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# Testing Document

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|---|---|
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AIR Cloud

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# 1 Purpose

The main purpose of Test Plan Document is to include tests of all the components of our application and verify that all the use cases we defined and developed work. In the last version we tested all the app, adding "Successful" to the working use cases
In particular we focused on all the section of the website, testing all the components and, in case of errors, we fixed them.

 

# 2 User not yet registered

Without registering, the user can navigate only through the "More info" page and in the Log In page. If he want to access to the project section, this action will be interrupted by the log in page. Let look the pages the user can achieve.

## 2.1 Testing of Top Bar Buttons

| Top Bar buttons test | |
|---|---|
| User: | All users(registered and not) |
| Initial state | Home page |
| Expected | The user sees the home page of the application, and on top of it the Top Bar with three buttons, on the right top side. |
| Possible Errors | There are three possible errors:<br>• If the routes in the main.py file are not correctly defined all the buttons do not work and the html pages will not open.<br>• If the connection with the database does not work the Log In button will not open the login.html page and the user will receive an error. |
| Output Test Result | Succesful |

Table 1: Testing of Top Bar Buttons


Figure 1: Top Bar

## 2.2 View of the web application

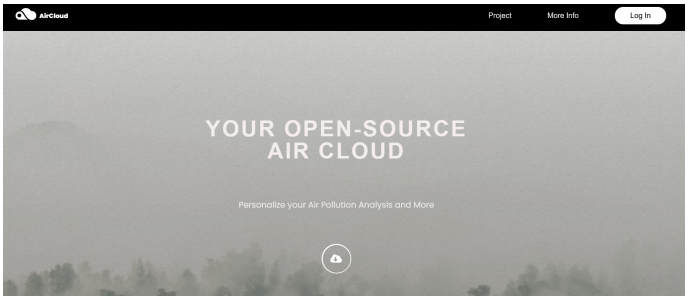


Figure 2: Home page

 

| Home page view | |
|---|---|
| Name identifier | Test 2 |
| User: | All users(registered and not) |
| Input | The following url `http://127.0.0.1:5000` |
| Initial state | Home page |
| Expected | The user sees the home page of the application, it is possible to see it in figure 2. |
| Possible Errors | There are two possible errors:<br>• Wrong url or python code not working. In this case the user receives an error from the browser that shows an error of trying to achieve a "No-existing" website. |
| Output Test Result | Succesful |

Table 2: View of the web application

## 2.3 Register

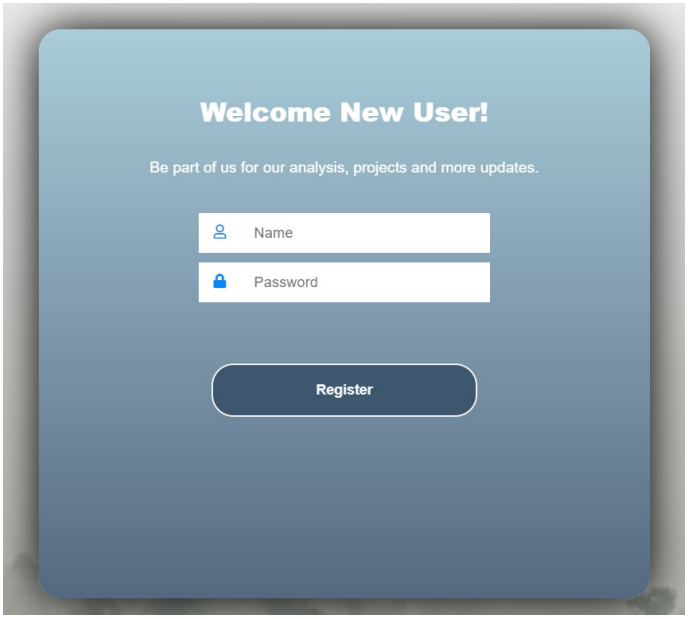


Figure 3: Register

 

