Homework 2: Group 1 Project

Plant Care Web App: PlantPal

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Introduction:

Question 1: What are we building?

- ➢ **PlantPal**
  - A web app that provides an easily accessible and convenient resource for houseplant owners that delivers multiple features (e.g. 'my plants') and capabilities (e.g. scheduling and plant recommendations) that can be personalised via user input.
  - Personalisation will allow the user to customise the app and tailor it to their own plant collection - helping the user take care of their plants using the unique requirements specific to the plant type.
  - **Technologies**: Backend (Python), Frontend(React, Typescript), Database (SQL), Project Management (JIRA) and APIs {Perenual, Weather}.

Project Motivation:

Question 2: What does PlantPal do?

PlantPal, as mentioned earlier, is a personalised houseplant care web app which allows houseplant owners to easily manage their houseplants. Through user input (i.e. user answering a chain of follow-up questions generated by the program), the app would store the user's input data, and as a result, generates a personalised 3-in-1 monthly schedule for each houseplant as well as provide relevant advice, resources and recommendations.

The app is houseplants (indoor plants) specific as including all plants would mean including crops or outdoor plants. Most people that grow crops (i.e. farmers or people with a house garden) would usually plant crops in large batches, outdoors and would likely benefit more from industry and farming expertise or experience.

Though, it is also important to note that there is an increasing interest in people growing their own fruits or vegetables as houseplants, such as tomatoes/ avocados/ potatoes bought from supermarkets, for example. This is because, when grown indoors, these plants tend to grow much slower and have a lower chance of bearing fruit. For this, the group's app will also include the top 5 common fruits/vegetables grown as houseplants, such as the examples mentioned earlier.

Why make a plant care program?

The initial motivation behind PlantPal includes several team members' own struggles with their own house plants. The range of houseplants across each team member varies from 0 to 30 houseplants. Studies and research were also done to further support and justify the group's project idea.

For example, a study was conducted by launching a survey to 2000 millennials (between the ages of 25 to 39) [1]. The aim of the study was to understand better the relationship and experience between the general public and houseplants [1].

The **results and statistics** from this study showed that: (**Points 1 to 6**: [1])

1. **7 in 10** millennials call themselves plant parents.
2. **81%** agreed that plants have positively affected their mental and physical health.
3. **40%** of millennials plan to buy more houseplants this year.
4. **48%** are not as confident in keeping their plants alive.
5. **47%** don't own plants as they don't know how to take care of them.
6. **67%** called themselves plant murderers.

Other statistics include:

a.   There is a growing interest in houseplant apps and accessories [2].
b.   House plants are the fastest-growing part of the UK plant market [3].
c.   A person in the UK spends over **£300** (on average) over a year on houseplants (with **Gen Z** spending a total of **£414.84** annually) [3].

From these statistics, It is clear that millennials and GenZ plant owners felt that having plants had an overall positive effect on their mental and physical health [1]. Thus, some of them would be inclined to buy more houseplants but would also love to learn more about growing houseplants, as opposed to killing them [1][2][3]. So, a houseplant care web app, such as PlantPal could greatly benefit houseplants owners (especially since there is a growing demand for houseplant apps right now [2]). A personalised web app like PlantPal could allow

houseplant owners to feel less anxious and encourage non-houseplant owners to start growing some.

Other than that, a study also highlighted the various challenges millennials had while growing houseplants: (**all points below: [1]**)

- 50% – The amount of sunlight needed for each houseplant.
- 46% – The amount of water needed for each houseplant.
- 43% – Whether the houseplant is an indoor or outdoor one.
- 48% – Keeping their houseplants alive.

Above that, another study in the UK showed that factors, such as overwatering, insufficient sunlight, incorrect potting/repotting, etc, are the few main reasons that people kill their plants [**3**].

These statistics, again, show the need for a simple, user-friendly, and personalised web app like PlantPal which could better help plant owners understand and grow their houseplants.

Current Program Specifications:

The user prompt is as follows:

1) After the user has signed up and verified their account, the program would start by asking about the type of houseplants the user currently owns. For this, the user would have the option of typing in the name of their houseplant (i.e. Monstera Deliciosa) or have the option to upload a picture of their plant. If the latter, the AI plant identification would determine the type of plant and store it as an input. After this step, a catalogue page showing all the user's current plants would be generated as well as their details (meaning the user can tap into plant 1 [for example] and a new page would open up, showing details of that particular plant).

