Application's Requirements Analysis and Specification

Description

It is required to create a client-server application named Climate Monitoring: it will let its users search a city and analyze its climatic parameters ordered by climatic category. It will be used by monitoring centers around the world or even by schools for educational purposes; with this application, users can have the climate 's depiction from different point of views and be able to share data effectively. The targeted platforms will be Windows, Linux and MacOS

Areas

The application's database will already contain a set of areas from all countries (around 140,000 areas), to make the users' job easier as they do not need to input the areas by themselves. The functionality to add an area will still be present in the application, but presumably it will be used seldom. To add an area, it will be required to input in the following order:

- Name
- ASCII name (the ascii compatible version of the name)
- Country code (short version of the country name)
- Country name
- Latitude
- Longitude

Users

There will be two types of users: Common users and Operator users

All users will interact with the client side, and they will be able to perform these actions:

- Search a city by typing its name in a search bar and then press a button (or press enter) to confirm
- Select the city from the list that is presented after typing the city's name to view the climatic parameters and info about the selected city and the monitoring center that recorded the parameters
- Change settings such as the application's theme

Operators

Operators, in addition to the previous functionalities, will be able to:

- Log into the application by inputting their credentials (user ID and password)
- Register into the application for the first time. They will be asked to input in the following order:
    - Name
    - Surname
    - User ID (alphanumeric string)
    - E-mail (will be used to send the registration code to input later)
    - Password (at least 8 alphanumeric characters)
    - A monitoring center to be selected through a drop-down menu that has all the centers available in the database or create a new center by using the specified button

    Every field must not contain spaces (except for the name and surname)
- Create a new center after logging in by inputting the center information specified in the **Monitoring centers** section down below
- Edit their own account information
- Add a new geographic area where they can input the area information specified in the **Areas** section higher up
- Add a climatic parameter recording to an area from a monitoring center by inputting the parameter information specified in the **Climatic parameter** section down below

Monitoring centers

Monitoring centers will be able to:

- Be created by a logged operator by inputting in the following order:
    - Name
    - Street
    - House number
    - Postal code
    - City (one of the areas the database contains)
    - District
- Employ one or more operators
- Monitor one or more areas even if it is not the same city the center is in
- Record and store climatic parameters only for the cities they monitor

Climatic parameter

Climatic parameters will be recorded by operators and the information required to record them is:

- Geo-name ID (the area id that identifies to which city the parameter refers to)
- Center ID (the center name that identifies from which center the parameter was recorded)
- User ID (the operator id that identifies who recorded the parameter)
- Category (the category assigned to the parameter recording – see **Climatic category** for more information)
- Date (the recording date)
- Time (the recording time)
- Score (a number between 1 and 5. The lower the value, the worse the conditions of the category will be, while the higher it is the better they will be)
- Notes (the operator's notes on the recording. Max 256 characters)

Climatic category

The application's database will already contain a set of categories for the operators to use. The default categories are:

- Wind (Wind speed in km/h, divided into bands)
- Humidity (Humidity percentage, divided into bands)
- Pressure (In hPa, divided into bands)
- Temperature (In Celsius (C°), divided into bands)
- Rainfall (In mm of rainfall, divided into bands)
- Glaciers' altitude (In m, divided into bands)
- Glaciers' mass (In kg, divided into bands)

Graphical User Interface

At the start of the application, every user will be presented with a main screen that will contain:

- A search bar in the top center of the screen with a drop-down menu that will let the user select the search method (by city name, country name or coordinates)
- A button with a gear icon in the top left of the screen that opens the settings screen
- A button named "(login)" in the top right of the screen that opens the login screen. This is the case when a user is not logged in
- A button named "('username')" in the top right of the screen. This is the case when a user is already logged in, so the username is shown instead of the "(login)" button. It opens a drop-down menu where we can select the following:
  - "Edit profile": if pressed, changes view to Edit profile screen
  - "Add area": if pressed, changes view to Area creation screen
  - "Create new center": if pressed, changes view to Create center screen
  - "Logout": if pressed, the main view goes back to have the login button

Area information view:

This is presented when the user clicks on one of the returned areas by the search method. Area information will display:

- A string with this format "Area-Name, Area-Country-Code" in the top center of the view
- An area description (country name, coordinates)
- A drop-down menu to select the monitoring center
- A button to view the monitoring center information (the button should have an eye icon)
- A drop-down menu to select the parameters' category
- The category explanation
- The recordings count
- A table containing:
  - The date and time of the recording
  - The score
  - The operator's user id that recorded the parameter
  - The operator's notes

Monitoring center information view:

The monitoring center information view will display:

- A string with this format "Center-ID" in the top center of the view
- Five strings with appropriate labels that represent all the center fields described in the **Monitoring centers** section

Login view:

The login view will display:

- Two input text bars with appropriate labels to input all the necessary fields required by the login phase described in the **Operators** section
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct
- A button to create a new account in the bottom left of the view that will bring the user to the registration form explained down below
- A cancel button to exit the login view in the bottom center of the view
- A button to confirm the login
- In case of successful login, the main view

Registration view:

The registration view will display:

- Five input text bars with appropriate labels to input all the necessary fields required by the registration phase described in the **Operators** section
- A search bar to select the monitoring center
- A check mark to create a new monitoring center after the account creation. This is mutually exclusive with the previous option about centers
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct
- A button to cancel the registration phase that brings the user back to the login view
- A button to confirm the registration
- In case of successful registration, an input text bar to fill with a registration code that will be sent to the specified email address during registration phase
- In case of correct code, if the user selected an existing center, the main view, else the monitoring center creation screen. After this last one, it will be displayed the main view

Monitoring center creation view:

The monitoring center creation view will display:

- Five input text bars with appropriate labels to input all the necessary fields required by the creation phase described in the **Monitoring centers** section
- A search bar to select the center's location like the one used to search areas in the main view
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct
- A cancel button to exit the center creation
- A button to confirm the center creation

Area creation view:

The area creation view will display:

- Six input text bars with appropriate labels to input all the necessary fields required by the creation phase described in the **Area** section
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct
- A cancel button to exit the area creation
- A button to confirm the area creation

Edit profile view:

The edit profile view will be the same as the registration view, except that the fields will already be filled with the operator's information. There will also be displayed:

- A cancel button to exit the edit profile view
- A button to confirm the changes
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct

Settings view:

The settings view will display:

- A drop-down menu to choose the application's theme. The user will have to choose between classic, dark or light theme

Verification view:

The verification view will display:

- Some text to explain that the user should check if the verification code was sent to the specified email address during registration
- An input text bar to input the verification code
- A cancel button to exit the verification view
- A confirmation button to verify the code
- In case of any input error by the user, a string (red color) next to the input bar that contains the faulty data that points out why it is not correct

Parameter creation view:

In the **Area information view**, there will be a button to record a new parameter that leads to a view that will display:

- Five input text bars with appropriate labels to input all the necessary fields required by the creation phase described in the **Climatic parameter** section
- A cancel button to exit the parameter recording
- A confirmation button to record the parameter to the database

Where it is not explicitly specified, the style and formatting are up to the developers, but it must be coherent with the rest of the application

Development process

The development phases are the following:

- Database creation
- Design phase
- Coding phase
- Test phase