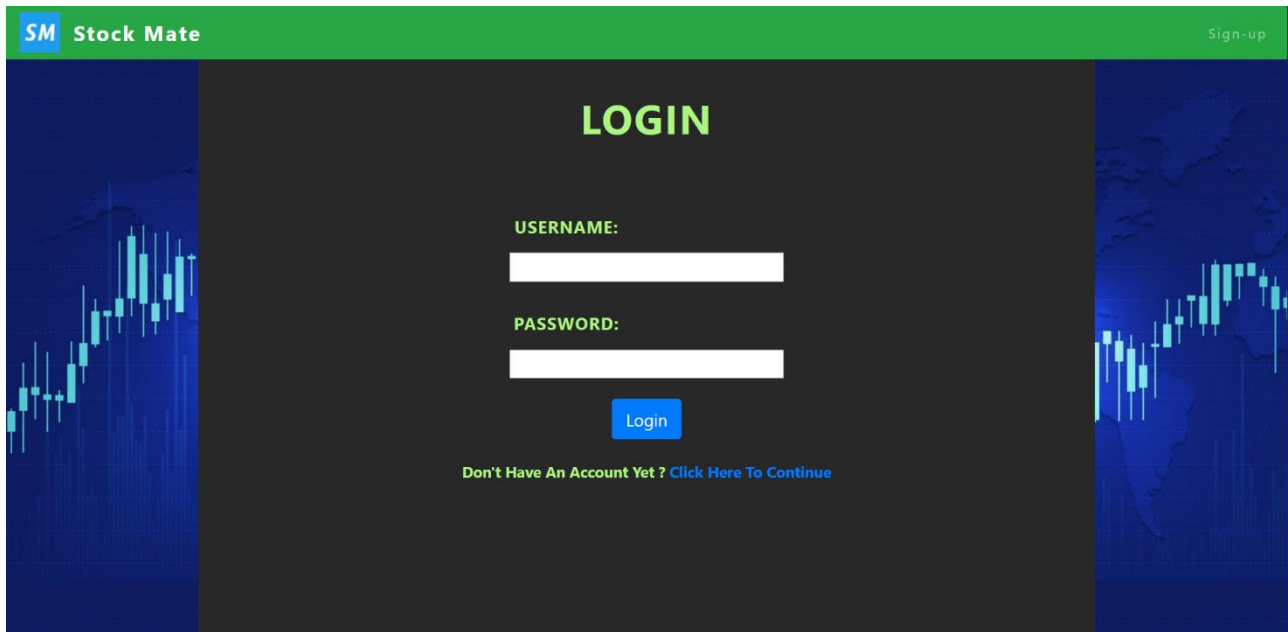


Figure 13 Login Page

5.4 Back-testing Page

This is the back-testing page from where users can back-test their strategies.

SM Stock Mate Logout

Hi td!! Welcome to Stock-Mate 📈

Choose a Stock: Adani Gas Ltd.|ADANIGAS

Entry rules:

Fast Line(Stochastic RSI(1.~ Cross over 20

Add

Exit rules:

Fast Line(Stochastic RSI(1.~ Cross over 80

Add

Backtest

Figure 14 Back-testing Page

5.5 Result Page

This is the result page where user's back-testing results appear.

