**PRF – Fundamentals of Programming**
**Coursework 2**

# Scenario

JavaTown Zoo is home to a wide range of animals. There are Aardvarks, Zebras, and animals of all shapes and sizes in between. The collection is extremely valuable; it is believed that some of the animals are the only examples of certain species in captivity.

The animals are cared for by zoo keepers. Such is the value of the animals that each keeper is allocated to a specific animal. Animals may be cared for by a number of keepers.

Keepers are on call at all hours, so the zoo maintains a comprehensive list of their contact details.

In order to support this operation, members of the public are encouraged to adopt animals. To do this they pay a small sum annually and, in return, are allowed free entry to the zoo. The sum required to sponsor a particular animal is based on the animal's species, the animal's age and the animal's ferocity. Younger and more ferocious animals generally cost more to sponsor. The calculation of the sponsorship cost is aided by the zoo's "Ferocity Scale", a number ranging from 10 ("very ferocious indeed") to zero ("extremely placid").

# Stage 1 [8 marks]

An analysis of this domain would reveal that there were a number of potential classes in this domain. One is clearly going to be required to represent the animals.

Implement a class, called `Animal` that could be used to model an individual animal in JavaTown Zoo. Use the scenario above to identify the attributes of the class (you may want to add others). Implement accessors and mutators for each of the attributes, paying attention to those attributes that require validation. Include a `toString` method, and any other methods that you suspect may be useful.

Include a `main` method that could be used to test the class. There is no need for anything elaborate; the method should simply create a few `Animal` objects and then demonstrate the methods (and associated validation) work.

For simplicity, we will limit the test data to three sorts of animal – aardvarks, bats, and coyotes. The basic cost of sponsoring an aardvark is £100, a bat is £50 and a coyote is £120. In each

case an extra 10% is charged for each point on the ferocity scale and then £10 is deducted for each year of age over 5. Make sure that your program illustrates these calculations!

# Stage 2 [6 marks]

A second class is obviously needed to store the details of the keepers. Implement a class, `Keeper` that could be used to represent those who care for the animals. It is safe to assume that keepers have all the usual contact attributes that would be stored for any employee. One further attribute is, of course, the animal the keeper cares for.

Once again, include a `main` method that demonstrates how your class works. Make sure that it shows how it would be possible to answer questions such as "How ferocious is the animal cared for by keeper X?" and "How much would it cost to sponsor the animal care for by keeper X?".

# Stage 3 [6 marks]

Finally, implement a program that lists a "roll call" of the entire zoo. The program should prompt the user to enter the number of animals in the zoo, and should them prompt the user to enter details of each. It should then display a list of all the animals, *sorted in order of their sponsorship value*.

## Assessment

This coursework is worth 15% of the assessment for PRF.

The deadline for this work is 5pm on 2nd December 2005. Your final programs from each stage that you have completed should be submitted via SIS in the usual way.

## Purpose

The purpose of this assessment is to give you practice in writing and using simple Java classes.

AMJ, 8th November 2005