Comprehensive Report for Task 4: Fishery Management System

General Introduction: The Fishery Management System is a Java-based application designed to manage and track fish inventory in a fishery. This system implements the LegalEntity interface, allowing it to represent a legal business entity with associated address and VAT number information. The primary goals of this system are to:

1. Maintain a list of fish in the fishery

2. Add and remove fish from the inventory

3. Display the current fish inventory

4. Save and load the fish inventory to/from a file

5. Represent the fishery as a legal entity with appropriate identification

The system consists of three main classes: Fishery, Fish, and FisheryTest. Each class plays a specific role in achieving the overall functionality of the Fishery Management System.

Class Descriptions:

1. LegalEntity Interface: Functionality: Defines the contract for classes that represent legal business entities. Goal: To ensure that implementing classes provide methods for retrieving address and VAT number information.

Methods:

- getAddress(): Returns the address of the legal entity.

- getVatNumber(): Returns the VAT number of the legal entity.

2. Fishery Class: Functionality: Represents a fishery as a legal entity and manages a list of fish. Goal: To provide methods for adding, removing, and displaying fish, as well as saving and loading the fish inventory to/from a file.

Key Methods:

- addFish(Fish f): Adds a fish to the inventory.

- removeFish(Fish f): Removes a fish from the inventory.

- displayFishes(): Displays all fish in the inventory.

- saveFishesToFile(String filename): Saves the fish inventory to a file.

- loadFishesFromFile(String filename): Loads the fish inventory from a file.

- getAddress() and getVatNumber(): Implement the LegalEntity interface.

3. Fish Class: Functionality: Represents an individual fish with species and weight information. Goal: To encapsulate fish data and provide a string representation of a fish.

Key Methods:

- getSpecies(): Returns the species of the fish.

- getWeight(): Returns the weight of the fish.

- toString(): Provides a string representation of the fish.

4. FisheryTest Class: Functionality: Tests the functionality of the Fishery and Fish classes. Goal: To demonstrate and verify the correct operation of the Fishery Management System.

Key Methods:

- main(String[] args): The entry point for running tests.

- testFisheryCreation(): Tests the creation of a Fishery object.

- testAddingFish(): Tests adding fish to the fishery.

- testRemovingFish(): Tests removing fish from the fishery.

- testDuplicateFish(): Tests handling of duplicate fish entries.

- testFileSaveAndLoad(): Tests saving and loading the fish inventory to/from a file.

- testLegalEntityMethods(): Tests the implementation of LegalEntity interface methods.

The Fishery Management System demonstrates object-oriented programming principles, including encapsulation, inheritance (interface implementation), and separation of concerns. It provides a practical solution for managing fish inventory in a fishery while also maintaining necessary legal entity information. The system's ability to persist data through file I/O operations adds an extra layer of functionality, allowing for data retention between program executions.

This comprehensive solution addresses the requirements of Task 4, providing a robust and extensible system for fishery management.