Project general description

The objective of the project is the design and implementation of a water management system for Fields/ crop irrigation.
There are two types of system users: users authorized to manage the crops of a specific company, users who manage water resources shared by companies.
Water managers can update information about the availability of water resources e to the global maximum daily supply limits and for each company; they can also consult the data relating to consumption (total or detailed by company).
Each company has one or more crops that need to be irrigated: the users authorized to manage the data of a given company can enter the information relating to the crops owned, which they will have to understand (at least) the size of the field (hectares), a parameter that indicates whether the type of cultivation has more or less large needs of water (they could be for example 3 levels: 1, 2, 3 to indicate little, medium, a lot), a parameter that indicates the type of irrigation (traditional or drip drip) and finally a parameter that indicates the ideal degree of humidity to maintain.
Based on these parameters and on humidity and temperature measurements, obtained periodically from sensors on the field, the quantity of water to be dispensed on each field can be established each day.
Depending on the number and the extension of his crops, the company manager will have to set the quantity requests daily amount of water to be used for irrigation.
This amount can be changed periodically: in case of update, the new quantity can be accepted or rejected by the management system water resources.
Distinguish the foreseen types of users: managers of the water service (GSI), managers of the single company (GA).
User authentication must be done via OAuth2 with google.
Provide, during the system setup phase, at least one user with the "GSI" role, automatically enabled to the system.
The request for membership of the service by a company takes place through the compilation of a special registration form that requires the company name and email address (user OAuth2 name). Membership requests can be evaluated by any user with role "GSI" who can then decide whether to accept or not. In case of acceptance, the user, indicated in the form, will be able to authenticate and become the manager of the related company.
Protect REST APIs with JWT tokens that can be generated from a special page, after authentication. of the user who must possess the "GSI" role.

Page description

COMPANY-DASHBOARD

- **Home:** all the fields of the company are displayed with their characteristics exactly as shown in the example table.
  Also, under the table you must insert a weather widget that shows the weather forecast based on the position it detects based on the IP or GPS etc...
- **Historical Water**: a table containing water management is shown for each field of the company, exactly as shown in the photo; from the database the table "water" and the balance makes the difference between booked and used.
- **Historical Measurement:** the sensors and actuators for each field are shown
- **Add Sensor**: a new sensor is inserted and the user can choose from a drop-down menu which field to insert it in (among those selected in the database), then the user can choose the type (humidity or temperature) and finally, when he clicks on the add button, it is inserted in the database.
  if one of the two fields is not selected, an error message is shown.

- **Add Actuators**: a new actuator is inserted and the user can choose via a drop-down menu in which field to insert it (among those chosen in the database), then the user can choose the type of actuator (humidity or temperature) and finally, when he clicks on the add button, the entered into the database. if one of the two fields is not selected, an error message is displayed.
- **Add Crops**: a new crop is entered, the user must complete all fields otherwise an error message is displayed. for the crop size it is necessary to enter a number, for the "need of water" field you can choose between low, medium, high; for the "type of irrigation" field you can choose between traditional or drip and finally the ideal humidity is a number between 0 and 100.
- **Water Management**: through this form the total availability of water for that particular company is changed the user must enter a value (otherwise an error will be displayed) and once clicked on "modify" the request is displayed on the "water dashboard" page which will be described later.

WATER-DASHBOARD

- **Home:** all the companies present in the database are displayed with their total water availability and the name of the company manager (GA) exactly as shown in the photo.
  The space below the table displays the total water change requests previously made by the GA user in the company dashboard -> water management.
- **Company Management**: this section displays the registration requests that are made through the signup page and the GSI user can decide whether to accept it (and therefore enter the company in the database) or reject it and not enter it.

SIGNUP

on the registration page all the fields must be present otherwise an error is displayed and only GA users who will then manage the company can be registered
GSI users for water management will only be 1 pre-registered.

LOGIN

on the login page, the user is logged in via OAuth2 with goggle and the user is directed to the "company dashboard" page if he is a GA user or to the "water dashboard" page if he is a single GSI user

Delivery instructions

• The application must be implemented in C# using ASP.NET Core with MVC architecture and must be structured according to the architectural indications seen during the course.
• The code must be well written and accompanied by appropriate comments on any row.
• The customer must be able to run the application independently.
• The code must be free from bugs
• As for the graphical interface, you are free to choose any library/framework to use (preferably bootstrap) and its architecture (server-side rendering, single page app, a mix, ...)
• Delivery consists of:
    - Application source code.
    - Written report containing
        o Clear instructions to do the initial setup of the solution and then allows the customer to try it
        o Illustrate the implementation choices and any significant notes.