Design rationale

Introduction:

Preliminary analysis of this game gives us the knowledge of how this game implements and how classes are interacted with each other. within this game, the player trains dinosaurs until they grow up, then trade them in exchange for money in an environment called shop. Additionally, there are two types of dinosaurs, carnivorous and herbivorous, carnivorous are capable of attacking herbivorous and kill them. The purpose of this assignment is to enable us to modify or create classes which enable us to make the game like it is supposed to be. This document illustrate the logic and reason of our design. New classes created for this design are Grass, Shop, Dinosaurs and Velociraptors that are designed to assist the system to run properly. On the other hand, there were some existing classes such as Tree and protoceratops that require a modification to accomplish the tasks in this assignment. Information mentioned are displayed below.

Grass:

Throughout this game, Grass has the ability to grow on bare dirt on the map and its probability is 0.5%. Grass is known as a source of food for herbivorous dinosaurs (Protoceratops) and when a dinosaurs eat them, their Food level increases by 5, then the location of the grass on the map, will be converted back to the bare dirt.

The food value of Grass which will be added to Dinosaur's food value will be stored in this class.

Tree:

Similarly, Trees can grow and they can be eaten by herbivorous dinosaurs (Protoceratops), however, their Growing method is different, they have a probability of %0.5 of growing next to another tree not anywhere else. Due to not adequate clarification, Trees after being eaten, will be removed from the map and will be replaced by bare dirt. Additionally, their foodValue is greater than FoodValue of grass and it adds 10 value to the foodLevel of dinosaurs.

Shop

The purpose of creation of this class is to allow the player to purchase and sell items in exchange of money. Buying items are, Protoceratops's corps, dinosaurs tag, Protoceratops's egg, Velociraptors egg and herbivorous, on the other hand, selling items are alive dinosaurs, dead dinosaurs and their eggs. Considering given options, it was decided for the purchased items to be transferred into the player's inventory directly because this is the final destination anyway. Therefore, there is an aggregation relationship between shop and the player because both parties can exist without each other, meaning, players can have no transaction throughout game without making a problem for either classes of shop or player.

More precisely, methods stored in this class are for purchasing and selling items and by calling these functions, players can easily trade something.

Dinosaurs

This class is the superclass of velociraptors and Protoceraptors that contains the methods of **breed()**, **Decrement()** and **eating()**. As mentioned, after each turn food level of Dinosaurs decrements until it hits the minimum food level value which is zero and when it hits it, the dinosaurs dies.
We create this Class as a superclass because this class contains the similar attributes and methods of those types of Dinosaurs, and we try to avoid DRY (Don't Repeat Yourself) and keep ke code as simple and as clear as possible.

Protoceratops:

The herbivorous dinosaurs that eat grass, tree and herbivorous purchased from the shop when they get hungry the move towards these food. They are also capable of breeding only when they are well fed or their food level is greater than 20. Baby Protoceratops are exact adult protoceratops with differences of having a food level of 10 and not breeding. This class inherits most of its attributes and methods from Dinosaurs.

To make Dinosaurs move towards the food,we can call a Followbehaivour class with argument of herbivorous food as the ‘target’ including grass and tree that Tells the dinosaurs what to eat and where to find it.

Additionally, the Proceratops has to move toward the nearest object, therefore, a method from FollowBehaviour called ‘distance()’ is called, which calculates and returns the distance between the current character location and the nearest target which could be grass or tree. While moving towards the food, Procerattops’ food level is decremented by 1 in each turn, which we decided to create a for loop that does that. If Proceratops reaches its target and it's not dead, Then, if the food target is Grass, it will add the specific value to Protoceratops’s foodValueLevel , and similarly, if the target food is tree, the code will add the tree’s value to Protoceratops.

Velociraptors

Likewise, Velociraptors inherit from Dinosaurs and they can breed. The only difference between Velociraptor and Protoceratops is that Velociraptors do not appear appear on the map at the start of the game, and they have the ability to attack Protoceratops if they are close to them, so attack method is their speciality.

As the specification says, Velociraptors do not exist from the beginning and they are created when the player buy their eggs from the shop. After a while the egg hatches and become a baby velociraptors. Baby velociraptors are exact velociraptors with the difference of not breading. Baby velociraptors becomes adult after 30 turns. A loop is going to be designed that is responsible for this action.

Similar to Protoceratorps, Velociraptors call a function in follow behaviour that assists them to find the nearest food. They eat alive and dead Protoceratops and eggs, so these are taken as the argument for the target. After being eaten their food value adds to the velociraptors’ food level.

Player

Player role in this system is to grow dinosaurs and sell and purchase the items associated with them. Velociraptors's existance depends on player purchasing their eggs. Buying items will add the selected item to the inventory of the player and then subtract the item's price from the player's budget. Oppositely, sold items are removed from player's inventory and associated money will be added to the player's budget.

Furthermore, player's can feed the Dinosaurs by placing them on the ground for dinosaurs to eat or feeding them by hand. Placing food on the ground require the same process for both Dinosaurs to determine what to eat and where to find it. However, hand feeding the Dinosaurs increase their food level by the food value of the selected item straightly.