



CAB230 Assignment 2

Client Side

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Introduction

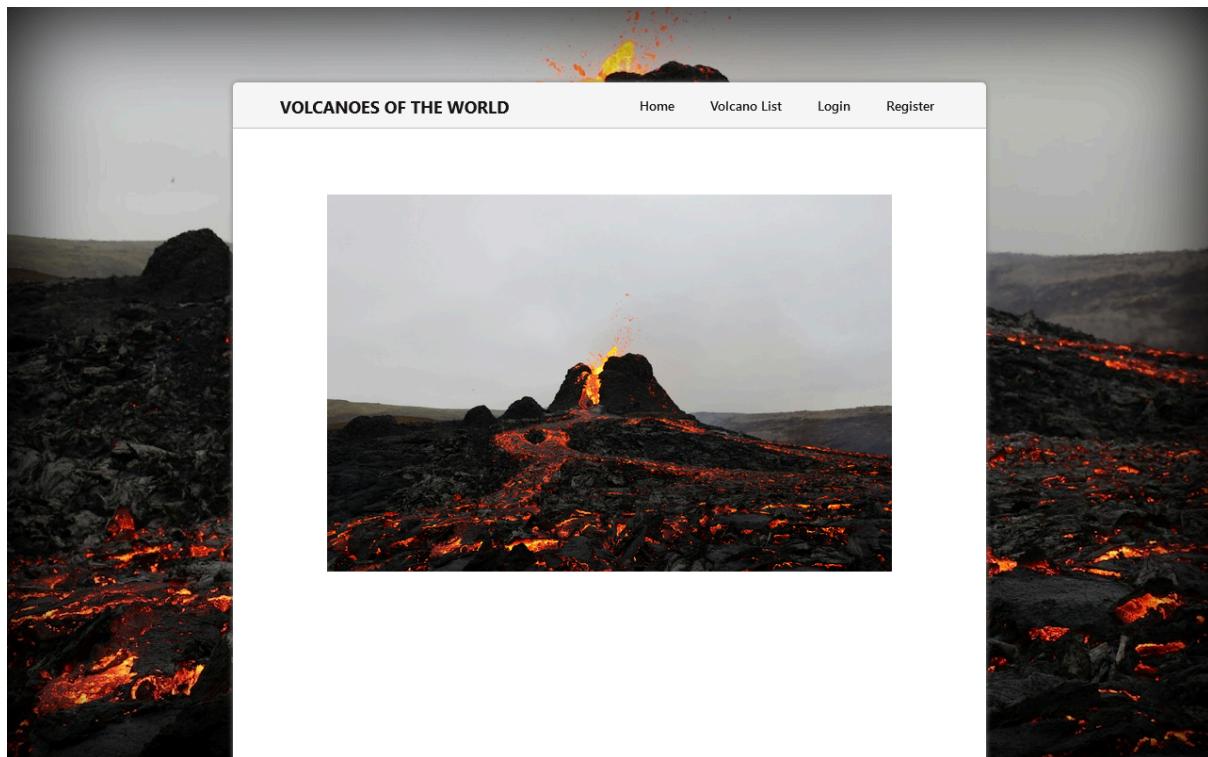
Purpose and description

With the aim of allowing users to find and view detailed data about volcanoes, a React-based web application was designed and developed via a REST API. The application allows users to search, filter, sort and view data on volcanoes as well as register an account and log in to view extra information on each volcano. It utilises a public online dataset collated with information using Swagger on 1343 different volcanoes around the world in 76 different countries.

The app provides a function autocomplete component that suggests names of countries based on what the user has already input in the search bar. It also utilises a table component with sort and filter functions that make it easy for users to search for specific volcanoes.

Styling is applied consistently throughout each page on the site as it takes elements from the AG Grid table theme, Balham. As such, the table displayed on each volcano page is styled similarly to the volcano list grid tables. The table on the volcano page also acts as a sort of breadcrumb component as it allows users to navigate from the volcano page back to the volcano list of the specific country that the volcano is from by clicking the country or region grid.

The modules that were used to complete this app were: AG Grid, Pigeon Maps, Chart.js and react-chartjs-2.



Completeness and limitations

For this application and assignment, I believe I have achieved a grade of 6. The reasons for why are justified and noted below:

- The application is well laid out and styled meticulously for desktop users.
- Navigation is handled using the React Router.
- The volcano list displays data accurately and neatly as a table component. The populated within data dropdown works and the search bar input works which also includes an additional autocomplete dropdown feature.
- Users may also utilise the search parameters to search for a volcano list using a country name or for a specific volcano using the volcano ID.
- The map component which displays the location of the volcano functions well and the chart component only displays when the user is logged in.
- Code files are organised and include comments. Fetching data is all handled through a single API file.
- The user may register an account, log in and log out of the site.

Use of endpoints

/countries

A dropdown appears with a list of countries that match the input's value when the user starts typing in the search bar.

The screenshot example displays the user typing the letter "a" into the search bar input. The autocomplete then matches countries starting with the input and returns a dropdown list with the relevant countries.

VOLCANOES OF THE WORLD

Home Volcano List Login Register

Volcano List

Country: Populated within:

Name ↑	Location	Subregion
Algeria		
Antarctica		
Abu	iwan, Marianas	Honshu
Argentina	iwan, Marianas	Honshu
Adataraya	iwan, Marianas	Honshu
Armenia	iwan, Marianas	Ryukyu Islands and Kyushu
Aira	iwan, Marianas	Honshu
Australia	Japan, Taiwan, Marianas	Honshu
Akagisan	Japan, Taiwan, Marianas	Honshu
Akan	Japan, Taiwan, Marianas	Hokkaido
Akandanayama	Japan, Taiwan, Marianas	Honshu
Akita-Komagatake	Japan, Taiwan, Marianas	Honshu
Akita-Yakeyama	Japan, Taiwan, Marianas	Honshu
Akusekijima	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
Asamayama	Japan, Taiwan, Marianas	Honshu
Asosan	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Ata	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Azumayama	Japan, Taiwan, Marianas	Honshu
Bandaisan	Japan, Taiwan, Marianas	Honshu
...

