Web Application Development

Web Development for Information Systems

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Introduction

Web development is the act of building, creating, and maintaining websites. The field encompasses a broad range of tasks including everything from coding to technical design, to the performance of a website or application running on the internet. Web development consists of front-end and back-end components:

For Web Development for Information System assignment, I've created a simple weather application using Django, Python, HTML, CSS and the OpenWeatherMap API.

The features of this weather application are as follows.

- It's a Weather Forecasting Application.
- You can get the current weather conditions in various cities through login to the system.
- The Admin can add the cities with their weather conditions to the main page.
- Registered user can check the weather through login to the system.
- Also, users can query the weather conditions, searching by cities.

Framework and technologies

Visual Studio Code

Visual Studio Code (VS Code) is a popular source code editor developed by Microsoft. It's designed to be lightweight, highly customizable, and efficient for coding tasks. VS Code is free and open-source, and it supports a wide range of programming languages and extensions.

Python Django Framework

Django is a high-level web framework written in Python that encourages rapid development and clean, pragmatic design. It follows the "batteries-included" philosophy, providing a wide range of built-in features and tools that help developers build web applications efficiently. Django's main goal is to enable developers to create web applications quickly while maintaining best practices for security, scalability, and maintainability.

HTML/CSS

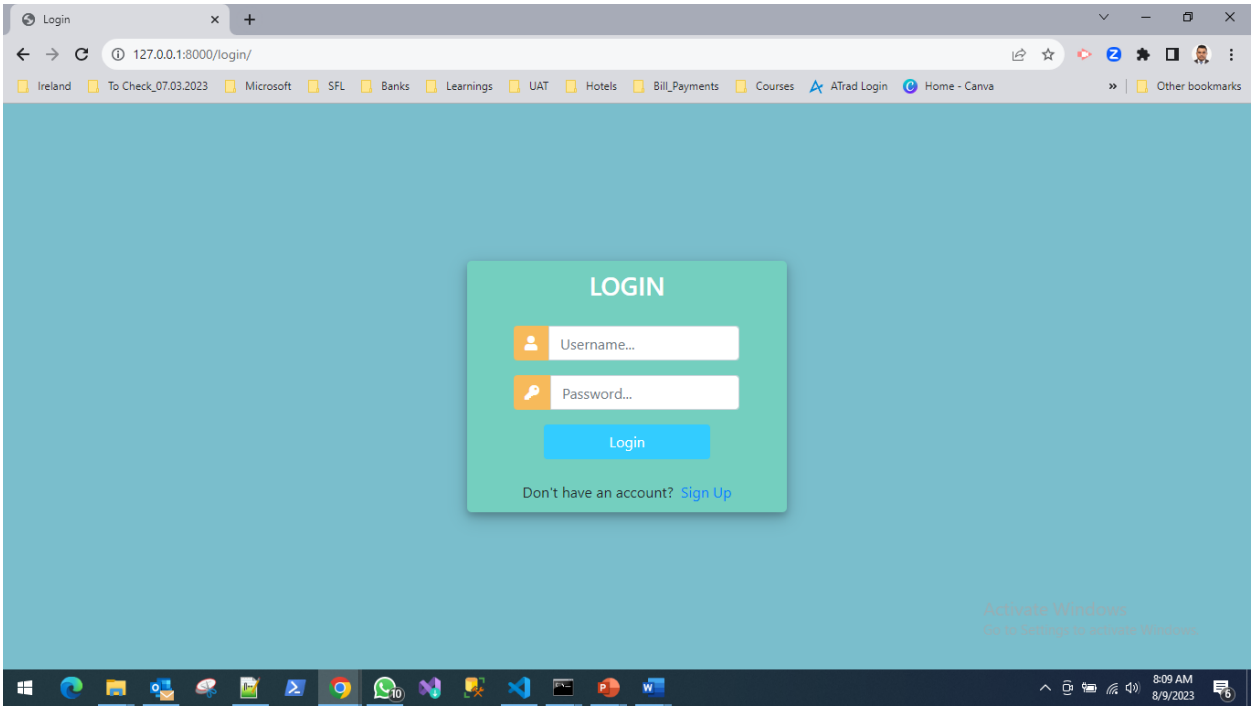
HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets) are fundamental technologies used in web development to create and style the structure and appearance of web pages. Together, these technologies form the foundation of front-end web development, enabling developers to create visually appealing and functional websites and web applications.

Openweathermap API

Openweathermap an online service that provides global weather data via API, including current weather data, forecasts, historical weather data for any geographical location. The OpenWeatherMap API is a service that provides weather data for locations around the world. It allows developers to access current weather conditions, forecasts, historical data, and other weather-related information for various cities and regions. The API is widely used in web and mobile applications to integrate weather information into their services.

