Bug Farm Simulator

1. Specification

Name: Symulator Hodowli Robaków
Type: Simulator
Date of production: January 2021
Technology: C++ with OpenGL library (Visual Studio 2013)

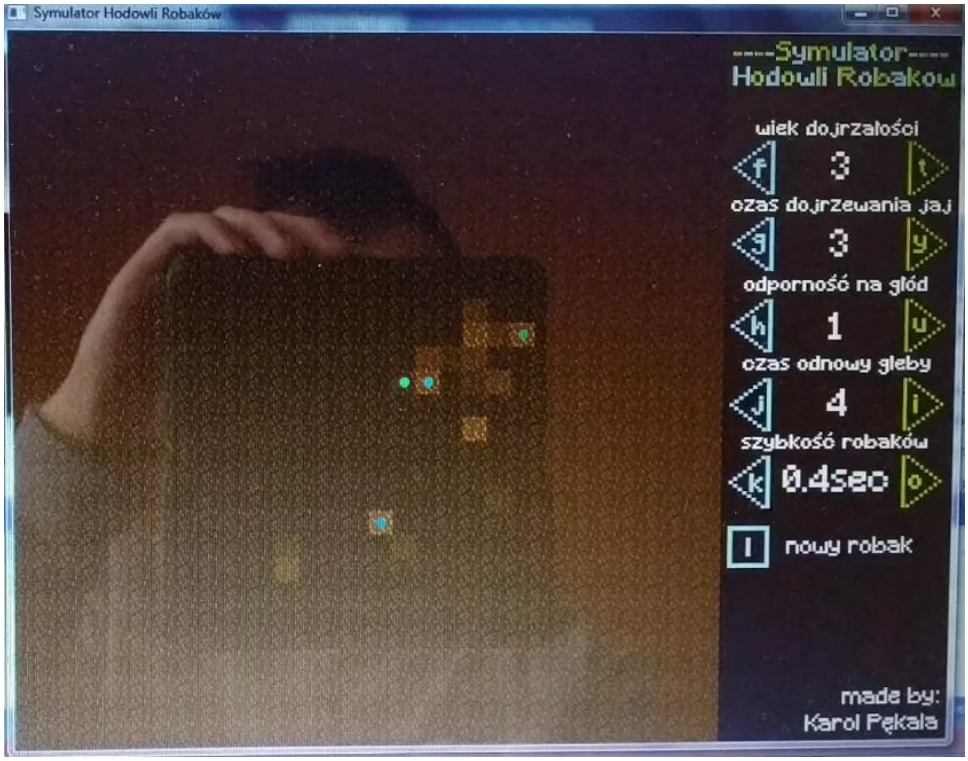
Please note that this project's data has been lost without previously preparing proper documentation, therefore this document is an attempt to create such document based on only data left, which is low quality .mp4 file presenting project (see attachment). Excuse me lack of proper files and good quality images.

2. Overview

Purpose of this project is simulating life circle of group of bugs on a simple farm, reflecting their basic needs and behaviours – eating, growing, moving and reproducing.

3. Description

Main and only program's window is displaying current state of the game – bugs on the 30x30 field of soil, and control panel on the right. Program starts with 4 bugs located in the middle and all properties of simulation set to default.



Bugs
Bugs are moving randomly – each frame bug is moving 1 square up, down, left or right. After moving to new location, each bug is trying to eat any food it can find on current square. If it

fails, it starts counting moves without eating. If the count reaches bug's "hunger resistance", it dies. With each move bug gets older, adding one point to its age count. After reaching maturity age, bugs can reproduce. It happens if two mature bugs will step into the same square at the same time, spawning new egg on that square.

Eggs

Eggs are spawn on squares on which two mature bugs have moved at the same time. With each frame, egg gets older, adding one point to its age count. After reaching hatching age, it transforms to a new bug, with age equal 0.

Soil

Each square of soil has its current amount of food that can be eaten by bugs after stepping on it. Eating the food causes the soil square to barren, reducing its food to 0. With each frame food is being restore by 1 point, up to max 10 points. Player can change the threshold after what amount of food restored soil can feed bug again (soil regeneration time). Amount of current food is represented by the colour of the soil – the darkest shade of brown indicates passing the threshold point, and each lighter shade is one point lower from that threshold. That's why after reducing "soil regeneration time" to lower values, soil squares after being eaten out becomes less light than the ones during higher values of "soil regeneration time".

Control Panel

Player can change simulation setting by pressing keys indicated by left and right arrows next to each property value. "Bug speed" indicates how long each frame lasts, so by decreasing this value, player can 'speed up' the bugs. Pressing 'i' causes new bug to spawn in the middle of the field.

4. Further development ideas

Project has been lost at described state, but I had much more complex and interesting idea for further direction of development.

Bugs would have more properties, like individual speed, sensing food around (which would slightly affect their choice of next move direction), some form of aggression against other bugs. This and current properties (hunger resistance, maturity age, hatching age) would be pass to the next generations, mixing with other bugs properties via reproduction, simulating process of evolving and promoting some properties over the others. This could lead to having some fun around establishing what bugs will evolve in more harsh and barren environment (e.g. more aggressive), or in bigger field (maybe faster one, or more resistant to hunger?). Different bug's properties could affect their appearance, making it more clear and interesting.