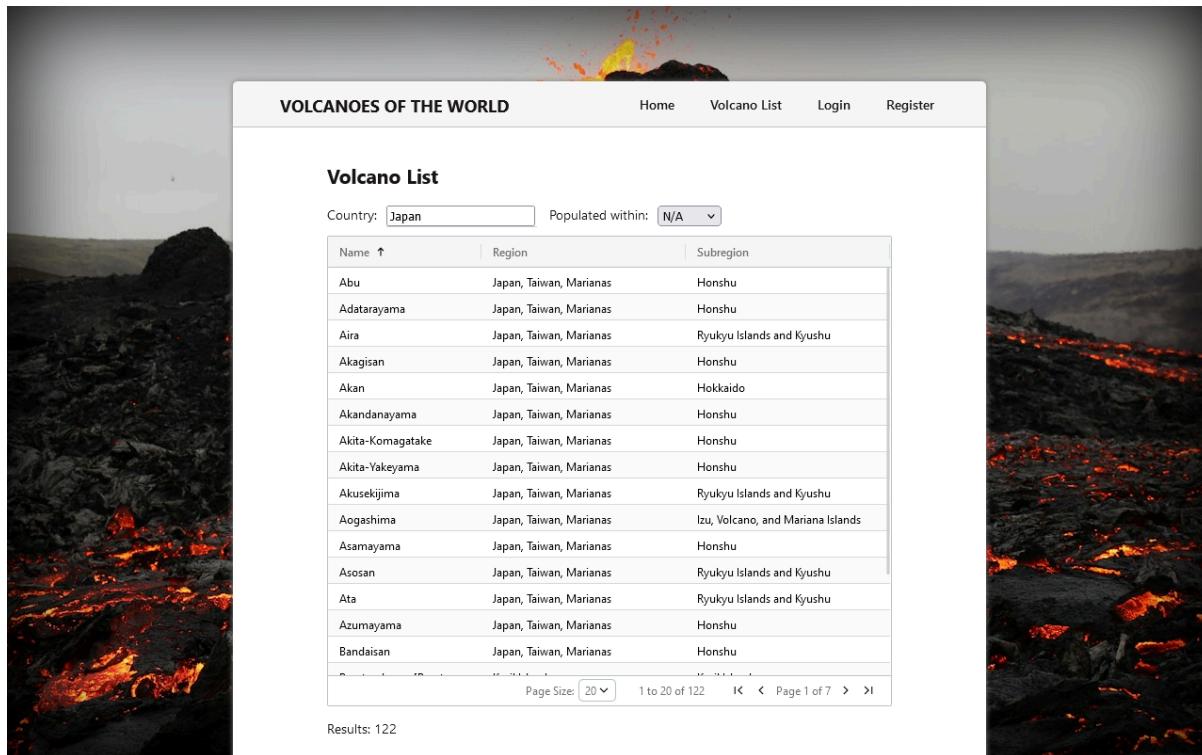
Page Size: 1 to 20 of 122 |<|<| Page 1 of 7 |>|>|

Results: 122

/volcanoes

The page displays the list of volcanoes based within a specific country in a grid table format.

The screenshot example displays volcanoes that are located within Japan. The populated within setting dropdown is not set to any distance.



VOLCANOES OF THE WORLD

Home Volcano List Login Register

Volcano List

Country: Populated within:

Name ↑	Region	Subregion
Abu	Japan, Taiwan, Marianas	Honshu
Adatarayama	Japan, Taiwan, Marianas	Honshu
Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Akagisan	Japan, Taiwan, Marianas	Honshu
Akan	Japan, Taiwan, Marianas	Hokkaido
Akandanayama	Japan, Taiwan, Marianas	Honshu
Akita-Komagatake	Japan, Taiwan, Marianas	Honshu
Akita-Yakeyama	Japan, Taiwan, Marianas	Honshu
Akusekjima	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
Asamayama	Japan, Taiwan, Marianas	Honshu
Asosan	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Ata	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Azumayama	Japan, Taiwan, Marianas	Honshu
Bandaisan	Japan, Taiwan, Marianas	Honshu

Page Size: 1 to 20 of 122 | < Page 1 of 7 > |

Results: 122

/volcano/{id}

The page displays information on the specific volcano in a table format. An interactive map is provided along with the exact coordinates directly below the map. When the user is logged in to an account, the bar chart with information on how populated the area around the volcano is displayed at the bottom of the page.

The screenshot example displays the data of a volcano with the id number of 1.

VOLCANOES OF THE WORLD

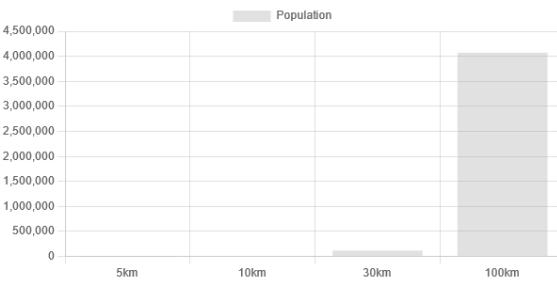
Home Volcano List Logout

Abu

Country	Japan
Region	Japan, Taiwan, Marianas
Subregion	Honshu
Last Eruption	6850 BCE
Summit	641
Elevation	2103