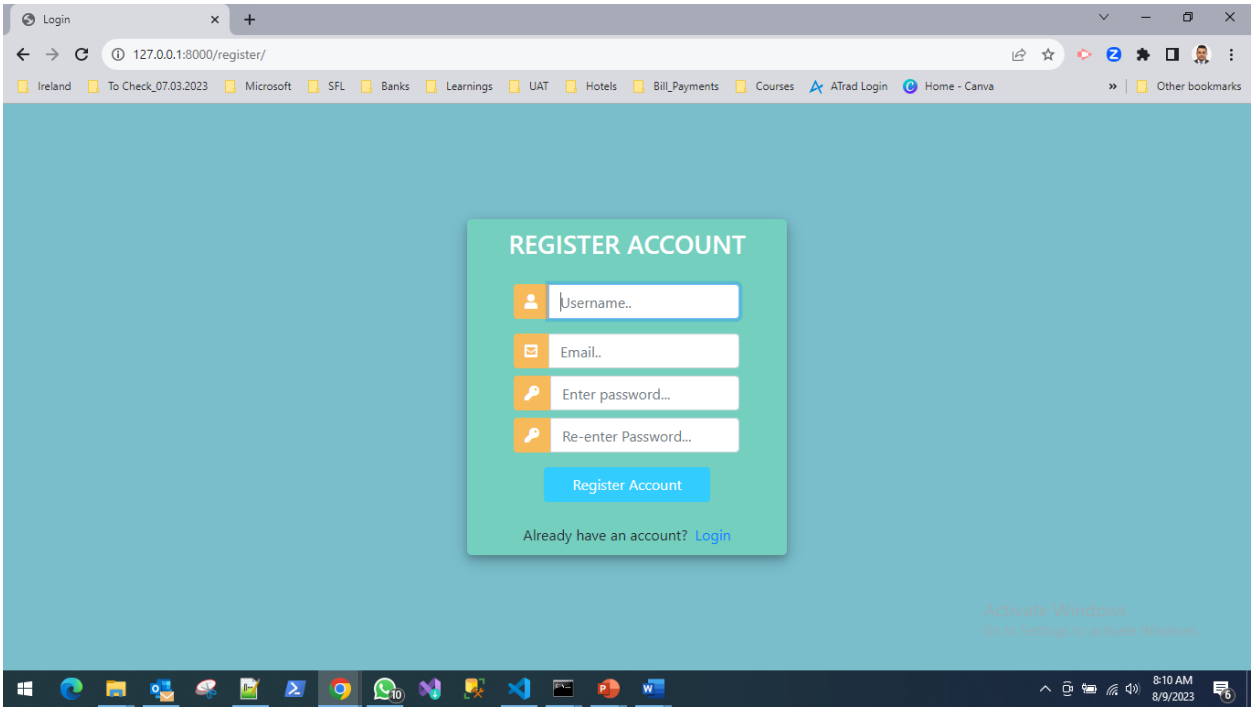
UX Design

This is the initial page while you go to the web application.

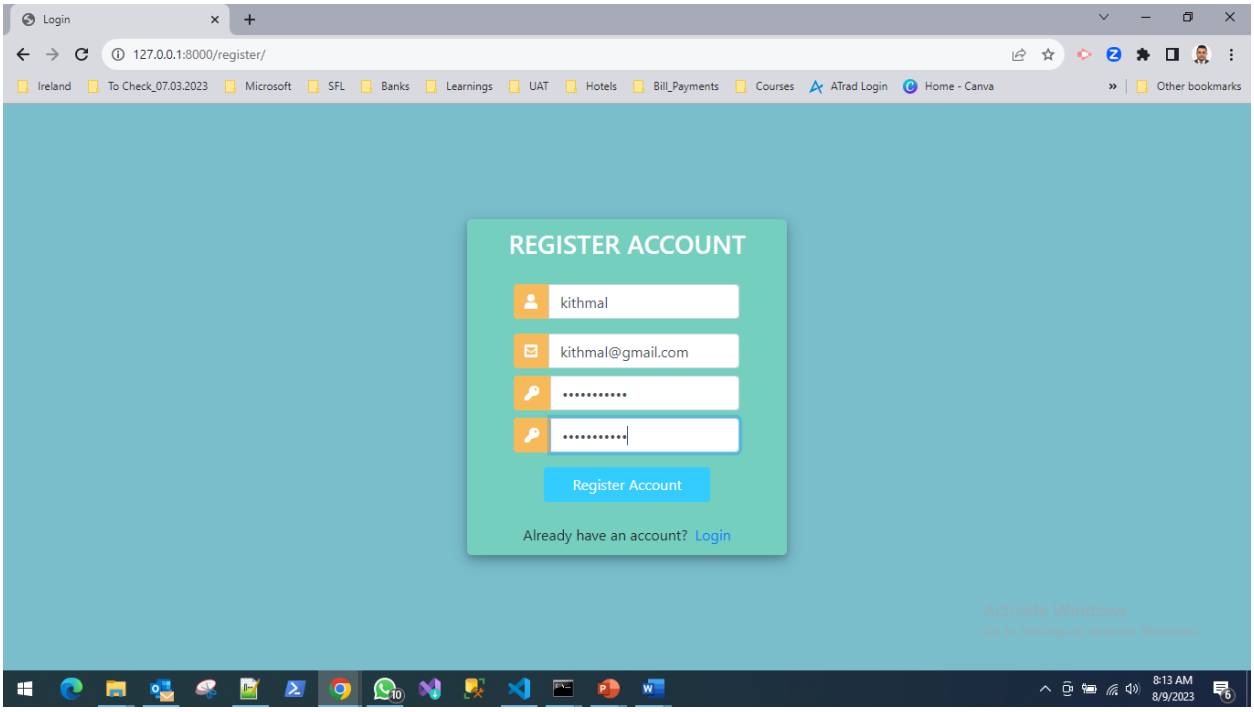


If the user is not registered, they have to login through the Sign Up link in the bottom right.

You'll be redirected to this page.