| Register page | |
|---|---|
| Name identifier | Test 3 |
| Reference to use cases | Use case 14 |
| User: | Only not registered users |
| Input | Clicking first in the login button in the home page and then clicking on the button register |
| Initial state | Register page |
| Expected | The user sees the register pages of the application, it is possible to see it here 3. Once he has filled the name and the password the user is redirected to the login page. |
| Possible Errors | There are two possible errors:<br>• If the user puts a username that already exists, the registration page is automatically reloaded.<br>• The user can get an error of postgres if the database is not correctly set up or the general schema has not been generated yet. |
| Output Test Result | Succesful |

Table 3: Register Page

## 2.4 More Info Page

| More info page view | |
|---|---|
| Name identifier | Test 4 |
| Reference to use cases | Use case 13 |
| User: | All (registered and not) |
| Input | Accessing the More Info page from the home page |
| Initial state | More Info page |
| Expected | The user sees a page with two subsections: General Idea and Data |
| Possible Errors | Python code not working |
| Output Test Result | Succesful |

Table 4: More Info page view

 

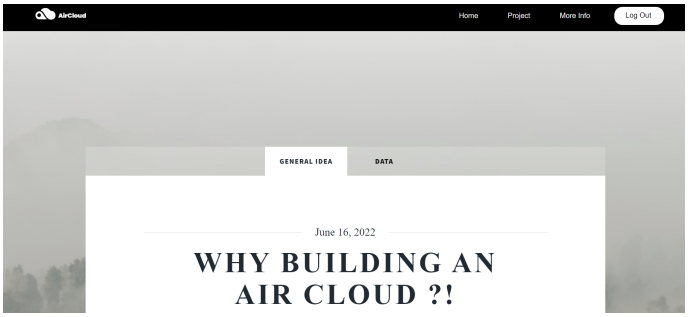


Figure 4: More Info page

## 2.5 Data Map

| Data map view | |
|---|---|
| Name identifier | Test 5 |
| Reference to use cases | Use case 16 |
| User: | All (registered and not) |
| Input | Accessing the More Info page from the home page, then accessing the Data Page and, finally, clicking on the button Open Map. |
| Initial state | Data page |
| Expected | The user sees an interactive map which shows the coordinates, the name and the AQI level registered by the stations for each country chosen for the analysis. |
| Possible Errors | There are two possible errors:<br>1. Error in the API for retrieving the stations coordinates<br>2. Server of OpenStreetMap down |
| Output Test Result | Succesful |

Table 5: Data map view

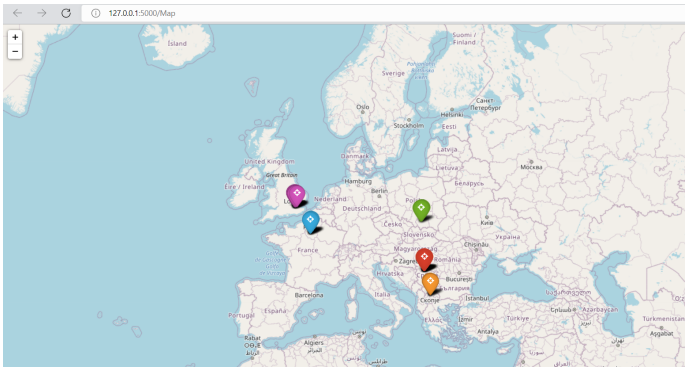


Figure 5: Data Map

 

# 3 User already registered

## 3.1 Log In

| Log In page | |
|---|---|
| Name identifier | Test 6 |
| Reference to use cases | Use case 15 |
| User: | Only registered users |
| Input | The user has to click on the Log In button |
| Initial state | Log In page |
| Expected | The user sees the Log In page of the application, it is possible to see it here 6. Once he has filled the name and the password the user is redirected to the login page. |
| Possible Errors | There are two possible errors:<br>• If the user put a username that already exists, the registration page is automatically reloaded.<br>• The user can get an error of postgres if the database is not correctly set up or the general schema has not been generated yet. |
| Output Test Result | Succesful |

