**DESIGN RATIONALE**

**Team Name: NoGroup**

**CLASSES IN THE EXTENDED SYSTEM**

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| **NEW CLASSES** | **EXISTING CLASSES** |
| *Grass* | *Dirt* |
| *Shop* | *Tree* |
| *ShopGround* | *Protoceratops* |
| *ShopAction* | *Wall* |
| *SeekFoodBehaviour* | *Floor* |
| *Velociraptor* | *WanderBehaviour* |
| *Tag* | *FollowBehaviour* |
| *Egg* |  |
| *Player* |  |
| *EatAction* |  |
| *TagAction* |  |
| *Food* |  |
| *Corpse* |  |

**ROLES AND RESPONSIBILITIES OF EACH SIGNIFICANTLY MODIFIED CLASS**

**Grass:**

The Grass class will be used to grow grass on a square that contains dirt. It will be denoted by the symbol ‘X’ on the map. After each turn in the game, there is a small probability that grass will grow on any dirt square. Only Protoceratops can graze on grass, and when eaten, will turn the grass square into a dirt square. Upon eating the grass, a Protoceratops will gain 5 food level.

**Shop:**

The Shop class allows the Player to buy items from it, as well as sell items that exist in the Player’s inventory. Upon launching the game, the Player will have an initial balance, and this value will change depending on how the Player chooses to spend their money.

If the Player is adjacent to the Shop on the map, the Player will be greeted with the message: “Welcome to the Shop”. A public method called shopMenu is then executed, prompting the Player to make one choice out of three available options: Buying, Selling and Leaving. Each option has its own numerical equivalent, with ‘1’ representing the Buying option, ‘2’ representing the Selling option and ‘0’ representing the Leaving option.

If the Player selects option ‘1’, then a list of purchasable items will appear through the purchaseMenu public method. When an item is bought, its value is subtracted from the Player’s current balance, and an updated balance is returned.

If the Player selects option ‘2’, then a list of sellable items from the Player’s inventory will appear through the sellMenu public method, as well as prices associated with each item. When an item is sold, its value is added to the Player’s balance, and an updated balance is returned.

If the player selects option ‘0’, then a message will state that “Player has stopped shopping”.

This approach offers flexibility to the user by giving them choices as to what they want to do in the game.

To make the shopping component of the program robust, guardian code must be implemented to avoid the Player from entering any invalid input. If the Player wants to buy an item that exceeds the current balance of the Player, a message is returned, stating “Invalid choice. Not enough money.” If the Player types an invalid option when choosing to either Buy, Sell or Leave (e.g. ‘hello’ is invalid input), a message is returned, stating “Invalid choice. Must be an integer.” Similarly, if the Player types an option value that exceeds the number of available options, a message is returned, stating “Invalid choice. Must be an option in Shop”.

This approach makes our game more robust in that we restrict the Player from making unrealistic purchases in the game.

**ShopGround:**

The purpose of this class is to instantiate the shop at the top left-hand corner of the map. This shop is denoted with the symbol “S”.

**ShopAction:**

The purpose of this class is to allow the player to interact with the instantiated Shop when the player is in sufficient range of the Shop on the map.

**Velociraptor and Protoceratops**:

In the case of baby Protoceratops and baby Velociraptors, we intend on creating counters that will track the age of these dinosaurs so that after they reach a certain age threshold, they will evolve into adult Protoceratops and adult Velociraptors, as well as obtain the ability to breed.

If a Velociraptor is above a specific food level, it will be in Wander mode. Similarly, a Protoceratops will be in Wander mode when it is above a specified food level. If the food level of each type of dinosaur drops to a value that is less than or equal to a specified value, each dinosaur will go into Follow mode. In Follow mode, a Protoceratops will start moving towards the nearest plant source, whether it be grass or trees. On the other hand, a Velociraptor will start moving towards the nearest live Protoceratops.

If a Protoceratops lies within a Velociraptor’s specified kill radius (yet to be determined), the Velociraptor will attack, and the Protoceratops will die.

**SeekFoodBehaviour:**

The purpose of this class is to allow a dinosaur to find a nearby food source. This of course depends on the type of dinosaur as a Protoceratops is herbivorous, and a Velociraptor is carnivorous

**EatAction:**

The purpose of this class is to allow dinosaurs to interact with food sources in the park.

**Egg:**

If a Protoceratops has a food level greater than some specified value, then it has a chance to lay an egg. Our system will also incorporate Velociraptor breeding such that if a Velociraptor’s food level is greater than some specified value, it will also have a chance to lay an egg. Despite different types of dinosaurs laying different types of eggs, each egg will share the same characteristics. After a certain number of turns, the egg will hatch into a baby dinosaur where each dinosaur will inherit characteristics based on the dinosaur where the egg came from.

**Tree:**

The Tree class will be used to grow trees on squares that are adjacent to ones that already exist in the game. After each turn in the game, there is a small probability that a tree will grow next to one that already exists. Only Protoceratops can graze on trees, and when eaten, will remove the tree from the map. Upon eating a tree, a Protoceratops will gain 10 food level.

**Food:**

The Food class serves as a physical object that can be either hand-fed to a Dinosaur or dropped on the ground next to a Dinosaur. If a Player is adjacent to a Dinosaur, the Player will be prompted if they want to feed it. If the Player selects ‘No’, then nothing happens. If the Player selects ‘Yes’, then the herbivore food is removed from the Player’s inventory. The dinosaur’s food level goes to maximum level once it is consumed.

**Corpse:**

The Corpse class serves as a physical object that occurs when either a Protoceratops or a Velociraptor has a food level of 0. A Protoceratops can also turn into a corpse if it is attacked by a Velociraptor.

**Tag:**

If the Player is adjacent to any live Protoceratops or Velociraptor on the map, the Player will be prompted on whether to tag the dinosaur or not. If the Player selects ‘No’, then nothing happens. If the Player selects ‘Yes’, then the Player’s inventory will be checked to see if they have a dinosaur tag. If a tag does not exist in the Player’s inventory, then a message will appear saying “You do not have a dinosaur tag!”. Once a dinosaur tag is used, it will disappear from the Player’s inventory.

Since each type of dinosaur has a different maximum food level, enabling the option for them to be tagged will differ. A Protoceratops can only be tagged if their food level is above a specified value. and a Velociraptor can be tagged if their food level is above another specified value.

**TagAction:**

The purpose of this class is to allow the player to interact with an adjacent dinosaur, prompting the Player if they want to tag this dinosaur.