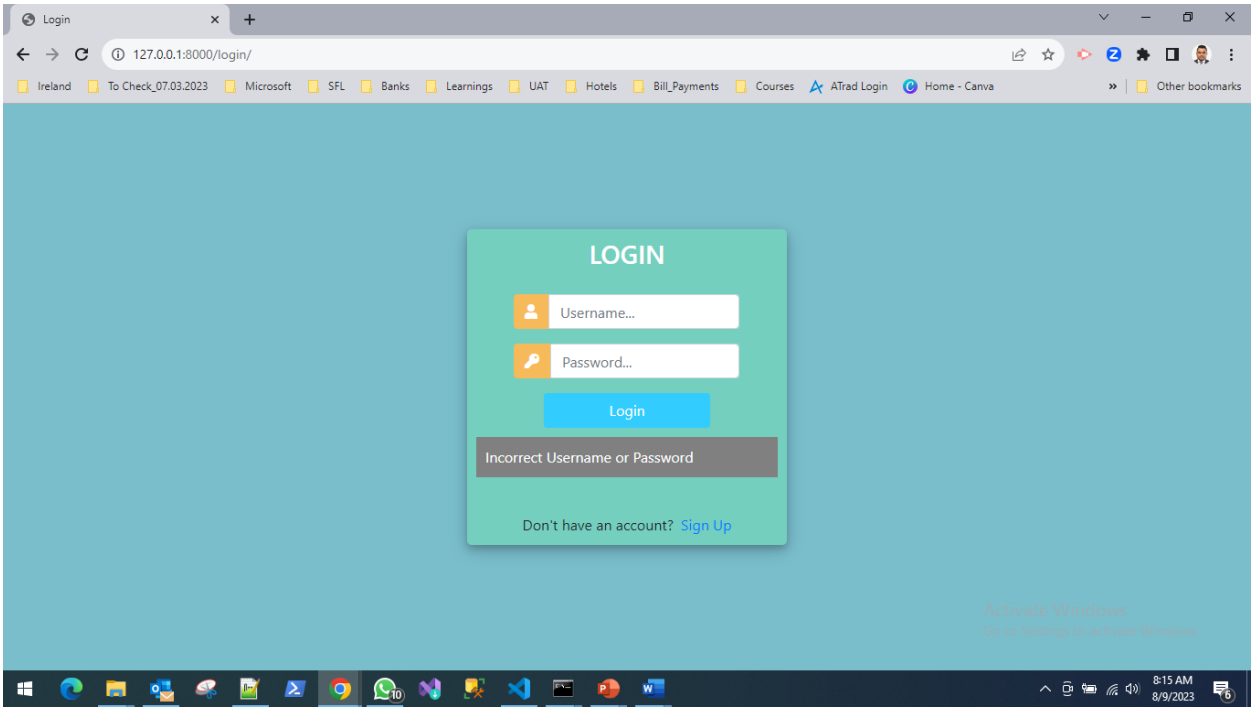


Once you fill the details, you must press Register Account.

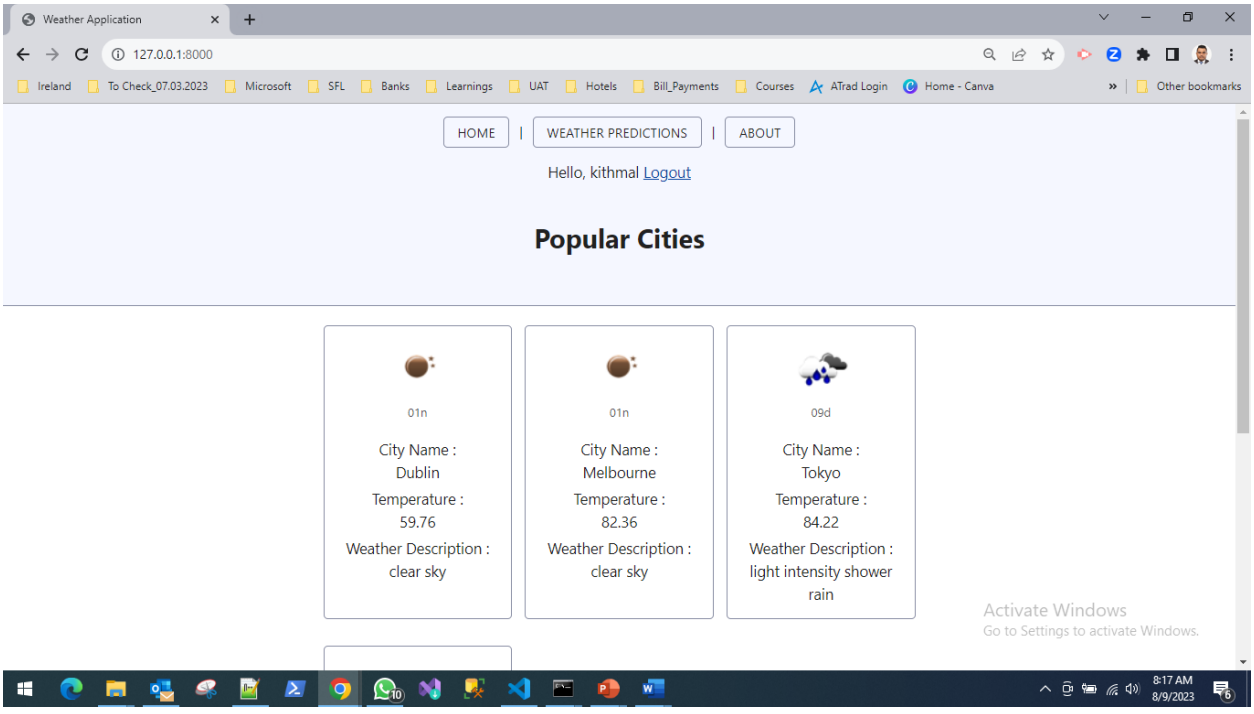


You'll be redirected to the login page once you completed the registration.

If you try to login through the created account, with incorrect credentials it'll give you an error message.

