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Faculty of Engineering, Built Environment and Information Technology

COS 214 Project
Sad & Tired

Jordan Reddy, u24597181
Chloe Kruger, u24569624
Anika Coetzer u24808840
Anica Ferreira, u24581802
Daniel Stevens, u18135600

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Research

Nursery objective

Nurseries are specialized spaces where plants are grown in their early developmental stages. The plants are cared for and grown from germination through to an appropriate size in order to be sent to their ultimate location. Within the nursery seeds are sown, cared for and maintained as seedlings with adapted indoor conditions ideal for their growth. (Murgiplast, 2025)

Different types of nurseries

Many types of nurseries exist for different kinds of needs: Forestry, Conservation Biology, Agriculture, Medicinal, Culinary, Ornamental, Retail etc. (Agriculture Institute, 2024) For this assignment we chose to focus on a retail Nursery/ Garden centre with the aim of selling plants for the domestic environment rather than a larger scale agricultural/forestry environment. These types of nurseries are very prevalent throughout SA; there are a myriad them throughout Pretoria alone.

All nurseries require quality staff, storage space, care facilities for the plant varieties and in the instance of the Retail a checkout area and even more to offer than just plants (Windy Willows, 2025).

Assumptions

Site selection, seed selection and the finer points of construction can be ignored. Modelling of in-depth systems will be simplified (e.g., not worry about where the water is coming from) and external weather will be ignored.

Final System

For our specific nursery we chose the retail nursery, and we prioritised the system of selling the plants rather than solely focusing on plant rearing. From researching how Retail nurseries operate, our system deals with rearing the seeds, inventory management, packaging and decoration and ultimately selling the plants to customers.

The growing of the plants was simplified and only three types (succulents, flowers and trees) were chosen to be grown. Our system also models some inventory management of the plants. Finally, the plants are packed and sold to consumers like a gift, with options on how to make up the gift with pots, bows and other decorations.

The final system was decided upon so that a simulation of the growth and buying process could be made but simplified heavily, however within the design we have left ways for it to scale and complexity to be added.

Requirements

Functional

Plant

Needs to have a means of creating different types of plants, a way to take care of plants with different needs and a way to see the current stages of the plant.

Inventory & Stock

A place to store plants and see to it that they grow, becoming ready for sale and allow staff members to interact with them to see to their adequate care.

Staff & Tasks

Staff will need to have tasks and allow them to interact with plants, customers and additional systems in order to allow proper plant care and see that

Customer & Sales

Customers will need to be able to view, select, customise and purchase plants from the nursery. The nursery will need ways to process these orders made by the customers.

Non-Functional

Scalability

The system is designed to be easily maintainable and easily extendable, allowing new plant types, staff roles, customer actions and payment methods to be added with minimal changes to existing classes and code. This will be achieved by using interface and design patterns like strategy and decorator.

Reliability

The system will ensure data consistency, particularly for inventory management. Critical operations like sales transactions will be updated correctly and customers cannot purchase unavailable stock.

Modularity

The codebase shall be organized into discrete modules (plant management, staff system, sales) with clear interfaces, allowing teams to work on separate modules simultaneously.

Design Pattern application

Design Pattern	Application
Factory Method	Responsible for the creation of plant objects. Factory method chosen as it is easy to expand more base types of plants made, and these objects will be modified and customized later in their life cycle rather than at creation.
Strategy	Responsible for providing methods to care for the plants. For now it is just watering-strategy (depending on how "thirsty" the plants are) but can be expanded later to a full "care-strategy"
State	Responsible for showing the growth states and stages of the plant.
Façade	Creates a higher level interface with which the front end can integrate with the backend.
Observer	Notifies the staff members of the different states of the plants, alerting the staff members of the current requirements of the plants.
Decorator	Create additional addons to product, modifying the product. Such as adding a choice of pot, of bow etc
Composite	Responsible for the bundling of the final products: plants with all their additional addons made by the decorator, for special deals.
Builder	Makes the actual final product.
Command	Used for the actions partaken by customers and staff.
Mediator	Allows customers to communicate with staff. Sending them their request and then staff members can then handle the requested tasks and communicate back to the customers.
Template Method	Used within staff to differentiate between different staff responsibilities

