**ITEC 2150**

**Summer 2018**

**Project**

You are to create a program that simulates an aquarium. Your aquarium will begin with the fish included in the attached file, fishFile.csv.

You are to create a Fish class that implements the Comparable interface. Your compare should allow the user to return an alphabetic list of the fish in the tank. The Fish class will have the following.

* Type – String – default “Blue tang”
* Size – Length of the fish (need to be able store partial inches). Default is 3.
* Current Age – Age of the fish in days – Must be greater than 0 and less than 10,000. Default is 30.
* Maximum age – How long the fish will live in days. Must be greater than 0 and less than 15,000. Default is 500.
* Aggressive – Is this fish aggressive. Default is false.
* Days in Tank – How many whole days has the fish been in the tank. – Must be 0 or greater and less than 1000. Default is 0.

If an invalid parameter is in the file for a particular field, you should throw a FishNotValidException with a message telling the user why the fish was not acceptable. An example is a non-numeric entry for one of the numeric fields. You will have to create the FishNotValidException.

* Methods
  + Getters and setters for each instance variable
  + A no argument constructor
  + A constructor taking each instance variable
  + A constructor taking a single String that corresponds to lines in the file may be helpful.
  + toString() – You must report all of the instance variables in this class. You should format size to display 2 decimal places.
  + Any other methods you need for your Fish implementation.

You are to create an Aquarium class. The Aquarium class must contain the following.

* Instance variables
  + A Linked List of Fish. You must implement this using a LinkedList.
* Methods
  + addFish – Adds a new Fish to the Aquarium
  + nextDay()
  + nextDay must include an iterator to step through the entire list of Fish.
  + If the fish is still alive, add 1 to daysInTank and currentAge for this fish.
  + If the fish is aggressive
    - Every 30 days, add 1 inch to its size
  + If the fish is not aggressive,
    - Every 30 days, add 0.1 inch to its size
  + getAllFish – returns the list of fish in an ArrayList<Fish>. Must use an iterator to build the list.
  + Any other methods you feel necessary for your implementation

FishNotValidException

* Create a new exception to use in your program to carry meaningful messages to the user

AquariumTester

* main method
  + Open and read the data contained in fishFile.csv. This must be used to create fish to populate the Aquarium. Your file reading must be done in the AquariumTester. You can either create a new Fish and pass it to the Aquarium addFish method or you can pass the String and handle it in the appropriate class, Aquarium and/or Fish. When you add a fish, you must set number of days in the tank to 0.
  + Once the Aquarium has been populated, you must loop through 730 days of growth.
  1. No fish can exceed its maxAge value.
     1. Once a fish reaches maxAge it will simply not age anymore nor will it grow.
  2. You must report to the user the results of this growth.
  3. Using your Comparable portion of the Fish class, sort the fish and display them in alphabetic order.
  4. Finally save the results of your aquarium back to the file specified by your user.

Your program must use a linked list to store and manipulate your fish. Your tank will simulate running for 730 days.

Sample program execution:

Please enter the file you want to read

fishfile.csv

Size is not valid

Current Age is not valid

Max Age is not valid

Days in tank is not valid

Type is Angel. Size is 5.00. This fish is currently 1000.

The maximum age for this type of fish is 1000.

This fish is not aggressive.

This fish was in the tank for 600 days.

Type is Grouper. Size is 42.00. This fish is currently 1130.

The maximum age for this type of fish is 10000.

This fish is aggressive.

This fish was in the tank for 730 days.

Type is Catfish. Size is 11.70. This fish is currently 1000.

The maximum age for this type of fish is 1000.

This fish is not aggressive.

This fish was in the tank for 500 days.

Type is Bass. Size is 42.00. This fish is currently 1030.

The maximum age for this type of fish is 5000.

This fish is aggressive.

This fish was in the tank for 730 days.

Type is Perch. Size is 19.00. This fish is currently 500.

The maximum age for this type of fish is 500.

This fish is aggressive.

This fish was in the tank for 350 days.

Type is Minnow. Size is 1.40. This fish is currently 150.

The maximum age for this type of fish is 150.

This fish is not aggressive.

This fish was in the tank for 120 days.

Type is Shark. Size is 33.00. This fish is currently 930.

The maximum age for this type of fish is 5000.

This fish is aggressive.

This fish was in the tank for 730 days.

The sorted fish.

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The maximum age for this type of fish is 1000.

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This fish was in the tank for 600 days.

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The maximum age for this type of fish is 5000.

This fish is aggressive.

This fish was in the tank for 730 days.

Please enter the file to save

grownfish.csv