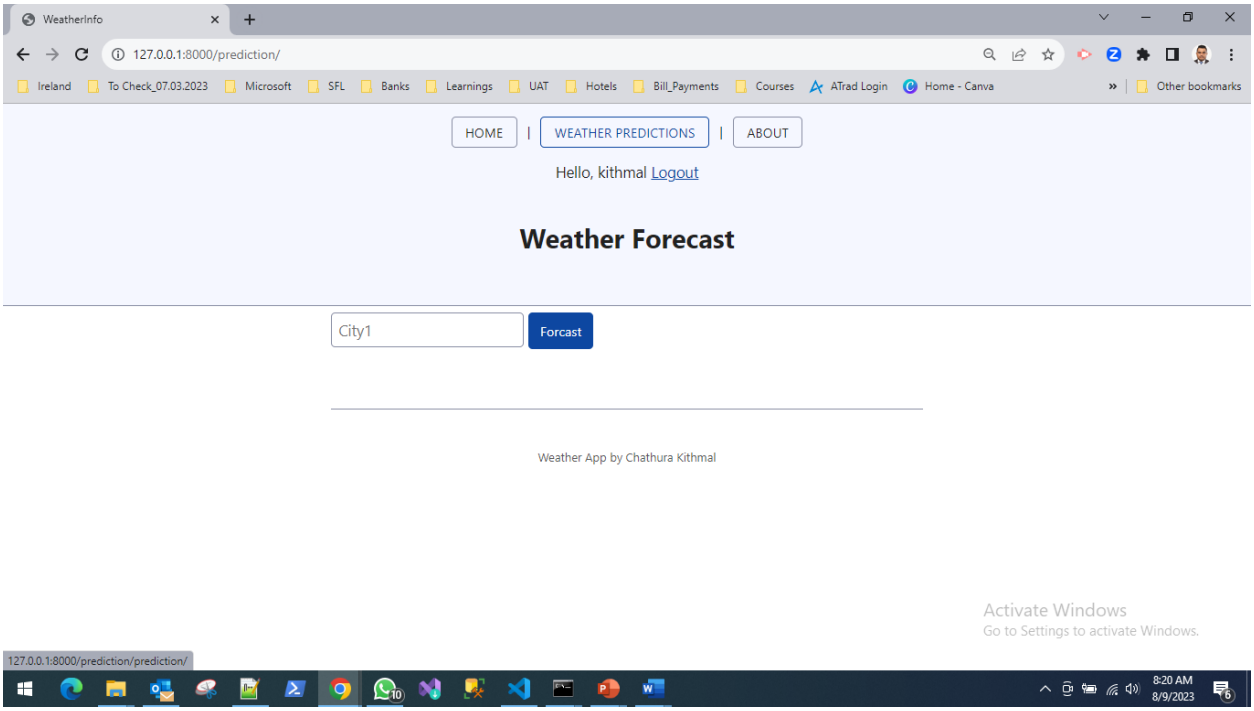


Once you login with proper user credentials you'll be redirected to the site's main page.