2) The program will then ask chains of follow-up questions on various topics.It'll start by asking some personalised questions and these include: "How often are you free to water your plants?"; "What country and state are you currently living in?"; "Do you currently own any growth lights?", etc...

3) After the previous step, the website would prompt the user to press into each plant in the catalogue and ask more plant related questions, such as: "What is your current watering schedule for this plant?"; "When is the last time you've watered this plant?"; "How often do you fertilise this plant?"; "When's the last time you've fertilised this plant?"; "Are there currently any problems with the plant (i.e. leaves are yellow/ brown)?". Thus, for each plant, the program would ask these types of questions to better understand the user and how to make the best schedule for them.

4) Once the program has obtained and stored all the necessary user information, it would automatically input relevant information (i.e. the type of soil/ amount of sunlight/ watering information, disease/ pests to look out for, etc... used for each plant). This is so that the user can easily access any relevant information about a particular plant when needed. Using the user information, the program will also generate a personalised 3-in-1 watering, fertilising and recovering monthly schedule (in calendar format). It will also generate a short initial general advice message (i.e. "This plant seems to be overwatered at the moment, your watering schedule would need to be changed and please note that a 'chunkier' type of soil is needed for this type of plant."). The schedule will show and remind the user of when to do what and this varies depending on the user's commitment level and the region in which the user's in. The region is a factor to consider as different regions have different seasons and weather conditions (i.e. plants don't need to be watered/ fertilised as often during winter).

5) There will also be an option for the user to manually input any plant updates (i.e. when a user has bought a new plant).

6) The website will also include a plant helper blog section containing other useful houseplant tips and resources. Tips could include blog posts or video tutorials (i.e. showing users on knowing when a plant needs to be repotted and a repot tutorial). Useful resources could include blog posts on "The top 10 most common pests and how to get rid of them" / "Why do different plants need different soil? Can I make my own soil?" / "How to make a DIY terrarium using a Tesco spice container.".

Question 3: PlantPal's Key Features

Feature(s)	Details
AI Plant Identification	Incorporating relevant plant API with AI to help identify the type of plant when users upload an image of their plant.
My Plants	A catalogue page showing all the user's existing plants. Users would also be able to tap into each plant and enter a new page, which shows specific information about that particular plant (i.e. type of plant [basic biological info of the plant], the type of soil it needs, how often it should be watered and fertilised, the amount of sunlight needed for this plant as well as diseases/ pests to look out for). Some of this information would vary depending on where the user is currently based and the current weather season (i.e. a Monstera growing in the UK cannot be watered as often as a Monstera growing in Thailand).
My Plant Calendar	A 3-in-1 watering, fertilising and recovery monthly schedule is generated after the user has inputted all the necessary data. The calendar would allow the user to know how many days it has been since the plant had last been tended to and give a recommendation for the next watering/fertilisation date (as well as plant recovery methods if need be).
Plant Suggestions	Allow the user to search for plants (using the Perenual API) to find recommendations for plants that might fit their requirements (e.g. little

	sunlight, air purifying etc), preferences (e.g. palms, orchids) and lifestyle (e.g. low maintenance).
Plant Helper	It is a section in PlantPal which would consist of helpful blog posts/ video tutorials (i.e. video tutorial on how to repot correctly).

Design & Architecture:

