Functional Requirements Specification

Plant Palace Management System

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Introduction

This document outlines the functional requirements for the Plant Nursery Management System. The system manages plants, staff, inventory, and orders using multiple design patterns to ensure scalability and maintainability.

Functional Requirements

Prototype Pattern

FR1 The system shall allow cloning of existing plant prototypes to create new plant instances efficiently.

FR2 The system shall store reusable prototypes for each plant type (e.g., flower, shrub, tree).

Factory Method Pattern

FR3 The system shall provide a factory class to instantiate plants from prototypes without exposing creation details.

FR4 The system shall allow extension by adding new plant categories without modifying existing code.

Strategy Pattern

FR5 The system shall apply different watering strategies (e.g., daily, weekly, seasonal) to plants depending on their type.

FR6 The system shall apply different fertilizing strategies (e.g., organic, chemical, slow-release) depending on the plant's needs.

FR7 The system shall allow staff to dynamically change a plant's care strategy at runtime.

Adapter Pattern

FR8 The system shall read plant inventory data from text files using an adapter interface.

FR9 The system shall support multiple file formats (e.g., TXT, CSV) by plugging in different concrete file readers.

Composite Pattern

FR10 The system shall group plants into greenhouse beds, and greenhouse beds into larger greenhouse units.

FR11 The system shall allow staff to perform care actions on individual plants or entire greenhouse structures uniformly.

Observer Pattern

FR12 The system shall notify subscribed staff members whenever a plant requires attention (e.g., watering, fertilizing).

FR13 The system shall allow multiple staff members to subscribe to the same plant or greenhouse unit.

Iterator Pattern

FR14 The system shall provide an iterator to traverse the inventory collection of plants.

FR15 The system shall allow staff to sequentially access all plants without exposing the underlying data structure.

Mediator Pattern

FR16 The system shall provide a mediator to coordinate communication between staff members.

FR17 The system shall allow staff members to send and receive care instructions without direct references to each other.

Command Pattern

FR18 The system shall encapsulate care tasks (watering, fertilizing) into command objects.

FR19 The system shall allow staff to queue and execute commands on plants.

FR20 The system shall support the extension of new commands without altering existing staff logic.

Chain of Responsibility Pattern

FR21 The system shall process plant care requests by passing them through a chain of handlers (e.g., watering handler, fertilizing handler).

FR22 The system shall allow each handler to either process a request or pass it to the next handler in the chain.