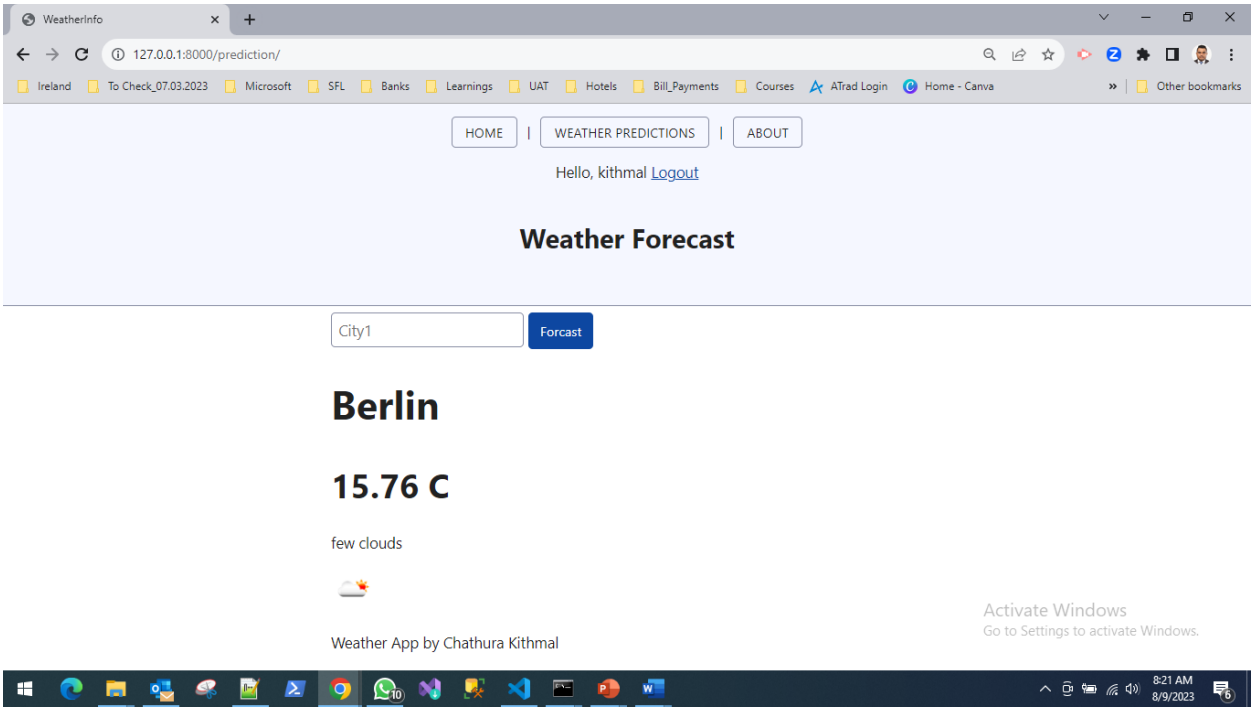


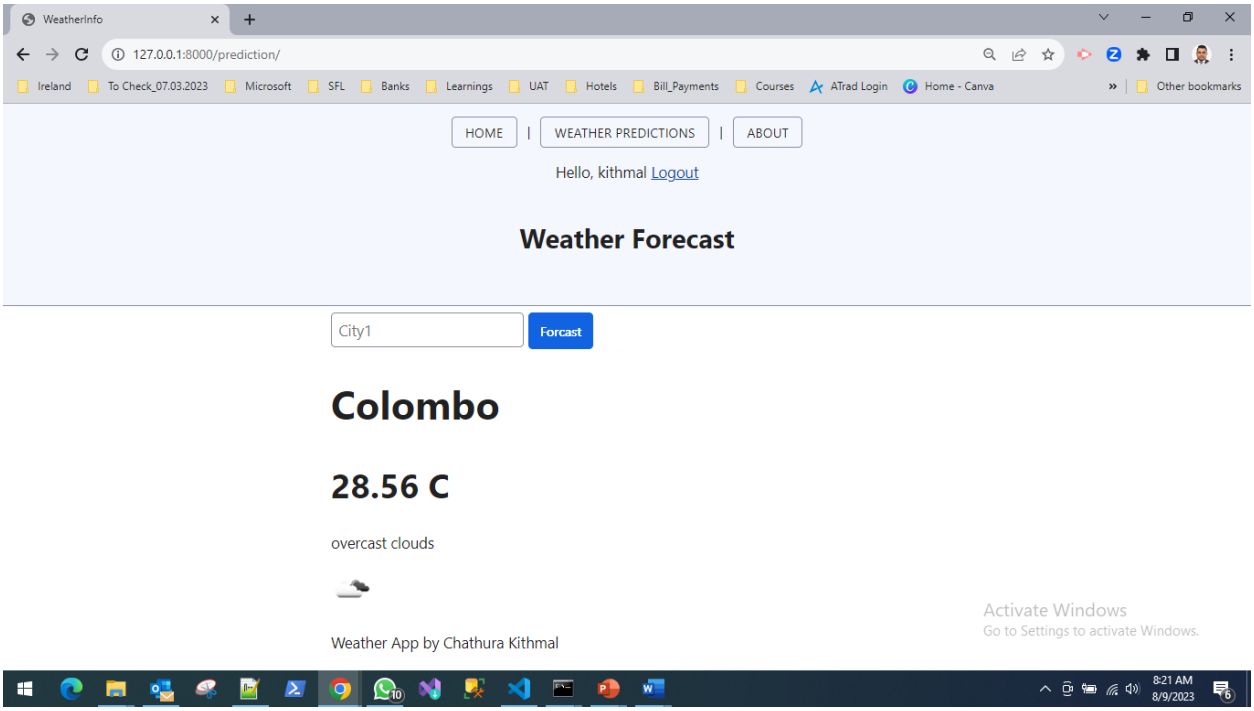
In the main page, you can see the cities added by the admin.

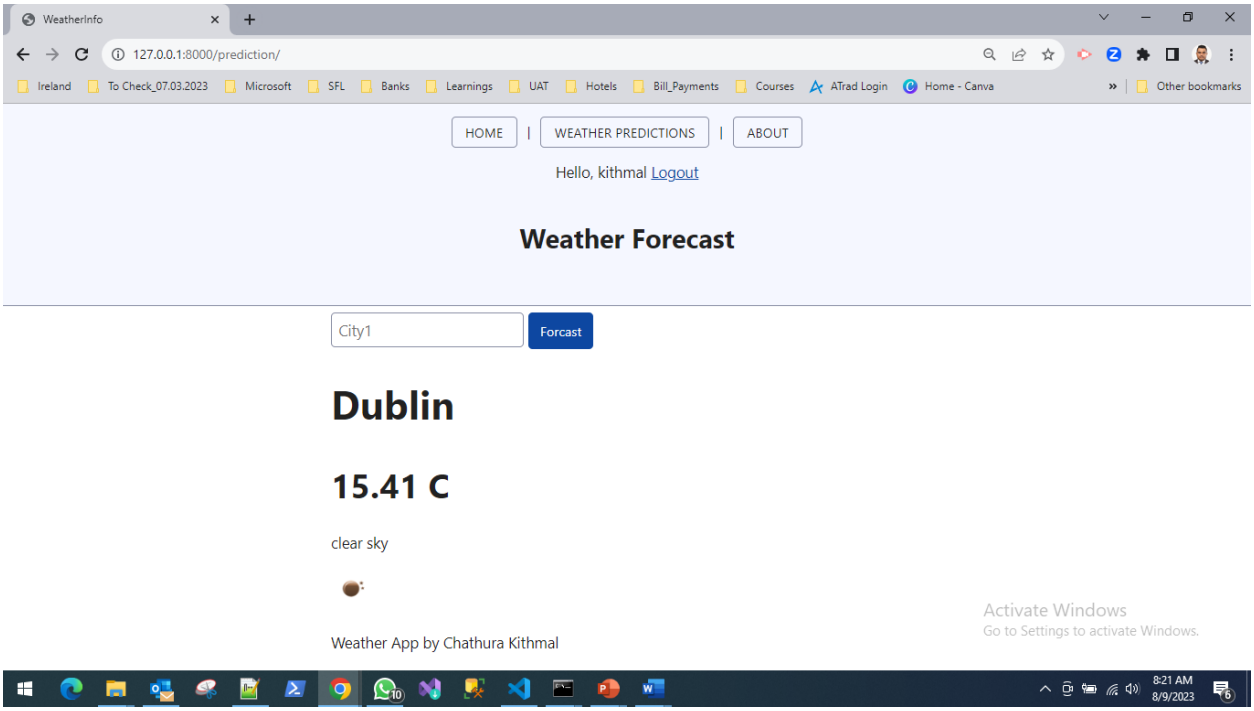
If you want to query the details of a city, go to weather predictions link in the above.