Table 6: Log In page

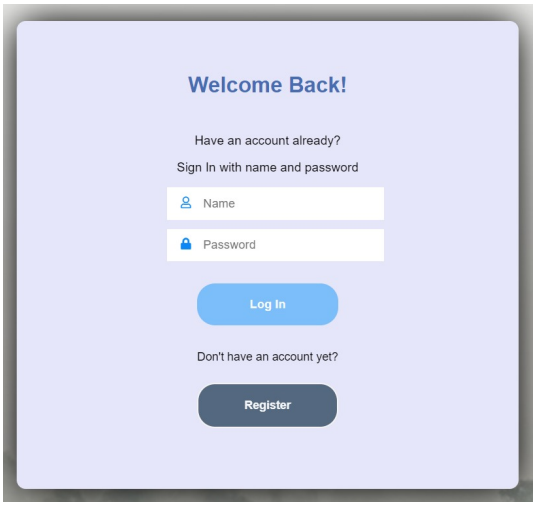


Figure 6: Log In

 

### 3.2 Log Out

| Log Out Button | |
|---|---|
| Name identifier | Test 7 |
| Reference to use cases | Use case 17 |
| User: | Only registered users |
| Input | The user has to click on the Log Out button |
| Initial state | Home Page |
| Expected | Once the user is Logged in, if he goes back to the Home Page he sees the Log Out button, in the top right corner of the Home Page. More specifically, the Log Out button should be showed at the same place the Log In button was. |
| Possible Errors | There are two possible errors:<br>• If the user cannot succeed the Log In, he cannot see the Log Out button in the home page.<br>• The button does not work and the user cannot Log Out from his account. |
| Output Test Result | Successful |

Table 7: Log Out Button

 

### 3.3 Query Data

| Query Data | |
|---|---|
| Name identifier | Test 8 |
| Reference to use cases | Use case 18 |
| User: | Only registered and logged in users |
| Input | The user has to choose from 5 cities and 3 data types from two drop-down boxes. |
| Initial state | New Project |
| Expected | The logged in user is able to retrieve the tables with the expected data, after choosing the city. |
| Possible Errors | NULL |
| Output Test Result | Successful |

Table 8: Query Data

### 3.4 Visualize Data

| Visualise Data | |
|---|---|
| Name identifier | Test 9 |
| Reference to use cases | Use case 19 |
| User: | Only registered and logged in users that have successfully retrieved the data. |
| Input | The user clicks on the "Visualize" button. |
| Initial state | Project Page |
| Expected | Once the user clicks on the "visualize" button the system will direct the user to the part of the page with the retrieved map. |
| Possible Errors | The user didn't query the data, and they cannot be displayed. |
| Output Test Result | Successful |

Table 9: Visualise data

 

### 3.5 Data Manipulation

| Data Manipulation | |
|---|---|
| Name identifier | Test 10 |
| Reference to use cases | Use case **??** |
| User: | Only registered and logged in user who already have retrieved data. |
| Input | The user has the options to choose to:<br>1. **Sort**: by clicking on the column by which the user wants to sort, the data will reorganize accordingly to the arrow next to the column name (ascending or descending sort). (Only for Forecast data)<br>2. **Filter**: the user after clicking on the "filter" button can enter the phrases she/he looks for to extract that data from the table.<br>3. **Analyze**: the user clicks on the "analyze" button at the top of the data. |
| Initial state | Project Page |
| Expected | Once the user chooses the wanted manipulation techniques and applies them, the result of the manipulation will appear in the project window in a table form. In the case of the "Analyze" button the user is redirected down to the simple statistic analysis table that is retrieved with the data, when queried |
| Possible Errors | The user didn't query the data, and they cannot be manipulated directly by him/her. |
| Output Test Result | Successful |