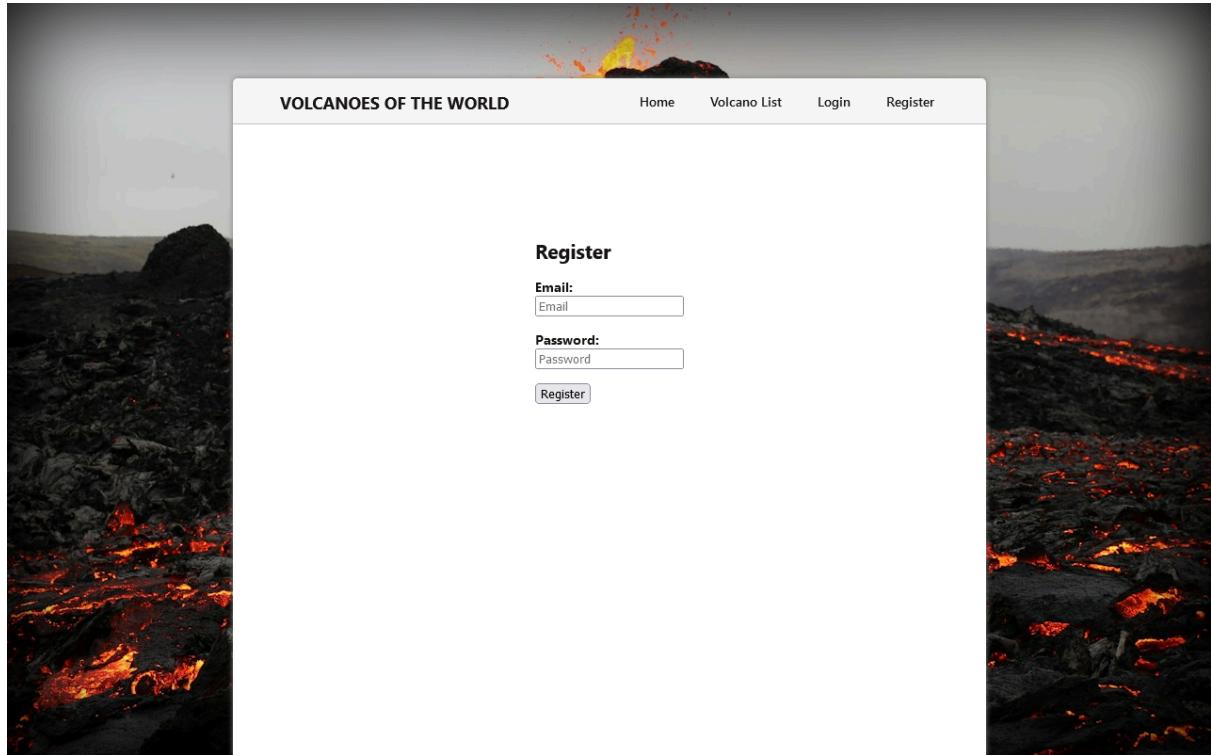


Latitude: 34.5 Longitude: 131.6



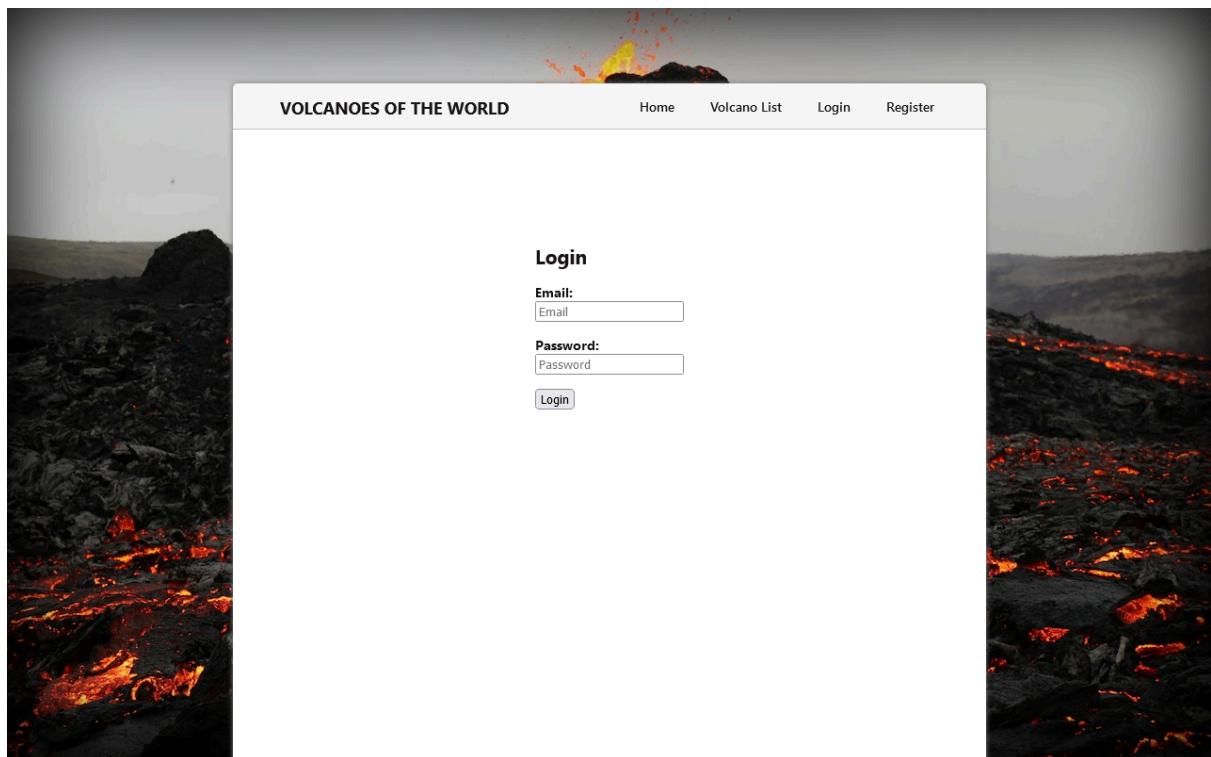
/user/register

This user may register an account. They must supply an email in the proper format and a password.



/user/login

This user may log in to an existing account. They must supply an email in the proper format and the correct password to log in.



Modules used

ag-grid-react

AG Grid React component is a module implemented to provide fully-featured table components to display, sort and filter data. It also allows for pagination and includes a page size setting.

<https://www.ag-grid.com/react-grid/>
<https://www.npmjs.com/package/ag-grid-react>

pigeon-maps

Pigeon Maps provides a fully functional map component of the world and allows a location marker to be placed using latitude and longitude coordinates.

<https://pigeon-maps.js.org/docs/installation/>
<https://www.npmjs.com/package/pigeon-maps>

chartjs and react-chartjs-2

Chart.js is a JavaScript charting library that creates different types of visual charts from data.

<https://www.chartjs.org/>
<https://www.npmjs.com/package/chart.js>

React-chartjs-2 allows Chart.js to function in React as React components.

<https://react-chartjs-2.js.org/>
<https://www.npmjs.com/package/react-chartjs-2>

Application design

Navigation and layout

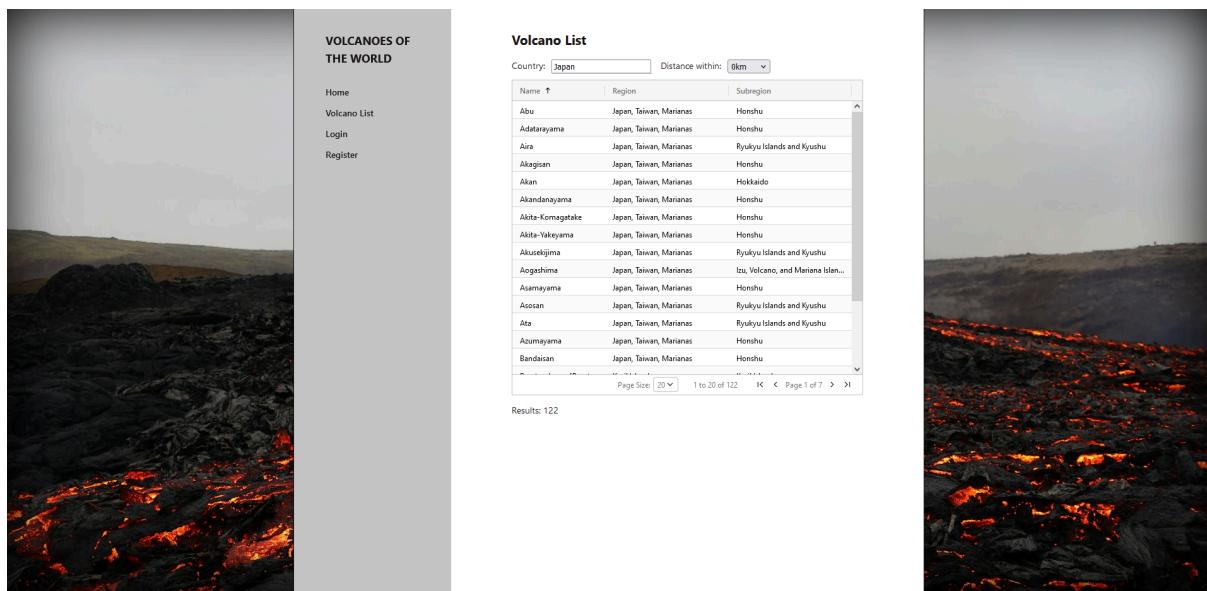
The navigation of the application is relatively simple as there aren't very many pages. The landing page, volcano page, login and register pages can be found in the header. From the volcano list page, the user may navigate to an individual volcano page by clicking a row from the table. From the individual page, the user may also click on the country, region or subregion table cell which brings them back to the volcano list page with the chosen country's volcanos displayed.