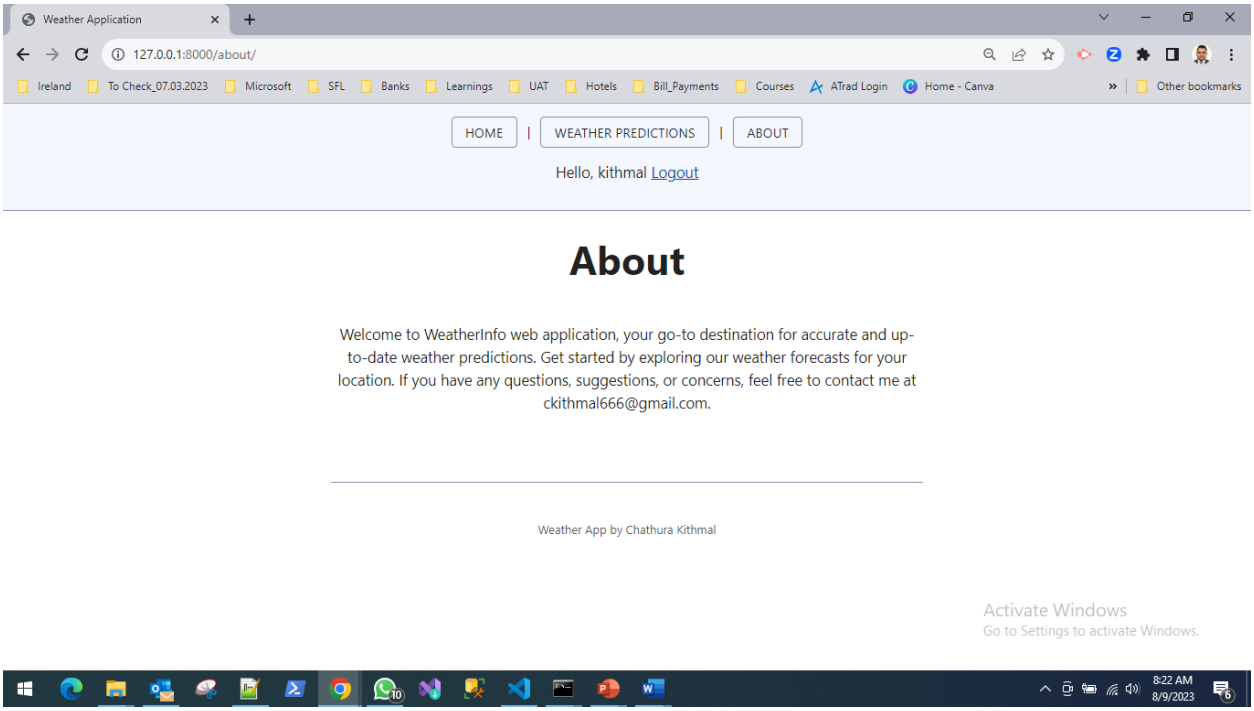
By typing any city, we can get the weather forecast according to the openweathermap API.