Table 10: Data Manipulation

 

### 3.6 Export Analysis

| Export Analysis | |
|---|---|
| Name identifier | Test 11 |
| Reference to use cases | Use case 21 |
| User: | Only registered and logged in user who already have retrieved data. |
| Input | The user has the option to export the analysis by clicking the "Export Analysis" button in the "Create Project" section, after the "Analysis" table. |
| Initial state | The user has clicked on "Search" button |
| Expected | Once the user clicks "Export Analysis" a new page is opened and the user can see a report with all the analysis of the dataset retrieved. |
| Possible Errors | There can be 2 possible errors:<br>1. pandas profiling is not correctly updated<br>2. The user hasn't enough data to be analyzed. It happens in particular if the user chooses a "real time analysis" but he/she has done less than 7 requests. |
| Output Test Result | Successful |

Table 11: Export Analysis

 

# 4 User Interface

## 4.1 Navigation Bar

An important element of the user interface is the navigation bar, which is common for all the pages of the application. Here the user can click on each tab. For the "Project" tab to be opened the user has to be logged in first, and then the "Project" page can be opened.
The "More Info" tab is accessible from all the users. On this section every user can read information about the general idea of our project, data involved, the API used by our application.
The last button on the right is used to Log In in the application. If you are not registered, in the Log In page is be the possibility to register for every new user.

## 4.2 HomePage

| Home page view | |
|---|---|
| Name identifier | DD 12 |
| User: | All (registered and not) |
| Input | The following url `http://127.0.0.1:5000/` |
| Possible Actions | You can only scroll down to see a short overview of the project and, in the bottom, some ratings about the application, done by the users. |

Table 12: Home Page

## 4.3 More Info

| More Info | |
|---|---|
| Name identifier | DD 13 |
| User: | Every user that wants to use the web application, even without logging in. |
| Input | To access the users, from the Home Page have to click on "More Info" button on the top bar. |
| Possible Actions | When clicking the button the user views an interface similar to the one of Home Page but divided in two sections:<br>1. **General Idea**: The user can read a brief article we wrote for explaining the reasons that led us to creating the "Air Cloud" web application. This section doesn't involve any dynamic feature, but it is rendered only as part of the static HTML part of the web.<br>2. **Data**: The user here can find all the information about the data treated in the projects and that can be found in details in the RASD document. In particular there is a clear explanation of all the chemical pollutants |

Table 13: More Info Section

 

# 5 Use case

In this section we will show the possible use cases of our software, showing software functionalities, possible users and considering possible exceptions in different situations.

## 5.1 Register

The register environment can be found in figure 3

| Register | |
|---|---|
| Name identifier | DD 3 |
| User: | Only people that are not registered yet |
| Input | To access the users, from the Home page, has to go in the log in page and then click on "Register" |
| Possible Actions | In this page the user has to fill both the name and password. When the user clicks on Register, he/she is redirected automatically to the log in page . |

Table 14: Register Page

## 5.2 Log In

| Log In | |
|---|---|
| Name identifier | DD 15 |
| User: | Only people who are already registered |
| Input | To access the users, from the Home page, has click on "Log in". |
| Possible Actions | In this page the user has to fill both the user name and password. When the user clicks on Log In, he/she is redirected automatically to the Home page if the password is right, otherwise the user remains in the login page. |

Table 15: Log In Page

 

| Use Case 3: Visualize the data map | |
|---|---|
| Name | Interactive map on the Data page of the application |
| User: | All the users of the application |
| Condition: | The actor has accessed the web application through the URL `http://127.0.0.1:5000/` and has entered on the More Info page. |
| Flow of Events | The events follow this order:<br>1. The user accesses the web application and click on the More Info page<br>2. The user accesses the Data page, inside the More Info page<br>3. The user clicks on the "Open Map" button<br>4. The user interacts with the map, using the zoom function and selecting the points to visualize its coordinates. |
| Exit condition | The user could use all the functionalities of the map. |
| Exceptions | The system crashed. |

