Database's Requirements Analysis and Specifications

Description

It is required to create a database for the application Climate Monitoring which will contain all the data related to areas, monitoring centers, registered operators, and climatic parameters with their categories.

Areas

The application's database will already contain a set of areas from all countries (about 140.000 areas), to make the users' job easier as they do not need to input the areas by themselves.

The database accepts areas structured as follows:

- `geoname_id`
- `area_name`
- `area_ascii_name`
- `country_code`
- `country_name`
- `latitude`
- `longitude`

The `geoname_id` field will be an identifier, which implies that every area will have a different Geoname ID, represented by an integer, to properly identify each area singularly.

Both the `area_name` and `area_ascii_name` fields will be alphanumeric strings with a maximum length of 100 characters.

The `country_code` field will instead accept two characters, which usually refers to the shortened country name.

The `country_name` field instead will be used to store the full name of the country with an alphanumeric string with a maximum length of 100 characters.

Both the `latitude` and `longitude` fields are stored as a decimal number, which will represent the area's position on the world map.

Each field described above must be added to register an area on the database properly. Failure to do so will result in the area not being added to the database.

Operators

Operators are users of the application whose information will be registered in the database as they have much more extensive access to the application (compared to regular users), being able to add areas, monitoring centers, and climatic parameters.

The database accepts operators as follows:

- `user_id`
- `ssid`
- `operator_surname`
- `operator_name`
- `email`
- `password`

The `user_id` field will be an identifier, which implies that every operator will have a different User ID, represented by an integer, to properly identify each operator singularly.

The `ssid` field, even though it is not an identifier, needs to be unique, as there cannot be two operators which share the same SSID number. It is stored as a 16-character string.

Both the `operator_surname` and the `operator_name` will be alphanumeric strings with a maximum length of 50 characters.

The `email` field needs to be a unique alphanumeric string with a maximum length of 100 characters, the uniqueness is needed to avoid two or more operators sharing the same email, which can lead to security issues.

The `password` field will be an alphanumeric string with a maximum length of 50 characters.

Each field described above must be added to register an operator on the database properly. Failure to do so will result in the operator not being added to the database.

Monitoring centers

A monitoring center is a structure used by operators to record climatic parameters. At the moment of creation, the area the center is located in must be on the list of areas monitored by said center.

The database accepts monitoring centers as follows:

- `center_id`
- `street`
- `house_number`
- `postal_code`
- `district`

The `center_id` field will be an identifier, which implies that every center will have a different Center ID, represented by an alphanumeric string with a maximum length of 100 characters, to properly identify each monitoring center.

The `street` and `house_number` fields, respectively represented by an alphanumeric string with a maximum length of 100 characters and an integer value. They both need to be unique, as there cannot be two monitoring centers in the same physical location.

The `postal_code` field is represented by an integer.

The `district` field will be an alphanumeric string with a maximum length of 100 characters. This is the only field that can be left blank.

Each field described above (except `district`) must be added to register a monitoring center on the database properly. Failure to do so will result in the monitoring center not being added to the database.

Climatic parameters

A climatic parameter is the information recorded by an operator of a center. Each climatic parameter can be submitted by one and only one operator.

The database accepts climatic parameters as follows:

- `date`
- `time`
- `score`
- `notes`

The `date` and `time` fields will be identifiers, which implies that every climatic parameter will have a different date and time of submission, respectively represented by an appropriate date and time structure.

The `score` field will be an integer number between 1 and 5.

The `notes` field will be an alphanumeric string with a maximum length of 256 characters.

Each field described above (except `notes`) must be added to register a climatic parameter properly in the database. Failure to do so will result in the climatic parameter not being added to the database.

Climatic category

The database will already contain a set of categories for the operators to use, but more custom categories can be created with the format shown below.

The database accepts climatic categories as follows:

- `category_id`
- `explanation`

The `category_id` field will be an identifier, which implies that every climatic category will have a different Category ID, represented by an alphanumeric string with a maximum length of 20 characters.

The `explanation` field will contain a brief description of the climatic parameter. This will be represented by an alphanumeric string with a maximum length of 256 characters.

Each field described above must be added to register a climatic category on the database properly. Failure to do so will result in the climatic category not being added to the database.