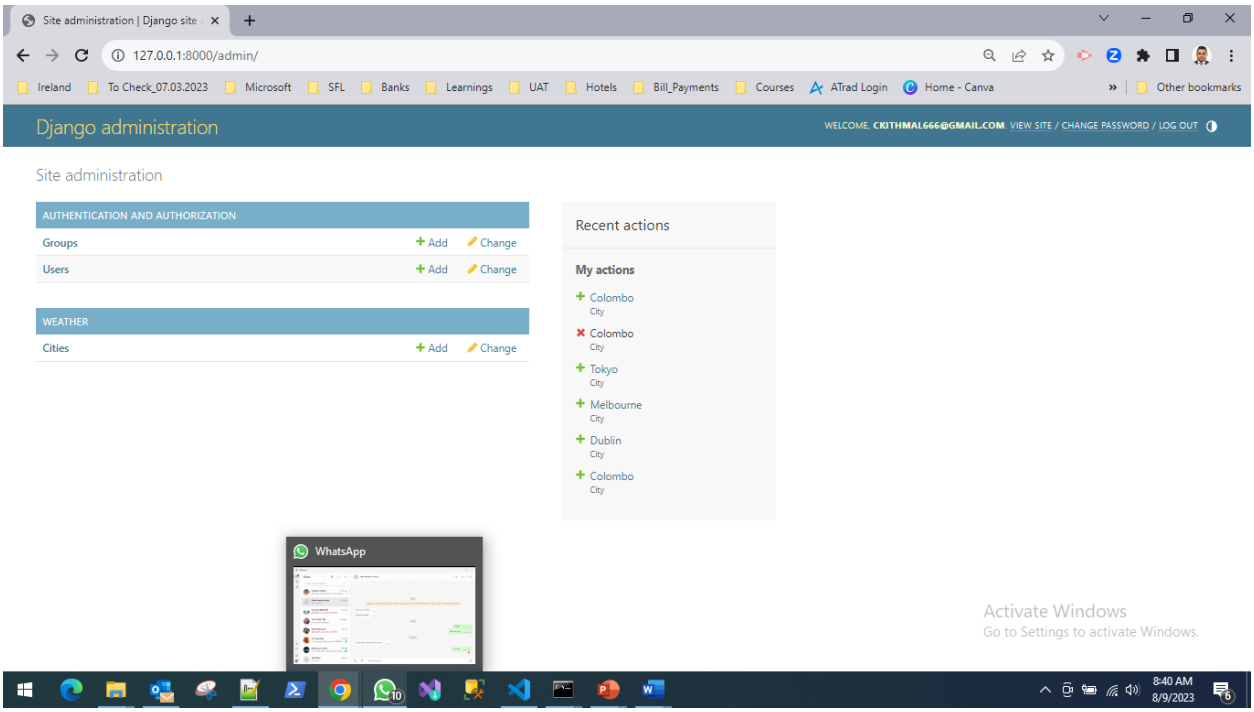




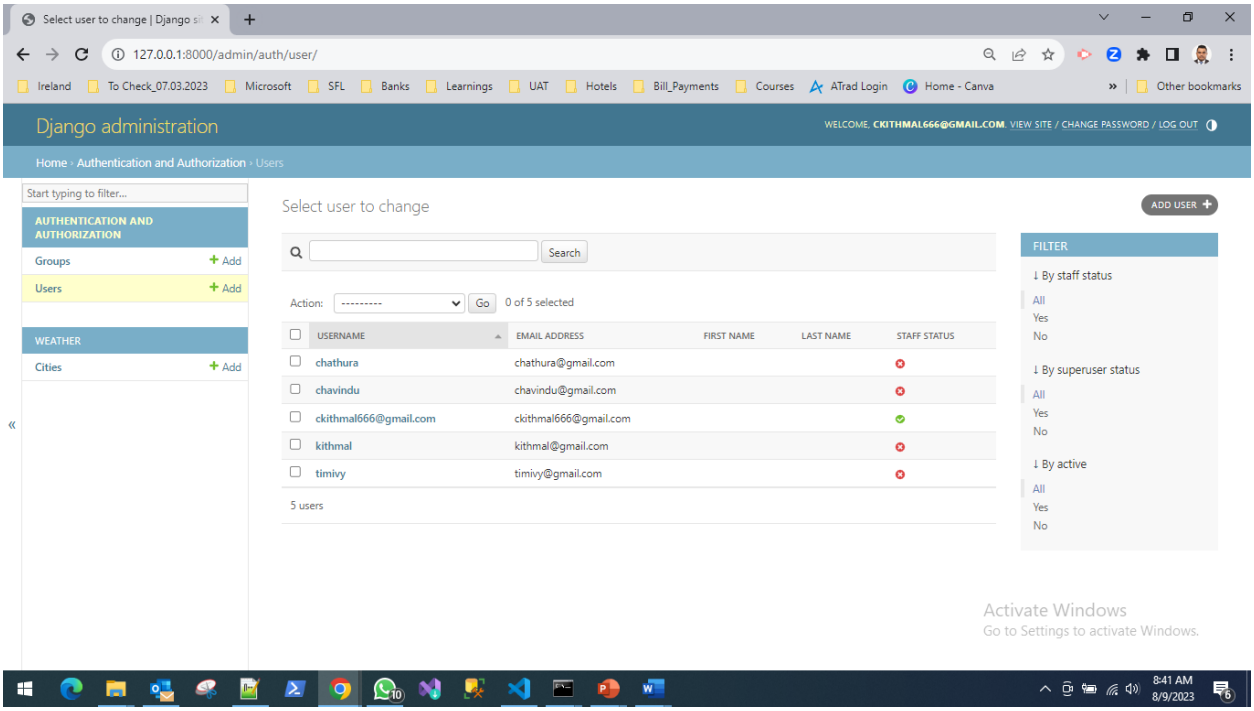
There is a about page, where you can put the details of the application.



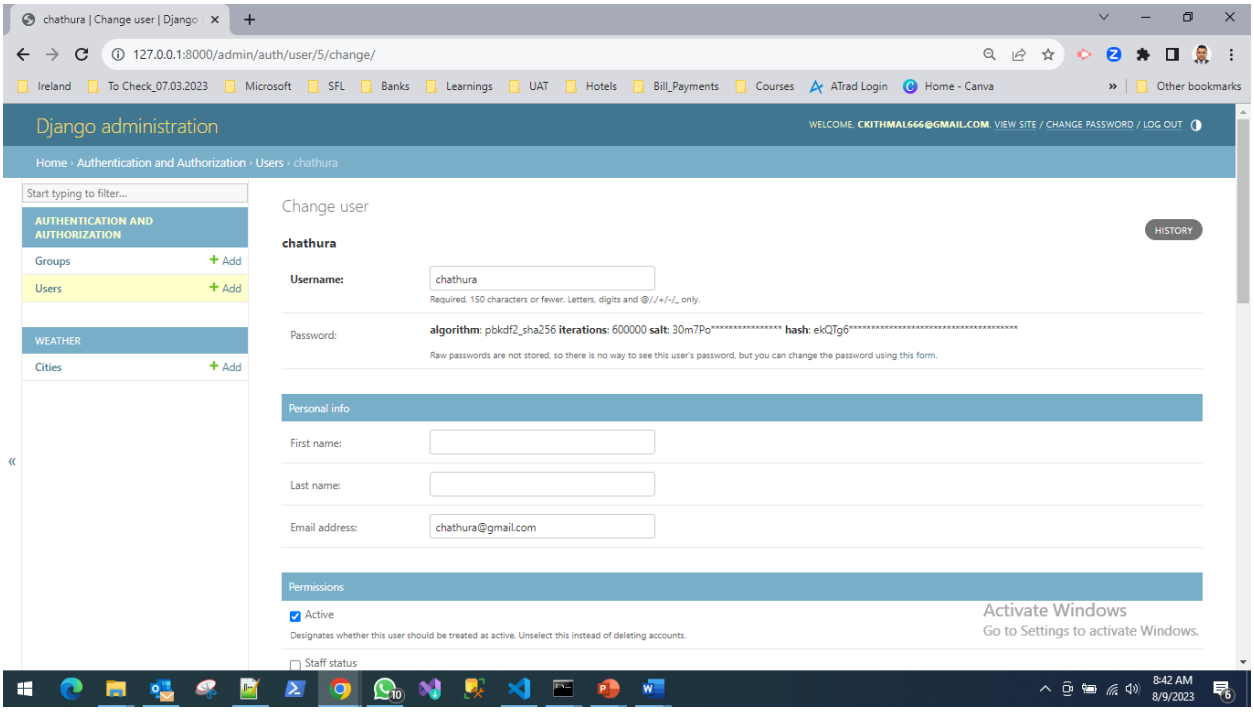
Once you login to the admin page, below will be shown.