Table 16: Visualize the data map

| Log Out | |
|---|---|
| Name identifier | DD 7 |
| User: | Only users that are registered |
| Input | In the top bar of the home page, users after having completed the Log In, will see the Log Out button instead of the Log In. |
| Possible Actions | When clicking the button the user logs out from his account and goes again in the home page but this time the button is transformed in Log In button. |

Table 17: Log Out Button

 

## 5.3 Query Data

| Query Data | |
|---|---|
| Name identifier | DD 18 |
| User: | A registered and logged in user after accessing the “project page”. |
| Input | 1. **City**: chooses one of the 5 cities available (Skopje, Belgrad, Kraków, Paris and London) from a drop down list.<br>2. **Data Type**: the user chooses what kind of data she/he wants to query: Real Time air pollution data, Forecast of air pollution for the next days or Both. |
| Possible Actions | After inputting the wanted parameters the user clicks on the “search” button and retrieves the data, which are presented in tables. Additionally with the queried data tables 2 new sections on the web-page will appear:<br>1. **Map**: An interactive Bokeh map of the city the user has currently queried.<br>2. **Basic Statistics**: A table with the basic statistics of the queried data.<br>The user can then click on any visible button to continue working with the retrieved data. |

Table 18: Query Data

## 5.4 Geographic visualization

| Geographic visualization | |
|---|---|
| Name identifier | DD 19 |
| User: | A registered and logged in user after querying the data. |
| Input | The user clicks on "visualize" and is redirected to the part of the web-page where the interactive map of the currently queried place is embedded. |
| Possible Actions | The user can hover on the red dot in the map to visualize a pop-up window with the basic air quality information about the place. The user can also proceed with analysis by choosing one of the buttons at the top of the data. |

Table 19: Geographic visualization

 

## 5.5 Data manipulation

| Data manipulation | |
|---|---|
| Name identifier | DD 20 |
| User: | A registered and logged in user after querying the data. |
| Input | The user has the options to choose to:<br>1. **Sort**: by clicking on the column by which the user wants to sort, the data will reorganize accordingly to the arrow next to the column name (ascending or descending sort). (Only for Forecast data)<br>2. **Filter**: the user after clicking on the “filter” button can enter the phrases she/he looks for to extract that data from the table.<br>3. **Analyze**: the user clicks on the “analyze” button at the top of the data and she/he is redirected down to the simple statistic analysis table that is retrieved with the data, when queried. |
| Possible Actions | After simple data manipulation the user can export the analysis or query new data. |

Table 20: Data manipulation

## 5.6 Analyze data and Export Analysis

| Analyze data and Export Analysis | |
|---|---|
| Name identifier | DD 21 |
| User: | A registered and logged in user with queried data. |
| Input | The user clicks on the "Export Analysis" button underneath the simple statistics table returned after querying the data. |
| Possible Actions | After clicking on the "Export Analysis" button the user is redirected to a new page with more advanced analysis performed on the data. Once the page is created the user can print the html page to export it as pdf |

Table 21: Analyze data and Export Analysis

 