The user journey is shown below.

```
↳ /
↳ /volcanoes?country={country}
    ↳ /volcano?id={id}
↳ /login
↳ /register
↳ /logout
```

Users may also navigate through the URL search bar for any page. The volcano list page includes search parameters for a country name, and the individual volcano page includes search parameters for an ID number.

In terms of the layout of the application originally used a sidebar instead of a header component as shown in the screenshot below, sort of similar to Wikipedia pages and other information or forum sites. However, while making some styling changes, I realised that the amount of navigation list items was incredibly short and that it took up a lot of space, so I decided that a simple and small header at the top would fit better.



The screenshot shows the application's interface. On the left, there is a large image of a lava field. To its right is a sidebar with the title "VOLCANOES OF THE WORLD". Below the title, there is a navigation menu with links: Home, Volcano List, Login, and Register. The main content area is titled "Volcano List". It features a search bar with "Country: Japan" and "Distance within: 8km". Below the search bar is a table with columns: Name, Region, and Subregion. The table lists various Japanese volcanoes. At the bottom of the table, there are buttons for "Page Size" (set to 20), "Results: 122", and navigation arrows. To the right of the main content area is another image of a lava field.

Name	Region	Subregion
Abu	Japan, Taiwan, Marianas	Honshu
Adataryama	Japan, Taiwan, Marianas	Honshu
Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Akagisan	Japan, Taiwan, Marianas	Honshu
Akan	Japan, Taiwan, Marianas	Hokkaido
Akandanyama	Japan, Taiwan, Marianas	Honshu
Akiite-Komagatake	Japan, Taiwan, Marianas	Honshu
Akiite-Yakeyama	Japan, Taiwan, Marianas	Honshu
Akusekjima	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Marianas Isl...
Asamayama	Japan, Taiwan, Marianas	Honshu
Asosan	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Ata	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Azumayama	Japan, Taiwan, Marianas	Honshu
Bandaisan	Japan, Taiwan, Marianas	Honshu

Usability and quality of design

The style of the application is clean and minimalistic, only using light monotone colours, along with one accent colour taken from the background image which complements the design. It presents data in a clear fashion as it remains consistent across every page and utilises whitespace, balance and hierarchy.

A large majority of the style is based on the AG Grid table theme, Balham. It takes multiple colours from the table and uses them for the application's main header as well as the table which can be seen on the individual volcano pages.

Some other notable usability and quality of design features include:

- Error messages are shown in a bright red colour which shows contrast and alerts the user to an issue.
- Navigation links in the header have a hoverable effect.
- Similar to the volcano list page where the user may navigate to a volcano page by clicking the table row, the table on the individual volcano page allows users to click on the country and region data to navigate back to the volcano list with the specific country already searched. This shows consistency across pages.
- Some subtle movement animations are applied to each page upon the page loading that enhance the feel of the website and make it feel more elegant.

There are, however, some improvements that could be made. For one, the autocomplete component, while it is functional, lacks some features that are usually present in other similar designs. The autocomplete list does not allow for user keyboard input, such as up and down arrow keys, to select an option. The user must instead navigate and use the mouse to select an option. The user also cannot unfocus or remove the autocomplete without hitting enter on the search bar or selecting an option. This is something that could be improved upon in future using some event listeners.

One other thing that could be improved in future, is the fact that the login and register pages look almost exactly the same, save for the header text. This could create confusion for some users who may be trying to log in or register. Some extra information or steps could be added to the register page to avoid this.

Accessibility

Some of the accessibility guidelines as provided by W3C, have been tested and met.

Priority 1

- Provides alt text to images.
- As the majority of the pages lack any colour, Information conveyed with colour is also available without colour.
- Documents may be read without style sheets.
- Text equivalents are updated when dynamic content changes.
- The screen does not flicker.
- The site's content appropriately uses the clearest and simplest language.
- Table row and headers are clearly differentiated through colour shade contrast.
- Inputs are appropriately labelled and properly positioned.

Priority 2

- Background and foreground provide sufficient contrast.
- Uses style sheets to control layout and presentation.
- Uses header elements to convey document structure.
- The content does not blink at all.
- Pages do not auto-refresh.
- Pages do not auto-redirect.
- Pop-ups and spawned windows do not appear.

Priority 3

- A navigation bar is provided.
- Creates a style of presentation that is consistent across pages.

Other

- The map component includes zoom in and out buttons which can be used with mouse buttons or keyboard inputs.

Technical description

Architecture

The main folder is shown in the screenshot below.

📁 node_modules	6/05/2024 2:30 AM	File folder
📁 public	20/04/2024 7:09 PM	File folder
📁 src	11/05/2024 10:45 PM	File folder
📄 .gitignore	20/04/2024 7:09 PM	Text Document 1 KB
📄 package.json	6/05/2024 2:30 AM	JSON File 1 KB
📄 package-lock.json	6/05/2024 2:30 AM	JSON File 724 KB
📄 README.md	20/04/2024 7:09 PM	MD File 4 KB

The src directory is shown in the screenshot below. It includes three main files as well as three folders.

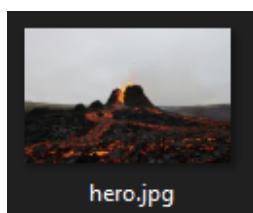
📁 assets	20/04/2024 11:37 PM	File folder
📁 components	11/05/2024 8:06 PM	File folder
📁 pages	12/05/2024 2:45 AM	File folder
📄 api.js	11/05/2024 10:52 PM	JavaScript File 4 KB
📄 index.js	12/05/2024 2:45 AM	JavaScript File 2 KB
📄 style.css	12/05/2024 2:46 AM	Cascading Style S... 6 KB

The components directory includes the autocomplete and search bar components as well as the header which remains constant across every page.