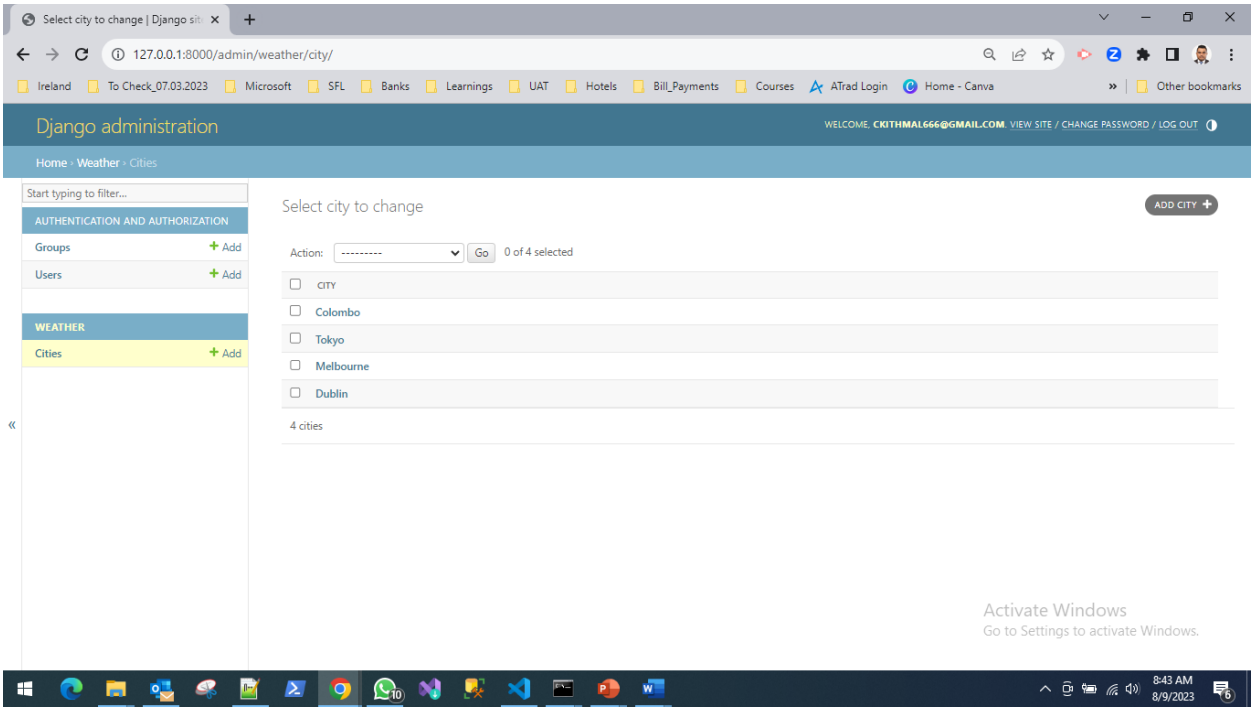
Only the Django admin can access that page.



All the passwords are hashed as a security measure.



When you go to admin-> Cities you can find the items which are loaded in the user's main page.



You can Add, Edit or Remove cities through this page.

Web Service

As the web API, I've used openweathermap API to get the data to the web site.

The OpenWeatherMap API is a widely-used web service that provides weather data and related information for various locations around the world. It enables developers to access real-time and forecasted weather data, historical weather information, and other weather-related parameters for integration into their applications, websites, and services. The API is maintained by OpenWeather Ltd.

Here are some key features and aspects of the OpenWeatherMap API:

Weather Data: The API offers a range of weather data, including current weather conditions, hourly and daily forecasts, and historical weather data.

Global Coverage: The API covers locations all around the world, allowing developers to retrieve weather information for a wide range of cities and geographic coordinates.

Data Types: The API provides information such as temperature, humidity, wind speed and direction, atmospheric pressure, cloud cover, and more.

Geolocation: You can use city names, geographic coordinates (latitude and longitude), and city IDs to query weather data for specific locations.

Units and Languages: The API allows you to specify units (e.g., metric or imperial) and languages for the data you receive.

Weather Conditions: The API provides weather condition codes that describe the current weather, which can be used to display appropriate icons or images in your application.

Forecasts: You can retrieve weather forecasts for upcoming hours or days, helping users plan their activities based on predicted weather conditions.

Historical Data: The API offers historical weather data for past dates, which can be useful for analysis and comparisons.

Rate Limits: Depending on your subscription level, the API imposes rate limits on the number of requests you can make within a certain time frame.

API Key: To use the OpenWeatherMap API, you need to sign up for an API key. This key is used to authenticate your requests and track your usage.

Developers often integrate the OpenWeatherMap API into their applications to provide users with up-to-date weather information, whether it's for travel planning, outdoor activities, or simply staying informed about current conditions. The API provides a convenient way to access weather data without the need to maintain your own weather data sources.

Security Measures

- As the Security measures I've implemented the User Authentication to this web site.
- Only the registered users will be able to login and check the weather forecast.
- When a user signed up, he/she will allow to use the forecast service.
- Authentication is fully handled by the Django framework.
- Also, all the passwords are encrypted using hashing method by Django framework.
- Raw passwords are not stored in the database, so there is no way to see this user's password.

Challenges Faced

- Initial challenge was my lack of Django/python framework knowledge. So, I've to improve it through, the help of Google, Youtube, Videos Tutorials, browsing through the other web pages…etc. I think I've done enough research to create this site in the proper way.
- Also, I've to style this web site properly, I've used the HTML CSS templates.
- Next challenge was to show the 5 days forecast in the search page. It was not successful because of the issue in the API key.
- Final challenge was the Cloud Deployment process, I've checked on how to deploy the site on Azure, but it was not successful.

Conclusion

In conclusion, I've learned a lot about Web development through this module. Initially didn't had any idea on what should be done for this assignment. But once I get to know about these technologies, I got some ideas on doing the assignment.

Overall, it was a very good learning experience for me. Thank you.