## 5.7 Use Case Diagrams

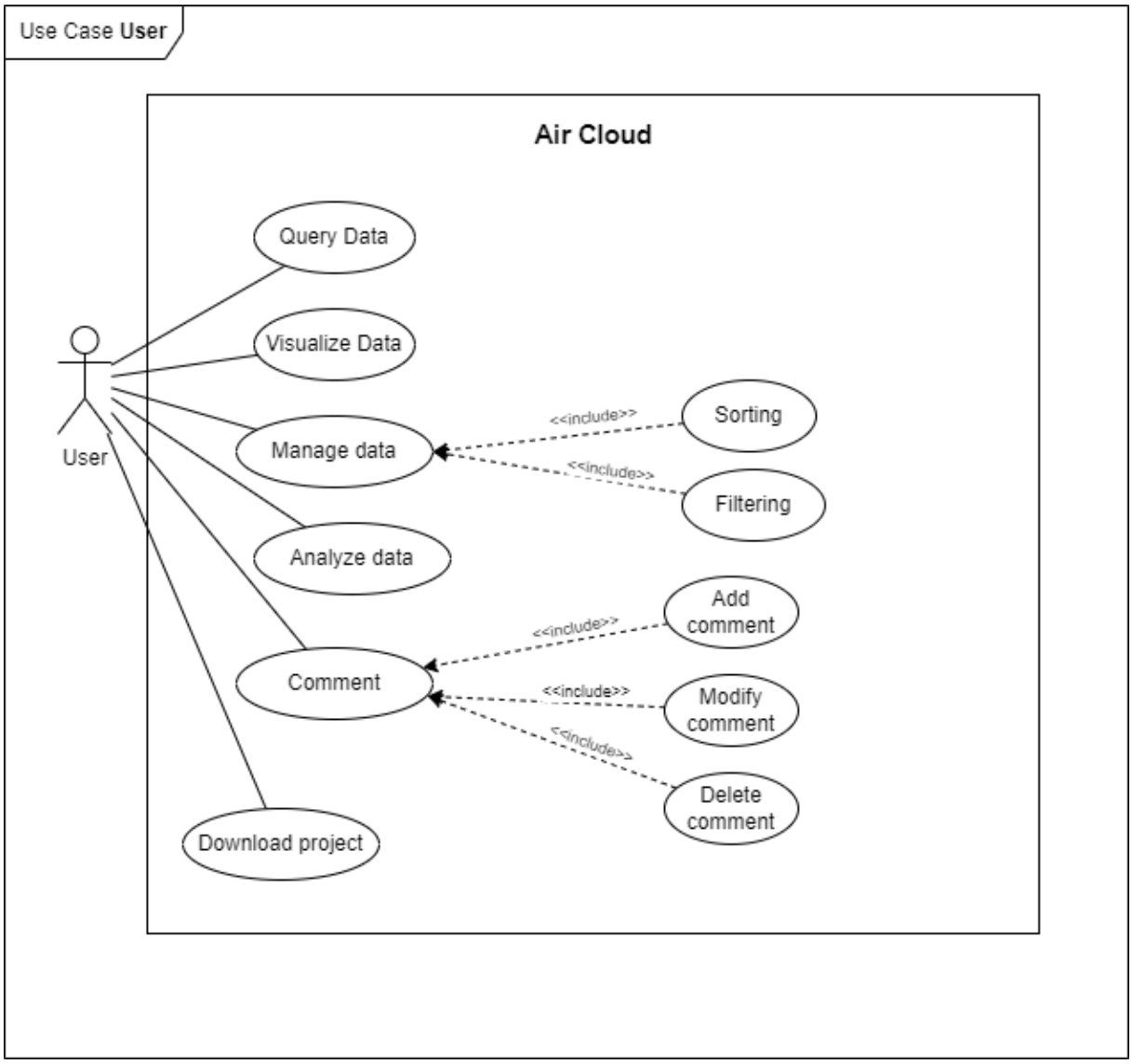


Figure 7: UML of our application

 

# 6 Effort Spent

Here we put some information on how much effort each group member spent in working at this document and what we did:

| Name | Hours spent (h) | Details |
|---|---|---|
| Bigai | 1,5 | User not register section (More Info Page and Data Map) and the related use cases. |
| Calcaterra | 3 | User not register section (Home Page and Register), log in and Export analysis |
| Leonardi | 3 | Query data and Geographic visualization |
| Rzewuski | 1 | UML of the application |
| Zallemi | 2 | top bar buttons testing, log out and more info use cases |

Table 22: Effort spent with details

# References

 