National University of Computer & Emerging Sciences
Karachi Campus

COEXISTENCE

A Study of Prey and Predator Populations in a Virtual Ecosystem

Project Proposal
Object-Oriented Programming
Section: D

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Project Proposal

- **Introduction**

The goal of this project is to create a simulated ecosystem that mimics the behavior of a real-life ecosystem, specifically one containing rabbits and their predators. The simulation will be developed using C++ and the Simple and Fast Multimedia Library (SFML). The simulation will allow users to observe the behavior of the rabbits and predators over time, and will demonstrate the impact of various factors on the ecosystem, such as habitat destruction, and the introduction of invasive species.

- **Existing System**

There are several ecosystem simulation games and programs available, but most of them are either too simplistic or too complex for the average user. Our simulation will fill the gap between these two extremes, providing a realistic and engaging experience for the user while still being accessible and easy to understand, while also perfectly demonstrating all the OOP concepts that we have studies in our course.

- **Problem Statement**

The main problem that our simulation aims to address is the lack of a realistic and engaging ecosystem simulation that accurately represents the behavior of rabbits and their predators. Our simulation will also aim to educate users about the importance of preserving natural habitats and maintaining a balance within ecosystems.

- **Proposed Solution**

Our proposed solution is to develop a simulation that allows users to observe and interact with a virtual ecosystem containing rabbits and their predators. The simulation will be developed using C++ and SFML. Users will be able to control various factors such as the thirst and hunger level, speed which the prey can run away from the predator, and the initial population levels for both predator and the prey, giving a nice view on how different factors give different intriguing results.

- **Salient Features**

    - Generation of different terrains with water bodies and grass plains.
    - Introduce invasive species and observe their impact
    - Realistic behavior of rabbits and predators, including hunting, breeding, and migration
    - Educational value, teaching users about the importance of preserving natural habitats and maintaining a balance within ecosystems

- Realistic graphics and animations of rabbits and predators (Optional, the team’s initial focus will be on the functionality of the simulation)

- **Tools & Technologies**
  - C++ programming language
  - SFML library for graphics and animation
  - Microsoft Visual Studio for coding and debugging
  - Windows operating system