Software engineer exercise

Level: medior

# Task description

Our client ECoding has requested a new web application for monitoring their hens in the chicken coop. Hens live in a hierarchy and the eggs that the hens lay have a different price based on the hen hierarchy.

**Basic criteria:**

* Each hen lays a random number of eggs each day.
* The minimum number of eggs that a hen can lay is X per day.
* The maximum number of eggs that a hen can lay is Y per day.
* The base price of each egg is derived from a price index that changed for each day.
  + The price index looks like this:

|  |  |
| --- | --- |
| * + Date | * + Price |
| * + 01/01/2023 | * + 1 EUR |
| * + 02/01/2023 | * + 1.2 EUR |
| * + 03/01/2023 | * + 1.1 EUR |

* + The price in the index is random for each day.
  + The max price of an egg are 3 euros.
  + The min price of an egg is 1 euro.
  + If there was an error in the price index, the client should be able to replace it at any time
* The price of the egg is adjusted by the following formula:
  + Egg final price = egg base price + 1% hen commission.
  + The 1% hen commission can be calculated as 1% of the Sum of the price of all eggs that the hens laid from the lower hierarchy level on the given day. (Only 1 hierarchy level below).
* Each day we get random new hens at a random hierarchy level. Maximum number of new hens is 10 and we always get at least one new hen.
* Each hierarchy level has to have at least one hen.
* ECoding has currently 20 hens split randomly between 3 hierarchies.
* New hens can also appear in a new hierarchy above all previous hierarchies, but only one new hierarchy can appear each day.
* New hens don’t lay eggs on the day they appear, only the following days.

ECoding would like to see how their profits evolve over time and wants to keep track of their hens.

ECoding is a demanding client and likes a nice, structured UI.

**Work required**

* Write a small simulation that can:
  + simulate the price index over z days
  + calculate egg laying of hens over z days
  + randomly simulate new hens appearing in the hierarchy
  + store the results of the simulation in a data structure you see fit
  + follow the criteria mentioned above
* Visualize the number hens from each hierarchy over time and the amount off euros they produce each day.
* Visualize the hen hierarchy
* Try to encapsulate the lifecycle of your work in a short document. Explain your steps and decisions.

**Key technologies to use:** Use any frontend or backend technologies you see fit, but please provide a manual on how to run the solution for our client.

# Task delivery

You will have max 1 week to finish this exercise. After you are happy with your project, please give us access to the app via Bitbucket or GitHub.

Your contact for this exercise is Tomas Filip, tomas@ecoding.sk