

# PoP 10g - Animals

Carl Dybdahl, Patrick Hartvigsen, Emil Søderblom

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We have written a model of animals in F#. Figure 1 shows the UML diagram we designed for this task. We have also written tests for our classes and documented their behavior.

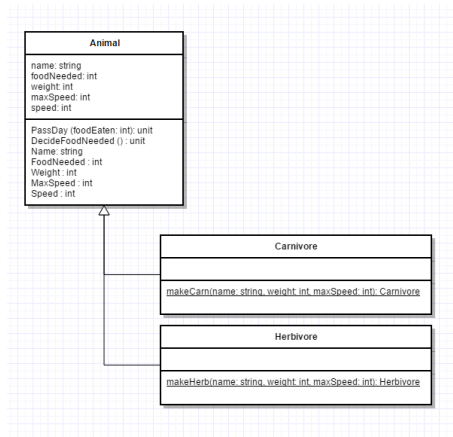


Figure 1: The UML diagram for the classes in this task.

## 1 Animal, Carnivore, Herbivore

We have a base class **Animal** which implements most of the behavior of animals. It has five attributes, **Name**, **Weight**, **FoodNeeded**, **MaxSpeed** and **Speed**. In addition, it has two methods, **PassDay** and **DecideFoodNeeded**. We have written XML-comments to describe the exact details of these methods and attributes, but they can roughly be described as follows:

- **Name** and **Speed** do not directly affect anything else.
- **PassDay** is given an amount of food eaten the current day and sets the **Speed** to a fraction of **MaxSpeed** based on how big a fraction of **FoodNeeded** is eaten.
- **DecideFoodNeeded** sets the food needed to a fraction of the animal's **Weight**.

A **Carnivore** is an **Animal** that needs less food, whereas a **Herbivore** is an animal that needs more food. Semantically, **Carnivores** represent carnivorous animals, whereas **Herbivores** represent herbivorous animals.

We made the constructor of `Carnivore` and `Herbivore` private so we could make sure `DecideFoodNeeded` was called on every animal as soon as it is constructed. To create an instance of these classes, one must use the static members `makeCarn` and `makeHerb`.

## 2 Race

We have written the code to do a race between `cheetah`, a `Carnivore` weighing 50 kg and having a max speed of 114 km/hour; `antelope`, a `Herbivore` weighing 50 kg and having a max speed of 95 km/hour; and `wildebeest`, a `Herbivore` weighing 200 kg and having a max speed of 80 km/hour.

The winner is declared to be the one who wins the most time in a test of three races on separate days, where each day the animals eat a random fraction of their `FoodNeeded`. If there is a draw, the race is retried.

## 3 Documentation

The code was documented according to the standard. In order to keep the documentation comments from cluttering up the code, we placed the documentation in the signature file `10g.fsi`.

## 4 Tests

We have tested all the methods and have gotten positive test results.