Question 4: Sample Architecture Diagram of PlantPal:
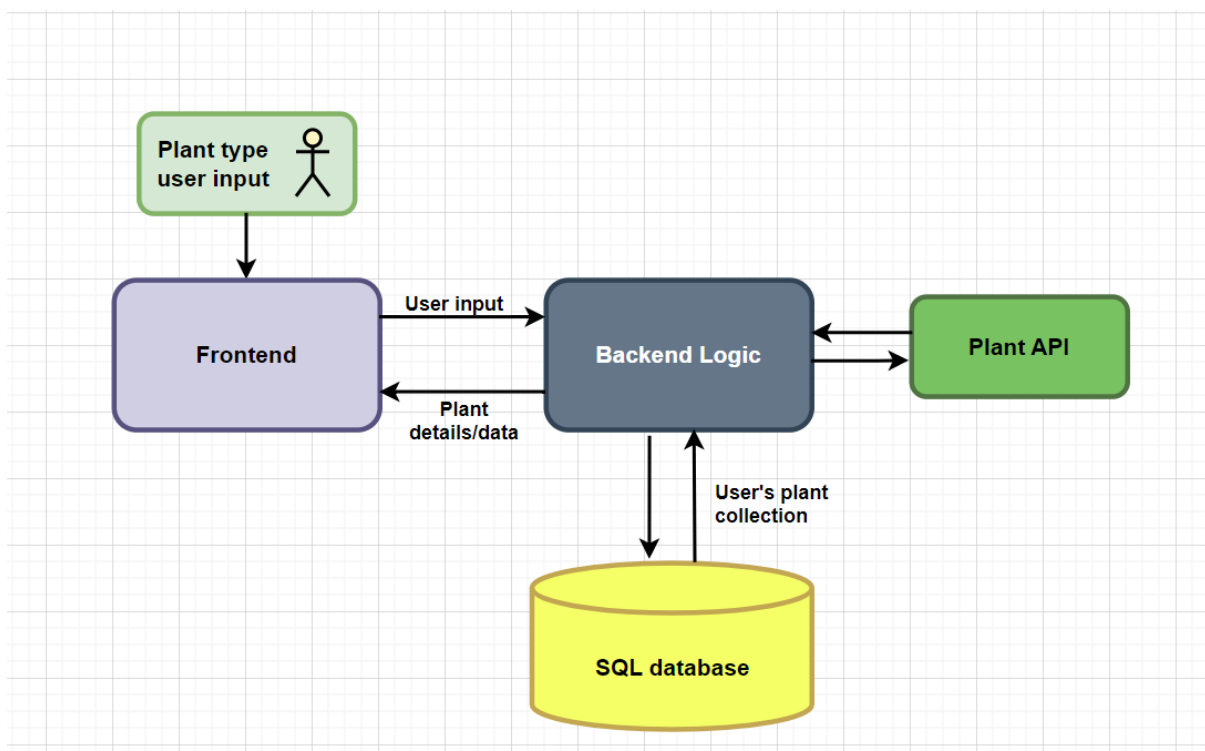
Question 5: Team Approach to project work:

Workload Distribution:

1. **Everyone** - Back-End Development: Focuses on setting up the server, database, and integrating APIs. Primarily work with Flask, API and SQL.

2. **Rinsola & Emina** - Front-End Development: Works on the user interface of the app using React and Typescript, ensuring it is user-friendly and intuitive.
3. **Emina, Jia Chi, Rinsola, Rebecca** - Testing and Quality Assurance: Focuses on testing the application, including conducting unit tests during the development stage and functional testing at the end of the stage.

*For reference, the Back end would be prioritised and only if time permits, will the front end be developed.

Code Management:

1. Using Git for version control.
2. GitHub for code hosting
   - Master Branch: The main branch is where the deployable source code resides. Only fully tested and approved code can be merged into this branch.
   - Development Branch: All members would have their own development branch whereby pull requests are used to help merge it into the main branch.
   - Pull Requests (PRs): When a feature is ready to be merged into the main branch, the member would create a PR. If possible, one other team member will help review, comment and approve the code in the PR before it's merged.
3. There'll be public URL deployment at the end of the project (not considering CI/CD).

Testing and Evaluation:

Testing Strategy:

1. **Unit Testing**: Each function or method or feature should have relevant and corresponding unit tests to verify that it works as expected. Python's built-in unit test module can be used for this purpose.
2. **URL Testing/Integration Testing**: Since the front-end and back-end are separated, the back-end developer will be responsible for testing their URLs. Postman will be used for this purpose.
3. **Error Logging**: If there is enough time, comprehensive error logging would be implemented to help facilitate debugging.
4. **Functional Testing**: Manually test each function from the front end and release a version to enable user testing. This way, we can get the necessary feedback and change the code accordingly.

References:

[1]

Fritz, K. (2020) 'SURVEY: DECORATING WITH HOUSEPLANTS', *Articulate.* 8 April. Available at: https://www.article.com/blog/survey-decorating-with-houseplants/ (Accessed: 12 May 2023).

[2]

'The Most Surprising Houseplant Industry Statistics And Trends in 2023' (2023) *GITNUX*, 13 April. Available at: https://blog.gitnux.com/houseplant-industry-statistics/ (Accessed: 12 May 2023).

[3]

Harris, C. (2022) *25 latest Houseplant Statistics & Facts (2023 UK), DIY Garden.* Edited by S. Franks. Available at: https://diygarden.co.uk/statistics/houseplant-statistics (Accessed: 12 May 2023).

[4]

'Best Free Plant Care App in 2023' (2023) *GITNUX*, 13 March. Available at: https://blog.gitnux.com/best-free-plant-care-app/ (Accessed: 12 May 2023).