Other resources

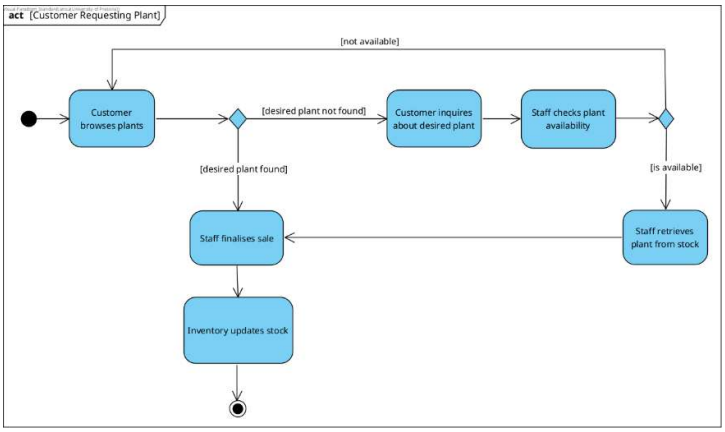


Figure 1 Activity Diagram

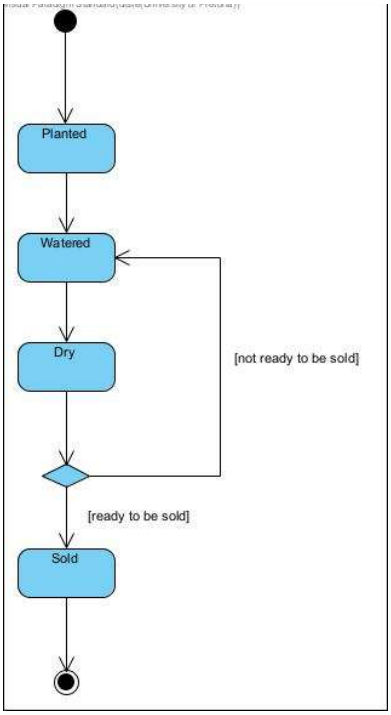


Figure 2 State Diagram

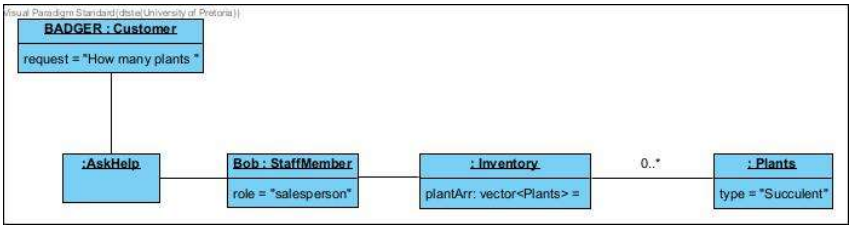


Figure 3 Object Diagram

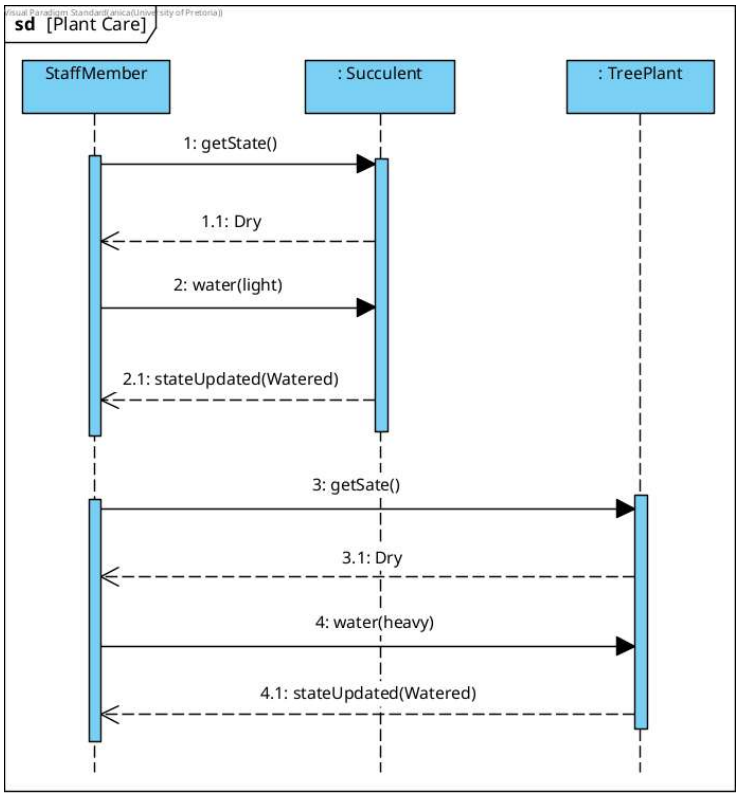


Figure 4 Sequence Diagram

