Green House Manager

Cover Page

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**Team Roles**

**A person wearing glasses

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**HIMANSH ARORA**

**(Database)**

**Hardware**

Raspberry pi model zero

Soil moisture sensors

Jumper cables

Insulation tape

Large LED light

DHT11  - humidity sensor

Temperature sensor

Power Bank

**Data**

**Data collected by the device** :

Device identification (device ID, Raspberry Pi model and version of   
software)

Time log of when sensor data was registered

temperature value in Celsius, humidity percentage from DHT11 sensor, soil moisture

percentage value

**Third party APIs**

Device will receive weather data in JSON format  -

Local temperature in Celsius (int)

Local humidity as percentage (int) sourced from the weatherapi.com.

**Data Storage and Processing**

Sensor data will be stored in a database. The database will be a MySQL database.

Data Storage

Why Store Data?

Today's businesses rely heavily on data. As a company grows, so does the amount of data it collects. And given the importance of data in today's business world, having a proper data storage system is a must-have for any company. This does not, however, imply establishing an old-fashioned paper-based data storage system. The current era is the digital era, which necessitates the implementation of appropriate digital data storage systems for improved operations, accessibility, and data security.

A Database is a perfect means to store and access any data electronically.

Why Database?

* Databases are capable of storing a vast amount of records in an effective manner, they take very less space.
* It's simple to add new data and amend or delete existing data in a database.
* It is extremely easy and quick to locate information.
* Data can simply be sorted and grouped, for example, into alphabetical order, numerical order, group by date, etc.
* Databases have multi-access which means they can be accessed by multiple people at the same time.
* The scope of accessibility can also be controlled by applying different security levels.
* The security of electronic data storage is obviously superior to that of paper storage.

For this project, a Relational Database will be used.

Why Relational Database?

* The data can be simply organized into categories.
* The data is well-organized, has a clear meaning, and is really simple to navigate.
* Relational Databases have a broad eco-system and built-in data integrity.
* Specific users can have direct access to data in tables within an RDBMS.
* SQL, the major query language used with relational databases, makes it simple for users to run complex queries.

A MySQL Database, which is a really simple to operate Relational Database, will be used for this project.

Database Scenario

A user will have one and only one login, however a login system will have many users (1:M). One plant can be planted by many users and a user may have multiple plants(M:N), hence the junction table ‘user\_plant’. A user will have one raspberry pi and vice-versa(1:1). If one user has multiple plants then their raspberry pi can be used to display conditions of more than one plant(1:M).

Entity-Relationship Diagram

Diagram

Description automatically generated

Sample Data

**user**: Primary Key = ‘user\_id’ and Foreign Key = ‘raspi\_id’

**plants**: Primary Key = ‘plant\_name’ and no Foreign Key

**user\_plant**: Primary Key = ‘plant\_id’ and Foreign Key = ‘user\_id’, ’plant\_name’

**raspberry\_id**: Primary Key = ‘raspi\_id’ and Foreign Key = ‘plant\_id’

**login**:  no Primary Key and Foreign Key = ‘user\_id’

Table

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Database Schema

Table

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Sample Queries

Following are some of the queries that can be used to access or alter data from the database:

* Display the user ID of a user using their registered username

= select user\_id from login where username = “peter123”;

* Display the plants by their plant ID owned by a particular user

= select plant\_id from user join user\_plant using (user\_id) where name = “Bryan”;

* Get the name of the user who live in either Dundalk or Drogheda and own either tomatoes or cucumbers

= select name from user join user\_plant using (user\_id) where (location like "%Dundalk%" OR location like "%Drogheda%") and (plant\_name = "tomato" OR plant\_name = "cucumber");

* User Mike has moved their house from Galway to Dublin

= update user set location = ”Dublin” where name = “Mike”;

**SECURITY**

Database Security

- Information will be encrypted

- Permissions to write and read will be assigned to users who access the database

- Strong passwords will be used

When transferring data, secure protocols HTTPS and SFTP will be used

Data will be encrypted with SHA256 encryption

**User Interface**

**User Personas**

**Graphical user interface, website

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**Testing**