Designosaurs: Design Rationale

FIT2099

Brainsorts

Topic: Designosaurs Design Rationale

Unit: FIT2099

Team Name: BrainSorts

Contents

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Implementation requirements

NOTE: * means the given class has already been added to the game package, it only requires methods added to it. **Methods** will be bolded for better readability

Grass

- Each square has a 2% chance to grow grass even if it is near a tree
    - If there are 2 or more squares with grass, the adjacent square has a 10% chance to grow grass
    - **grassGrowth**
- A player near grass can harvest it to give hay
    - **pickUpAction** to add to inventory

Tree*

- A tree has a 5% chance to drop a fruit.
- The fruit will stay in the same square as the tree but will stay for 20 Turns
    - **fruitRot** (a counter for how long the fruit will stay on the map)
- If the player is in the same square as the fruit they can pick up the fruit
    - If a player picks up the fruit, the fruit will not rot in their inventory
- If the player interacts with a Tree, they can search it for fruits to add to their inventory
    - If the player interacts with the tree they have a 60% chance of failing
        - This would return “you search the tree but you did not find any fruits”
    - This would be the method **searchFruitTree** with the if condition that works alongside the probability

Dinosaurs

- A dinosaur will be hungry once the food level is below 20,
    - Message will pop up showing the dinosaurs hunger level decreasing each turn
- The dino will die if its not able to feed, or is not fed
- If the dino food level is above 60 then it will modify its wander behavior to move towards a dino of the opposite gender attribute.

_____Species_____

- *Stegosaurs**
    - Player starts with a small herd of stegs
        - All of them will start at a hunger level of 50/100 starting hunger level
    - Player standing near a steg can feed them fruits or hay
        - Hay adds 20 to the stegs hunger level
        - Fruits add 30 to the stegs hunger level
        - **feedAction**
- *Allosaurs*
        - Eggs need to be bought from vending machines
        - Will attack stegosaurs if they are near them by a square
        - Can be fed carnivore meal kit(which are bought from the vending machine)
        - Also they can cannibalize another dead allosaur to level up hunger level by 50
        - Eat an allosaur egg to gain 10 hunger points

Breeding

- If Dinosaurs are well fed i.e. above the food level of 60
    - Then their wander behavior will be modified to allow for them to move towards another dinosaur of the opposite gender who both have the same mating state. (which will be the sign to modify the wander behavior.)
        - **mateState**
    - The female dinosaur of the pair will lay an egg 10 turns later
        - **layEggAction**
- Baby dinosaurs will be born with a food level of 10
    - They cannot breed
    - After 30 Turns they will be fully grown

Design Rationale

1. **Grass**
    a. Classes Involved
        i. Ground
        ii. Stegosaur
    b. New Classes and implementations
        i. Trees
        ii. Fruits
        iii. Grass
        iv. GrassGrowth

Stegosaurus survive on grass and fruits. To be able to feed stegosaurus we created a Grass class and Tree class that extends the Ground Abstract class. The Ground class represents a bare park with squares of dirt and trees. Therefore, we made Grass and Tree classes inherit from the Ground class. Also, there is a possibility for the squares of dirt to grow grass, so we created a GrassGrowth class for Grass class to use to grow grass with respect to the squares of dirt in the Ground class. However, for every square in the Ground class that has a tree on it, a stegosaur can eat the fruit on that tree. Fruit that drops from the tree stays in the player inventory. Therefore, we created a Fruits class so that the Tree class should instantiate Fruits object from the Fruits class. The Stegosaurus creates an object from the Ground class to be able to survive on both grass and fruits on trees.

2. **Hungry Dinosaurs**
    a. Classes Involved
        i. Action
        ii. Grass
    b. New Classes and implementations
        i. Harvest
        ii. PurchaseAction
        iii. FeedAction
        iv. GrazeOnGrass

Stegosaurus can move towards a grass and graze on it, and so we created a GrazeOnGrass class that extends the Action class in the engine package as grazing on grass is an Action so it needs to extend the Action Abstract class. The GrazeOnClass class should know about the Grass class because once the stegosaurus grazes on each square of grass, this square of grass then becomes a square of dirt and so it needs to know about the Grass class to be able to grow grass again. Also, if a player is next to stegosaur, the player can feed it fruit or hay. Therefore, we implemented PurchaseAction for the player to purchase fruit or hay from the vending machine and implemented FeedAction for the player to feed the dinosaurs. Both PurchaseAction and FeedAction extend the Action Abstract class as they are both actions. The Harvest class because if the player is standing on the grass, they can harvest it.

3. **Breeding**
    a. Classes Involved
        i. Action
        ii. MoveActorAction
    b. New Classes and implementations
        i. MateAction
        ii. LayAction
        iii. Eggs
        iv. AllosaurEgg
        v. StegosaurEgg
        vi. BabyAllosaur
        vii. BabyStegosaur
        viii. Allosaur

If a Stegosaur wants to breed, it will move towards a stegosaur of opposite sex. We created MoveActorAction class to know about the Action class because of the fact that stegosaur move towards another stegosaur. Then we created MateAction and LayAction to inherit from the Action Abstract class in the engine package as they are a type of actions involved in breeding. After the mate action, the female stegosaur female will lay an egg. We created Eggs Class and we make the LayAction class creates Eggs class. We also created an AllosaurEgg and StegosaurEgg to extend the Abstract Eggs class because an egg might be either allosaur or stegosaur. The AllosaurEgg and StegosaurEgg classes then creates the BabyAllosaur and BabyStegosaur as later these eggs will hash and become baby dinosaurs. The BabyAllosaur and BabyStegosaur creates the Allosaur and Stegosaur classes. The baby dinosaurs then become adult dinosaurs.

4. **Eco points and purchasing**
    a. Classes Involved
        i. Application
        ii. Item
        iii. Location
    b. New Classes and implementations
        i. VendingMachine

At the beginning of the game the Application classe needs to place a vending machine so we created a VendingMachine class and made Application class to create a Vending machine object. The vending machine will sell food, eggs and weapons, so we made the vending machine to extend the Item class and we assumed that all food, eggs and weapons will be classified under Item. The vending machine also will need to be placed in a specific location and hence it uses Location class to know which location will the vending machine be placed.