📄 Autocomplete.js	11/05/2024 10:26 PM	JavaScript File	2 KB
📄 Header.js	11/05/2024 11:49 PM	JavaScript File	1 KB
📄 SearchBar.js	11/05/2024 10:23 PM	JavaScript File	3 KB

The pages directory contains every file that default exports and creates a full complete page to the index.js to render.

📄 App.js	12/05/2024 2:46 AM	JavaScript File	1 KB
📄 Login.js	12/05/2024 2:45 AM	JavaScript File	2 KB
📄 Logout.js	11/05/2024 10:34 PM	JavaScript File	1 KB
📄 Register.js	12/05/2024 2:45 AM	JavaScript File	2 KB
📄 Volcano.js	12/05/2024 2:45 AM	JavaScript File	3 KB
📄 VolcanoList.js	12/05/2024 2:45 AM	JavaScript File	4 KB



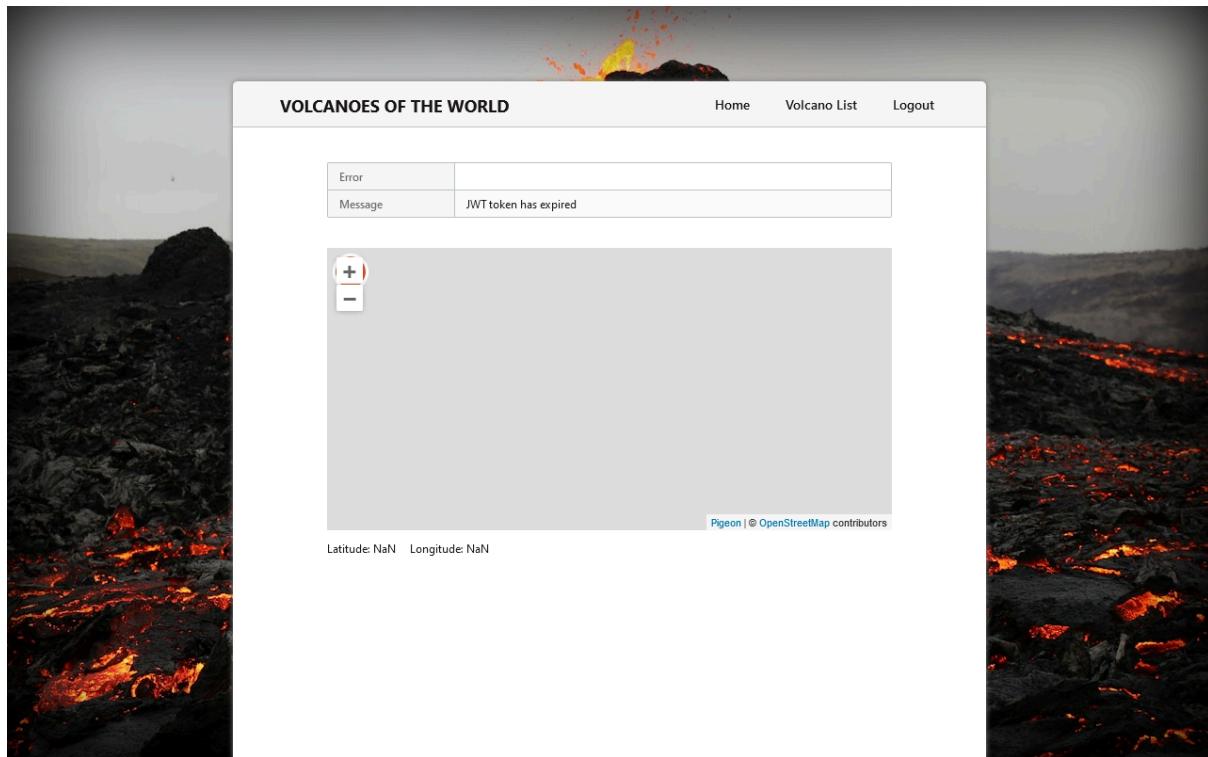
The assets folder only contains one image. This folder, should any more similar files appear, may contain any images, fonts, or other assets, generally for styling or visual elements.

Test plan

Task	Expected outcome	Result
Navigate with React Router	Open new page through link	PASS
Open list of volcanoes page	Display AG Grid table of volcanoes	PASS
Type country into search bar	Display autocomplete component	PASS
Click autocomplete option	Search for list of volcanoes using country	PASS
Input country into search bar	Search for list of volcanoes using country	PASS
Select populated within option	Search for list of volcanoes using country and populated within	PASS
Click a volcano list row	Open the specific volcano page	PASS
Open volcano page	Display table data and map component	PASS
Login to existing user	Return success message and save JWT token	PASS
Register new user	Post email and password to the API	PASS
Fail to login or register	Display error message	PASS
Login or register user	Redirect logged in or registered user to homepage	FAIL
Open volcano page while logged in	Get data and display additional chart	PASS
Open volcano page with expired token	Hide chart and display data as normal. Remove JWT token	PASS
User logged in	Replace login and register to logout when user logged in	FAIL

Difficulties and persistent errors

One major roadblock that I encountered was trying to figure out how to display the volcano data, without it returning an error if the user had an expired JWT token, as shown in the screenshot below.



I resolved this issue by calling a fetch within a fetch. As an explanation, the first fetch fetches the data using the JWT token. If the JWT token is still valid, it continues. But if the API returns an error, then a second fetch is called with no JWT token and it returns the data from that. The rest of the code continues as normal

```
// Fetch data
useEffect(() => {
  fetch(`#${url}/volcano/${id}`, requestOptions)
    .then((res) => res.json())
    .then((data) => {
      // If data returns error then request another fetch without token, else continue
      if (data.error) {
        localStorage.setItem("token", "");
        return fetch(`#${url}/volcano/${id}`).then((res) => res.json());
      } else return data;
    })
    .then((data) => setVolcano(data))
    .catch((e) => setError(e))
    .finally(() => setLoading(false));
}, []);
```

Another error in the app—one that continues to occur—is the logout link in the header, which will not show unless the page reloads.