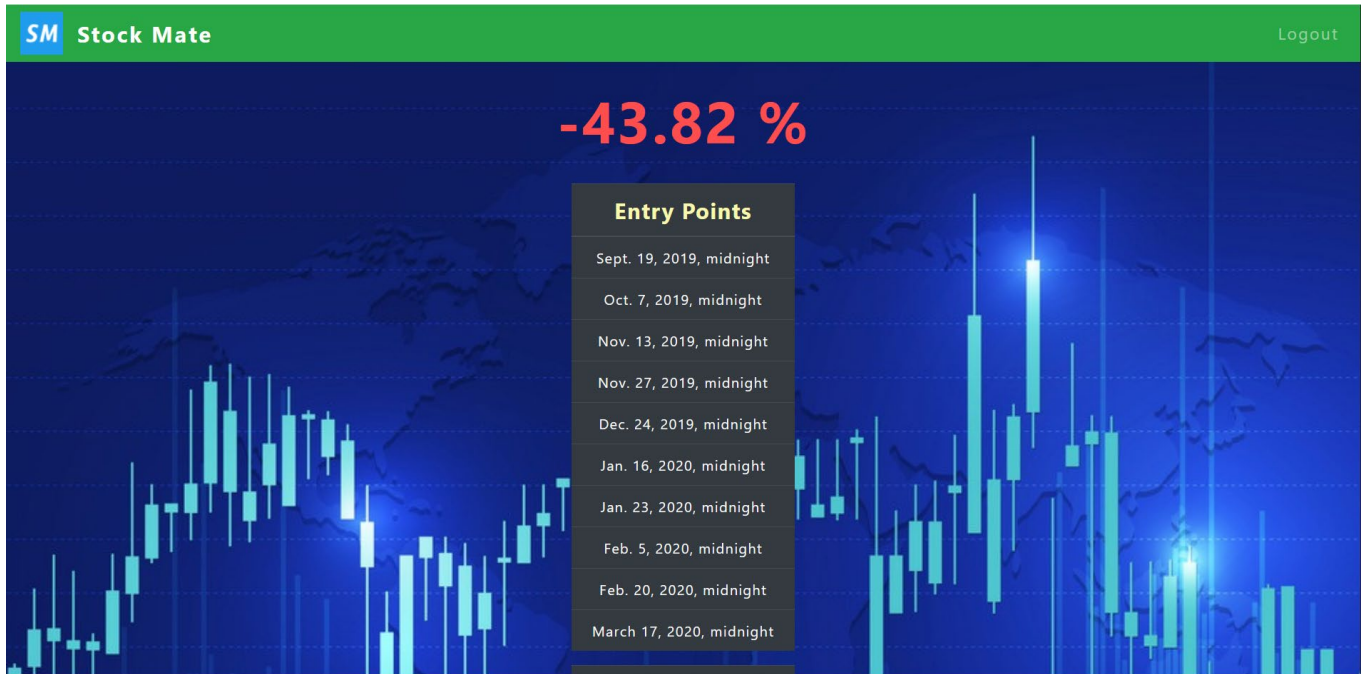


Figure 15 Result Page

CHAPTER 6: LIMITATIONS OF THE PROJECT

6.1 Limitations

As any system in the world there are limitations in our project too, but according to us we have fulfilled the initial project definition when we started the project.

6.1.1 Back-testing

Our system is only capable to back-test the user's strategies, it gives no guarantee if the strategy works for the user or not; because we back-test user's strategies over past data, as mentioned earlier.

6.1.2 Limited Indicators

There are only limited number of indicators which the users can back-test on. Indicators are graphs made by formulas which indicate what the future of that graph will be.

CHAPTER 7: PROJECT OUTCOMES

7.1 Project Outcomes

We made a fully responsive website capable of having an account system and can also back-test user's strategies for any stock.

7.2 Project Outcomes (For us)

We learned many things by working on this project.

- **Team Work** – This is the most important thing we learned, we got to know how to manage while working with a team.
- **Situational Leadership** – Our leader for this project was Priyanshu (19DCE052), but in some situations when a problem would arise about a particular thing; we all did our part and became the leader as per the situation because we have mastery in different things.
- **New Technologies** – We learned about so many new technologies like HTML, CSS, JS, Bootstrap, Python, Django, Pandas, etc. – as we progressed through our project.

CHAPTER 8: FUTURE ENHANCEMENTS

8.1 AI/ML Implementation:

We may implement AI/ML concepts to predict the tentative data and show the user if his strategy would actually work if he invests in the future. But for that we'd need a vast knowledge of how ML algorithms works and which algorithm we'll use for its implementation.

8.2 Adding more Indicators:

For the time being, we have implemented many indicators' back-testing algorithm, but we may add a few more just to make a whole set. But the reason we didn't add all the indicators in the first place is because all the indicators have different formulas, different back-testing algorithms.

CHAPTER 9: REFERENCES

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