

CS5001-Implementation of a game using object-oriented programming

Introduction:

- This report is made to show the functionalities of a game built to demonstrate the object-oriented approach.
- I have also included the UML diagram which includes all the classes, their attributes and their methods.

Problem Context:

- Each game starts with a $m \times n$ grid. The aim of the game is to finish with the high consumption to production ratio.
- There are three types of objects in the game: producers, transporters and consumers.
 - Producers are of two types: corn farmer and radish farmers.
 - Corn farmers produce 5 corn every four turns.
 - Each corn gives 5 units of nutrition.
 - But, there should not be any producers for 2 spaces to left or 2 spaces to the right or one space above and one space below for corn farmer to produce.
 - Radish farmers produce 10 radish every three turns.
 - Each radish gives one unit of nutrition.
 - They only need one space on each of the four sides to produce.
 - Consumers are of two types: rabbits and beavers.
 - Rabbits can consume 8 units of nutrition and can not store any food per time step.
 - Beavers can consume 5 units of nutrition but can store up to 50 units of nutrition per time step.
 - Transporters are of two types: horizontal and vertical transporters.
 - Horizontal transporters can transfer from left to right or right to left only if they are placed between a producer and a consumer.
 - Vertical transporter can transfer top to bottom or bottom to top only if they are placed between a producer and a consumer.
 - But, both have a limit of transfer they can only transfer up to their limit.
- After the game is setup with as many objects of game you want on your game grid, the game begins.
- After the specified number of turns the game will show how much has been produced, how much has been consumed and the ratio of consumed and produced.

Game design:

- I have created a main search execution class that runs the game. I have also created classes like Farmer, Rabbit, Beaver, HorizontalTransporter and VerticalTransporter which extend the given AbstractItem class to define the properties.
- Then, I have created CornFarmer and RadishFarmer classes that extend the properties from the Farmer class
- Finally, I have created a Grid class which extends the properties of the AbstractGrid class.
- I have implemented all the methods that have to be implemented from abstract classes and have tested the execution of the game.