Extensions

Some potential future extensions or improvements that could be made to the app, may include:

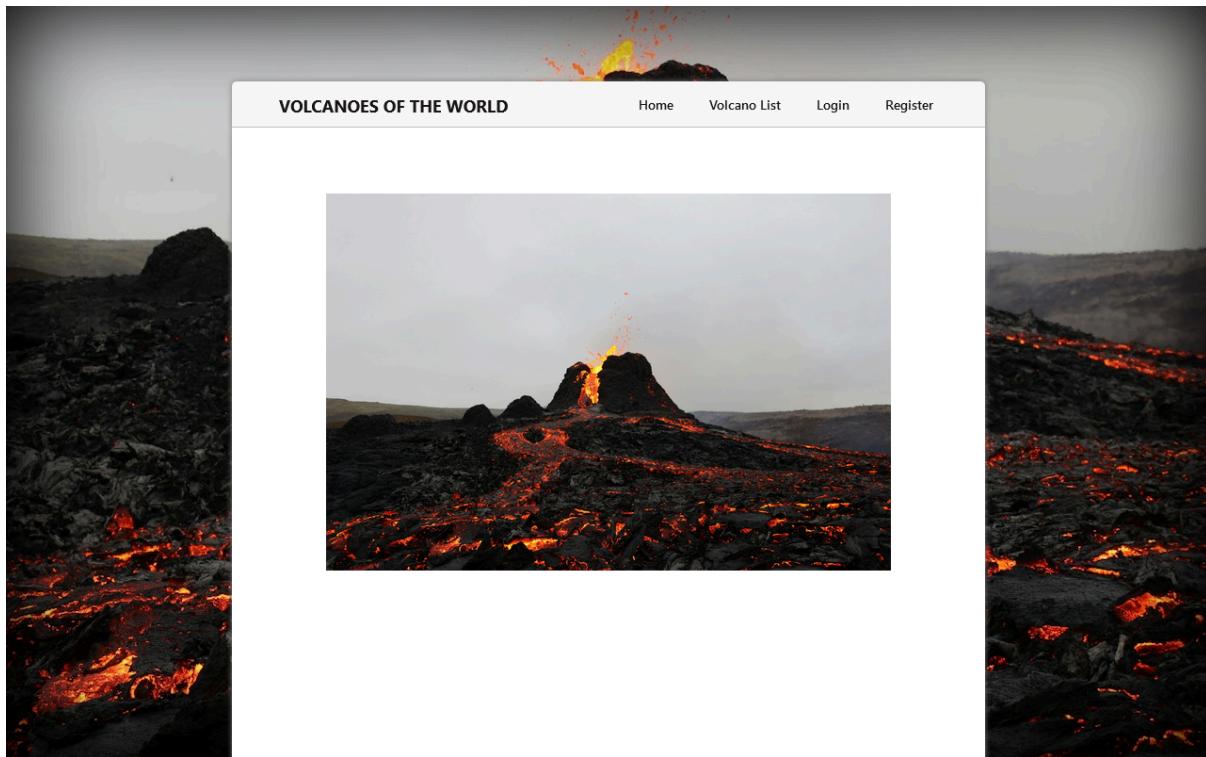
- Better autocomplete that allows users to use the keyboard arrow keys and enter or escape keys to select options or hide the autocomplete from view.
- Redirect the user back to the previous page or to the homepage upon logging in.
- Redirect the user to the login page upon registering an account.
- Fix the logout link error.

User guide

Homepage

↳ /

The user would start at the landing page, which includes a hero image, as shown below.



Header navigation

From here, the user may select one of the navigation links in the header. These include the: homepage (the current page), the volcano list page, the login page, and the register page.



Below is an example of one of the navigation links, in this case, the volcano list link, hovered.



Volcano list

↳ /volcanoes?country={country}

The volcano list page displays a table of volcanoes within the country that is specified. If no country is specified, the country defaults to Japan.

From here users may:

- Sort the list by volcano name.
- Filter by region and/or subregion.
- View different pages and choose the page size.
- Filter by populated within using the dropdown.
- Search for a country by either using the search bar or changing the search parameters in the URL address bar.

The full page of an example volcano list with the country set to Japan and the populated within data set to nothing is shown below.

The screenshot shows a website titled "VOLCANOES OF THE WORLD". The main content area is titled "Volcano List". It features a search bar with "Country: Japan" and a dropdown for "Populated within: N/A". Below these are two tables. The first table lists volcanoes with columns for Name, Region, and Subregion. The second table lists the same information for a subset of volcanoes. At the bottom, there are pagination controls and a note that there are 122 results.

Name ↑	Region	Subregion
Abu	Japan, Taiwan, Marianas	Honshu
Adatarayama	Japan, Taiwan, Marianas	Honshu
Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Akagisan	Japan, Taiwan, Marianas	Honshu
Akan	Japan, Taiwan, Marianas	Hokkaido
Akandanayama	Japan, Taiwan, Marianas	Honshu
Akita-Komagatake	Japan, Taiwan, Marianas	Honshu
Akita-Yakeyama	Japan, Taiwan, Marianas	Honshu
Akusekijima	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
Asamayama	Japan, Taiwan, Marianas	Honshu
Asosan	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Ata	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Azumayama	Japan, Taiwan, Marianas	Honshu
Bandaisan	Japan, Taiwan, Marianas	Honshu

Name ↑	Region	Subregion
Abu	Japan, Taiwan, Marianas	Honshu
Adatarayama	Japan, Taiwan, Marianas	Honshu
Aira	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Akagisan	Japan, Taiwan, Marianas	Honshu
Akan	Japan, Taiwan, Marianas	Hokkaido
Akandanayama	Japan, Taiwan, Marianas	Honshu
Akita-Komagatake	Japan, Taiwan, Marianas	Honshu
Akita-Yakeyama	Japan, Taiwan, Marianas	Honshu
Akusekijima	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Aogashima	Japan, Taiwan, Marianas	Izu, Volcano, and Mariana Islands
Asamayama	Japan, Taiwan, Marianas	Honshu
Asosan	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Ata	Japan, Taiwan, Marianas	Ryukyu Islands and Kyushu
Azumayama	Japan, Taiwan, Marianas	Honshu
Bandaisan	Japan, Taiwan, Marianas	Honshu

Page Size: 20 | 1 to 20 of 122 | < | Page 1 of 7 | > | >>

Results: 122

Autocomplete

While using the search bar, an autocomplete list component may appear. This list matches the user's input to the list of countries to suggest country's names.

Upon clicking on an option, the app immediately searches for and displays data in the table of the list of volcanoes within that country.

The screenshot shows an autocomplete dropdown menu. The input field contains the letter "a". Below it, a list of country names is displayed, each preceded by a small icon. The list includes Algeria, Antarctica, Argentina, Armenia, Australia, Japan, and Taiwan.

Country:	a
Algeria	
Antarctica	
Argentina	
Armenia	
Australia	
Japan	
Taiwan	

Volcano

↳ /volcano?id={id}

The user may navigate to the individual volcano page by clicking a volcano on the volcano list row or by using the URL address bar. Each volcano has a unique ID number that can be searched for.

