

CSE5910 : Multimedia Programming in Java

Laboratory Session Worksheet. Week 4, Semester 2, 2007

Individual Exercises.

1. Take as a starting point a copy of your `Beast` class from the earlier laboratory session.
2. Remove from class `Beast` the field for the number of wings. Be sure to remove any access to this data member from within the constructor and the `ListAttributes()` methods.
3. Change the data member `scariness` to a *private* data member `bodyWeight`.
4. Write a function `setBodyWeight()` that checks that its only parameter is a valid weight and sets the `Beast`'s `bodyWeight` to that value. Write a function `getBodyWeight()` that returns the current value of the `Beast`'s `bodyWeight`.
5. Write a function `getTotalWeight()` that returns the total weight of the `Beast` calculated using the following formula:

$$\text{totalWeight} = \text{bodyWeight} + \text{numberOfLegs}$$

6. Change the function `Frightens()` to compare the total weight of the `Beasts`. The heavier `Beast` always frightens the lighter `Beast`.
7. Derive two new classes from class `Beast`: class `WingedBeast` and class `FinnedBeast`.
8. Add to class `WingedBeast` a data member for the wing-span and another for its number of wings. The number of wings must always be an *even* number. How will you ensure this is the case?
9. Write constructors for the two new classes that call the constructors of their parent classes (super classes) as well as initialising all of the fields unique to themselves.
10. Overload the class `Beast`'s `getTotalWeight()` function and calculate the total weight of a `WingedBeast` using the formula:

$$\text{totalWeight} = \text{bodyWeight} + \text{numberOfWings} * (\text{wingSpan} / 2.0) + \text{numberOfLegs}$$

11. Add to class `FinnedBeast` a data member for the number of fins.
12. Overload the class `Beast`'s `getTotalWeight()` function and calculate the total weight of a `FinnedBeast` using the formula:

$$\text{totalWeight} = \text{bodyWeight} + \text{numberOfFins} + \text{numberOfLegs}$$

13. Overload the `Winged` and `Finned` `Beasts`' `ListAttributes()` functions. The derived classes `ListAttributes()` function should only print out the *extra* features of these two `Beast` types and then call the base class `Beast`'s `ListAttributes()` function to list the remaining features.
14. Store your `Zoo` of `Beasts` in a generic container type of your choice. Allow the user of the software to add and remove `Beasts` from the `Zoo`.