TECHNION
Azrieli Continuing Education and External Studies Division

Lab

Mini-Project

Lab Objectives

In this lab we'll practice the concept of a project.

Tasks

1. Out objective this lab is going to be creating cat breeding simulator. While the idea behind the project itself is somewhat mad, we will be using this concept to understand the structure of a project. The project will have 3 main parts.
    a. A "Database"
    b. A set of functions to manipulate data
    c. A "main" function to work with the data.
2. The first thing we'll have to build is our "Database" of cats, while normally advanced data bases like SQL are used – we will be using a list of dictionaries.
   First, we will create an example list with cats. The list will have inside it a set of dictionaries each containing the data for a single cat. The characteristic we will take note of in the cats are gender, weight, height, ear size and claw size.
    a. Create a list containing 2 cats – one male and one female as a blueprint.

   However, this kind of data collection is not useful when running the program multiple times. Therefore, we will use a txt file to save and load our data.
    b. Create a function that will save the list we have in a txt file.
        i. Input – List of cats
        ii. Output – Return file name
    c. Create a function that will load a list from a txt file.
        i. Input – File Name
        ii. Output – Return list of cats
3. Now that we have an easy way so save and load our progress, we can start with our breeding functions. We will need 3 main functions – one will be "breed" – taking two cats (one male and one female) and producing 2-6 offspring – each either female or male. The second will mutate our offspring. And the final one will pick the ones with the best's stats by priority.
    a. Create a function that will breed a list of cats with two cats.
        i. Input – List of cats with two cats
        ii. Output – List of an additional 3-9 cats. randomly male or female with stats averaged from the parents.
    b. Create a function that will mutate a list of any number of cats. The mutation is + up to 5% and – up to 5% of the original values of the cats randomly for each stat (Except gender).
        i. Input – List of cats
        ii. Output – List of cats after changes
    c. Create a function that will pick the best male and female cats out of the list of cats according to a chosen set of two priorities. The priority matters more the second priority.
        i. Input – List of cats, name of priority one and name of priority number two.
        ii. Output – The two "best cats" (One female one male) according to the priorities chosen. You may choose whatever way to judge as you want but try to make the first priority matter more the second.
4. Now we have our functions we will be building our "Main" function. This will be the function that will both collect input from the user and run the other functions as needed.
    a. Ask the user for a Database file name.
    b. Load the Database from the file.
    c. Ask the user for priorities of stats for the cats.
    d. Breed the cats
    e. Mutate the cats.
    f. Find the "best cats"
    g. Print the "best cats"
    h. Ask the user if they'd like to keep going.
    i. Repeat from d. until user requests to stop.