The full page of an example volcano with the id of 1, while the user is logged in, is shown below.

The screenshot shows a web application interface for 'VOLCANOES OF THE WORLD'. At the top, there is a navigation bar with links for 'Home', 'Volcano List', and 'Logout'. Below the navigation bar, the title 'Abu' is displayed above a table of volcano details. The table includes the following data:

Country	Japan
Region	Japan, Taiwan, Marianas
Subregion	Honshu
Last Eruption	6850 BCE
Summit	641
Elevation	2103

Below the table is a map of Japan showing the location of Abu. The map includes place names like '阿武町' and '津和野町', route numbers like '11', '14', '17', and '315', and a red location marker. The map also includes a copyright notice for 'Pigeon | © OpenStreetMap contributors'. Below the map, the coordinates 'Latitude: 34.5 Longitude: 131.6' are displayed. At the bottom of the page is a population density chart. The y-axis is labeled 'Population' and ranges from 0 to 4,500,000. The x-axis is labeled 'Distance' and ranges from 0 to 100km, with major ticks at 5km, 10km, 30km, and 100km. A single grey bar represents a population density of approximately 4,000,000 people over a distance of about 40km.

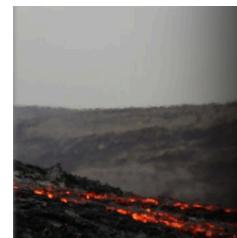
Information table

The page displays data on the volcano through a table format. The user may click on the country, region, or subregion data cells to navigate back to the volcano list page with other volcanoes within the same country displayed.



Abu

Country	Japan
Region	Japan, Taiwan, Marianas
Subregion	Honshu
Last Eruption	6850 BCE
Summit	641
Elevation	2103



Map

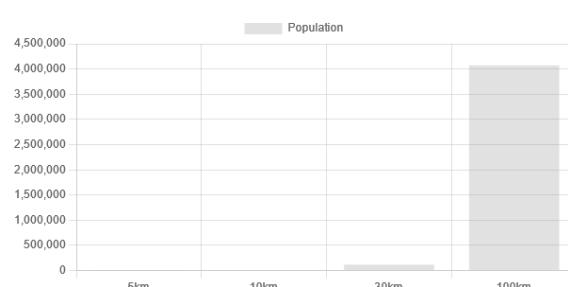
The coordinate (latitude and longitude) data is displayed in a map format which allows the user to zoom in and zoom out by using the scroll wheel or clicking the plus and minus buttons. The exact latitude and longitude is also displayed in text form below that.

Below are two of the same volcano maps, one zoomed out and the other zoomed in.



Chart

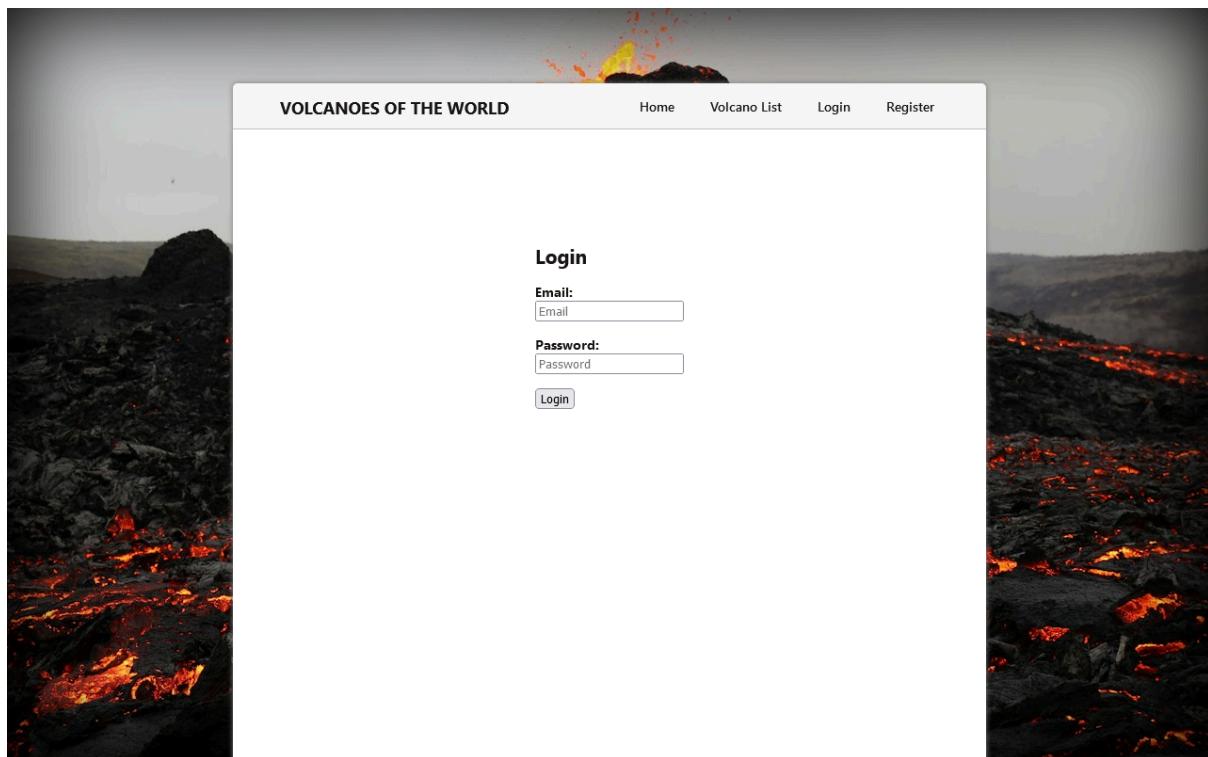
If the user is logged into an account, they may also see additional data of the population number within a certain distance of the volcano. This data is only shown when the user is logged in and disappears when they are logged out or when their JWT token expires.



Login

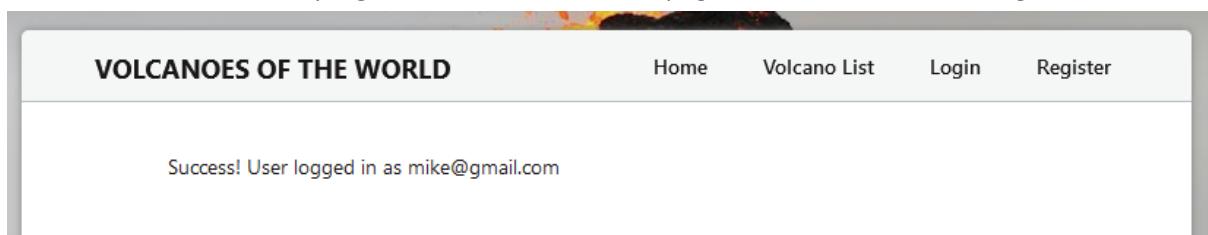
↳ /login

The user may log in to an existing account using this page. They may do this by entering their email and password into the respective inputs and clicking enter or the log in button below that.

