

**OBJECT ORIENTED PROGRAMMING**

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| INSTRUCTOR | MS. Bushra Mehmood |
| COURSE CODE | CMC 112 |
| SEMESTER | 2nd |
| CREDIT HOURS | 3 (Theory) + 1 (Lab) |
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| **Group Members / Student Name** | **Registration Number** | **Project Title** |
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**Project Proposal: Digital Farm Management System (DFMS)**

**1. Project Title**

**Digital Farm Management System (DFMS)**

**2. Project Overview**

The **Digital Farm Management System (DFMS)** is a console-based simulation designed to assist in managing a virtual farm's core operations. The system provides functionalities to manage animals, simulate daily activities, track production (milk and eggs), and monitor animal health. It aims to serve as an educational and prototype tool for understanding basic principles of farm resource management using object-oriented programming in C++.

**3. Objectives**

* To simulate basic farm operations such as feeding animals, health tracking, and product
* generation (milk, eggs).
* To apply object-oriented programming principles including inheritance, encapsulation, and polymorphism.
* To develop a simple and user-friendly CLI (Command-Line Interface) for user interaction.
* To create a scalable foundation for future additions like crop and worker management.

**4. Scope of the Project**

**Functionalities Implemented:**

* **Animal Management:**
  + Add cows and chickens.
  + Feed animals and track their health.
  + Simulate day-to-day changes (e.g., health deterioration if not fed).
  + Produce milk (from cows) and eggs (from chickens).
  + Check the total production stock (milk and eggs).
* **Animal Health Monitoring:**
  + Display health levels and provide warnings for low health.
  + Adjust health based on feeding status each day.
* **Production Simulation:**
  + Randomized milk and egg production depending on animal health and feeding status.

**Planned (Future Scope):**

* **Crop Management:**
  + Plant and harvest crops like wheat and corn.
  + Track growth stages and yield.
* **Worker Management:**
  + Assign workers to feed animals or tend crops.
  + Automate tasks based on worker roles.
* **Data Persistence:**
  + Save and load farm data from files.
* **GUI Upgrade:**
  + Migrate from CLI to a graphical interface for better user experience.

**5. Technologies Used**

* **Programming Language:** C++
* **Standard Libraries:** iostream, cstdlib, ctime
* **OOP Concepts Applied:** Inheritance, Polymorphism, Encapsulation

**6. System Design Overview**

**Class Hierarchy:**

* **Animal (Base Class):**
  + Derived Classes: Cow, Chicken
  + Common attributes: name, health, fedToday
  + Common methods: feed(), newDay(), checkHealth(), produce()
* **Crop (Base Class):**
  + Derived Classes: Wheat, Corn
* **Worker (Base Class):**
  + Derived Classes: AnimalCaretaker, FieldWorker

**7. Benefits**

* Enhances understanding of object-oriented design.
* Models real-world farming behavior in a controlled virtual environment.
* Provides foundation for educational and simulation-based farm management applications.

**8. Limitations**

* No persistent storage; all data is lost after the session ends.
* Basic CLI interface; lacks GUI for user-friendly interaction.
* Limited scope of animals and crops.

**9. Timeline (Sample)**

| **Phase** | **Duration** | **Task** |
| --- | --- | --- |
| Phase 1 | Week 1 | Requirement analysis and class design |
| Phase 2 | Week 2 | Implementation of Animal management system |
| Phase 3 | Week 3 | Implementation of Crop and Worker skeleton |
| Phase 4 | Week 4 | Testing, bug fixes, and final improvements |

**10. Conclusion**

The Digital Farm Management System provides a well-structured, object-oriented solution to simulate basic farm operations. While currently focused on animals, it is extensible and designed for future development into a more comprehensive farm simulation, making it a solid base for learning and expanding OOP concepts in a real-world scenario.