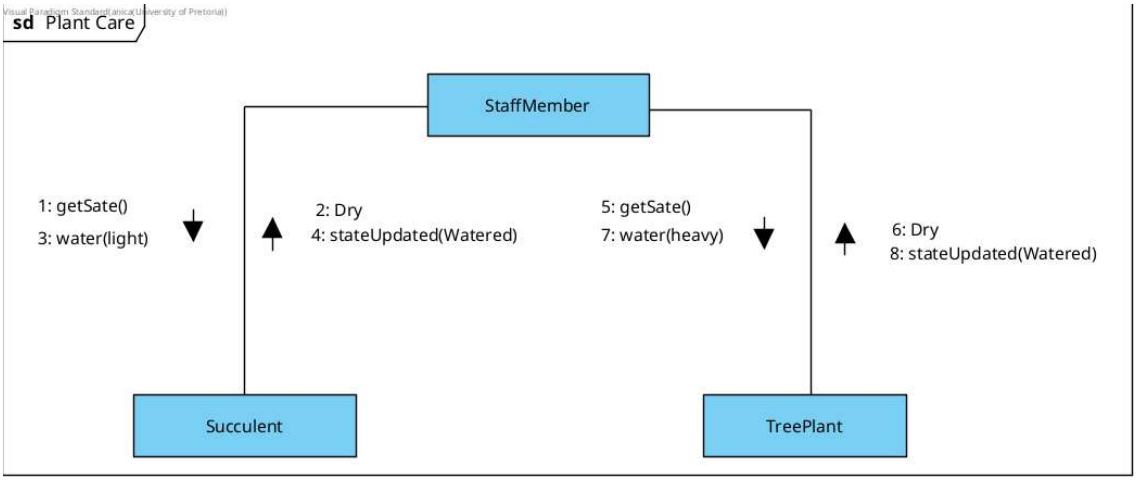
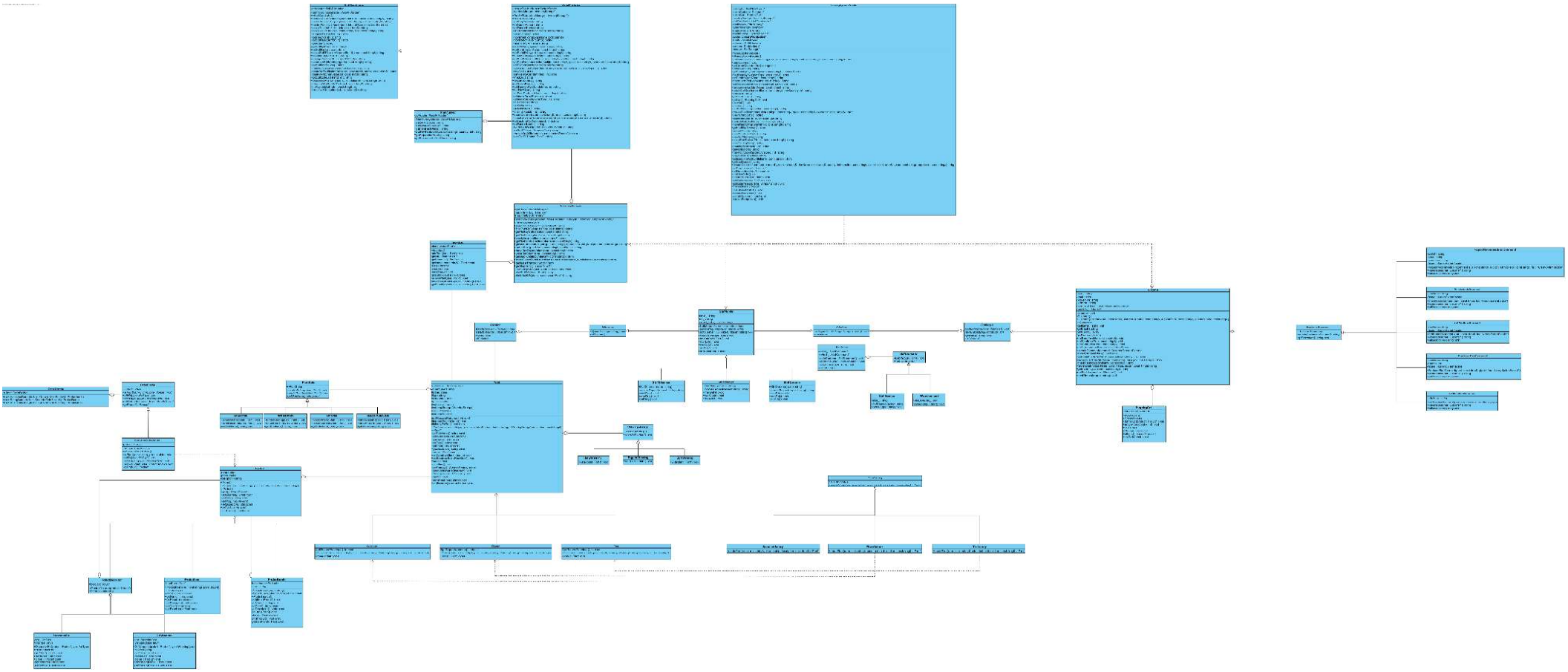


Figure 5 Communication Diagram



Google Docs Link:

https://docs.google.com/document/d/1HPxxu9CmK-XGPmpwNCYz1Xmc9GYl1Dt6AcmN4H4ljvs/edit?usp=sharing

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