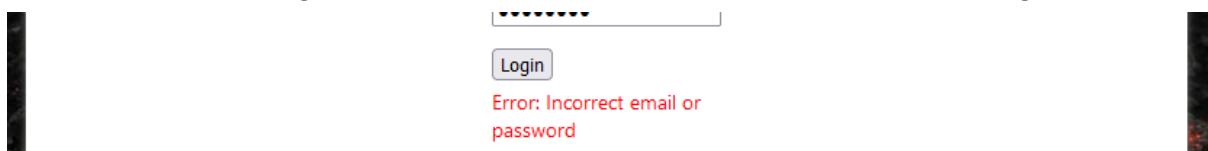


If the user does not enter a valid email or leaves any of the inputs empty, the form is not submitted and the user is prompted to enter one.

When the user successfully logs in to their account, the page returns a success message.



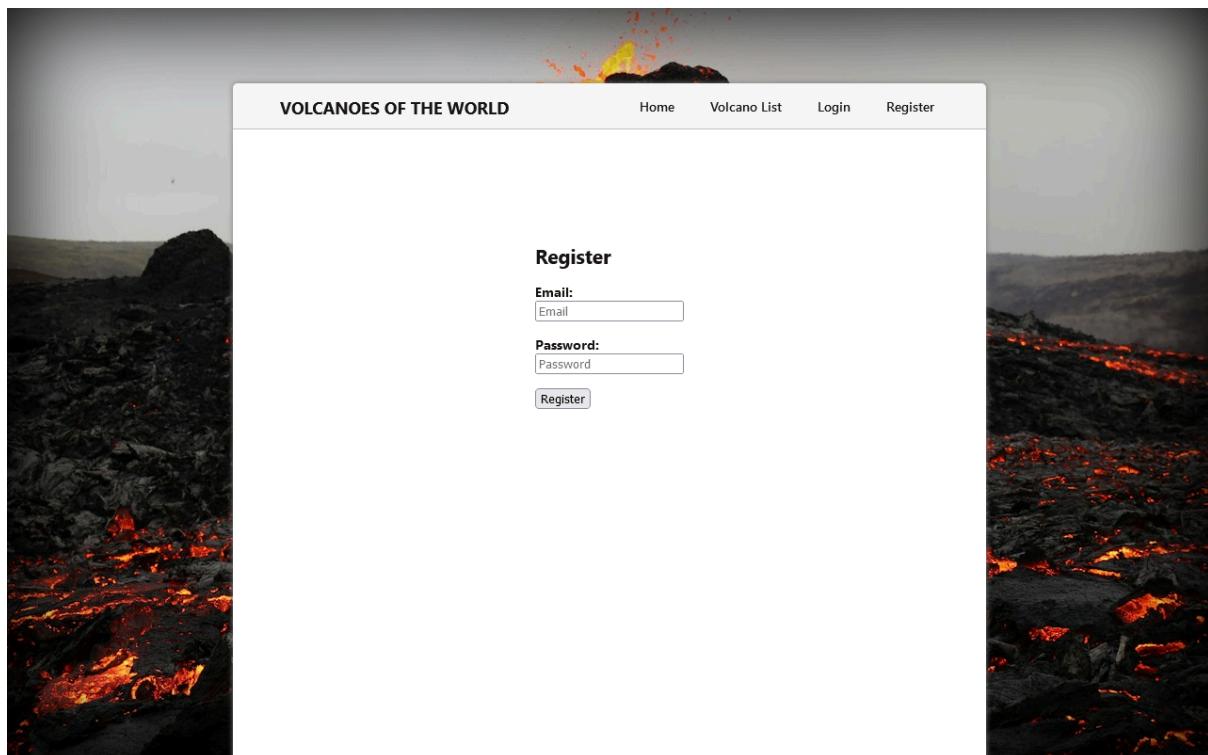
If the user is unable to log into their account, the form instead returns an error message in red.



Register

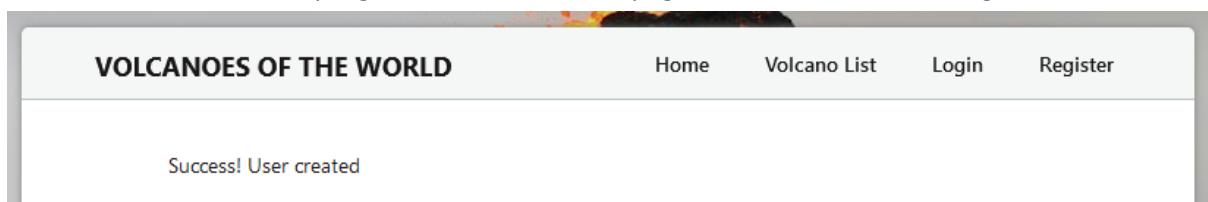
↳ /register

The user may register an account using this page. They may do this by entering their email and a password into the respective inputs and clicking enter or the register button below that.

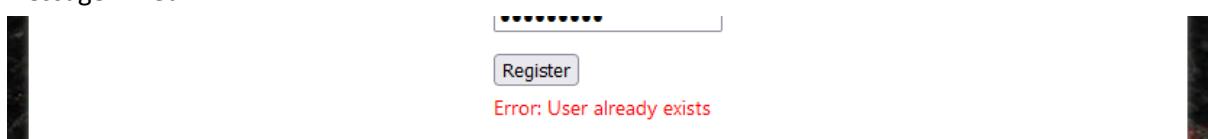


Similar to the login page, if the user does not enter a valid email or leaves any of the inputs empty, the form is not submitted and the user is prompted to enter one.

When the user successfully registers an account, the page returns a success message.



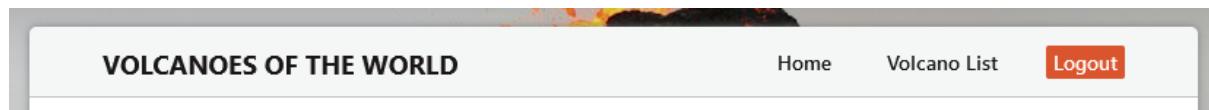
If the user enters an existing email or some other error occurs, the form instead returns an error message in red.



Logout

↳ /logout

The user may log out of their account and session through this page found in the header when the user is logged in.



Upon clicking it, the user is logged out of the session with their JWT token removed from the local storage and the page returns a success message.



References

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