FIT2099 Assignment(Design rationale)

(For probability
We can generate random number between 1 and 100,so if we want 1 percent probability, We can apply condition (random number >99) which will only be true for one number (100) So therefore implements that 1 percent chance)

Dirt,Trees and Bushes

1. At the beginning of the game (and at the beginning of each turn), each square of dirt has a 1% chance to grow a bush.

Add a Bush class with display char 'b' on the ground.Then inside the Dirt class tick method,we can set the ground to bush by using the Location class method.i-e Location.setGround(new Bush)

2.On any turn, any square of dirt that is next to at least two squares of bush has a larger (10%) chance to grow a bush

Inside the Dirt class tick method, we can find nearby locations using Location.getExits() .Then we can iterate through nearby locations and check if it is an instance of Bush class using Location.getGround()

3. In any square of dirt that is next to a tree there is no chance for a bush to grow

Inside the Dirt class tick method,Find nearby locations using Location.getExits() and use Location.getGround() to find if any of these locations are instance of Tree.Then this condition will supersede any of the preceding conditions for growing bush

4.On any turn, any tree has a 50% chance to produce one ripe fruit and a bush 10%.

I created a new class named FoodSource which is the super class for Bush and Trees. Add a Fruit class extending the Item class.Create an ArrayList of Fruit objects as an attribute in FoodSource class from where I can access those fruits in Bush and Tree.Then based on chance we can add a new Fruit object to ArrayList of fruits.

5.On any turn, any ripe fruit in a tree has a small (say, 5%) chance to fall. Dropped fruit will sit on the same square as the tree. Fruit left on the ground will rot away in 15 turns.

Add a Fruit-Status enum class with two attributes (Dropped and Rotten).Inside the Tree tick method,based on chance we can change the Fruit to dropped by using the method for Fruit object i-e Fruit.addCapababitily(Fruit-Status.Dropped).Same we can do for rotten fruits and remove the current status of fruit

6.The player can pick up fruit that is lying on the ground or from a bush. Fruit in the player's inventory does not rot.

For the fruits that on the ground and in the bush, We can set the portable attributes for fruits to be True which allows the us to add PickUpitemaction() to Player list of actions.getPickUpitemAction() inside the Item class returns this action if portable is set to True and as it is inherited to the Fruit class,It can invoked on any Fruit object.

7.The player can try to pick fruit from a tree or bush in the same square. This has a chance of failing (say, 60%) with a message such as "You search the tree or bush for fruit, but you can't find any ripe ones."

Create a new class by name of Harvesting-Fruits that extends Action.In the playTurn method of player,If the current location is Tree or bush , then search for ripe fruits in Tree and bush .If there are then add Harvesting fruits to Player,s list of actions.Otherwise display a message

Hungry Dinosaurs

1.A stegosaur should start out with a "food level" of 50 out of a maximum of 100. This should decrease by 1 on every turn. If the food level gets to zero, the stegosaur becomes unconscious and cannot move or act unless it is fed. After 20 turns of unconsciousness, the stegosaur dies.

In the playTurn method for stegosaur decrease the hitpoints by 1.When it reaches an unconscious state checked using IsConscious() method within Actor class, then have a counter initialized to be 0 and increment for each time it is unconscious.When 20 is reached on counter, remove the actor from the map and add a Stegosaur corpse on the map which extends the Corpse class.

2.A stegosaur that is hungry (i.e., if its food level is below 90) should move towards a food source and eat it. Stegosaurus are herbivores and can eat fruits only from bushes or a fruit laying on the ground under a tree. They can't eat from trees because their necks are short and their jaws are too weak to bite through branches.

Add a class Following () implementing the behaviour Interface.Inside the getAction method find the nearest food source and return a MoveActorAction() specifying path to be taken.This action is added to Stegosaur list of actions inside the playTurn() method if hit-points are less than 90

3.When a stegosaur eats a fruit from a bush or a fruit laying on the ground under a tree, that fruit should disappear and should increase the stegosaurus's food level by 10.

In the play Turn method for Stegosaurus ,check if the current location is instance of Tree or bush and for a dropped fruit or the fruit on the bush ,increase stegosaurus food level using theheal() method inherited from the Actor class to Stegosaurus class

4.If the player is standing next to a stegosaur and holding fruit, they should be able to feed it to the stegosaur. Fruit given directly by the player should increase the stegosaurus's food level by 20.

Create a FeedDinosaur class which instantiates the Stegosaurus (extending the Action class).In the execute method which takes in Actor as argument , we can traverse through list of items in inventory of actor .Use the the same theheal() method of Stegosaurus and remove the item from inventory of actor.We can return the instance of this class in getAllowableactions() method in Stegosaur

5.When a stegosaur becomes hungry, a suitable message should be displayed (e.g. Stegosaur at (19, 6) is getting hungry!)

We can prompt this message in the playTurn method if it satisfies the condition of getting hungry.

Brachiosaur

1.You will also create a small herd of brachiosaurus which are also herbivores (2 males and 2 females).

Same as Stegosaur class, we can create Brachiosaur class,In the Application, we can create instances for it at random location by using the addActor method in Location

2.In these game, these long neck dinosaurs can only eat fruit from trees

In the play Turn method for brachiosaurus ,check if the current location is instance of Tree and the fruit on the tree ,increase brachiosaurus food level using theheal() method inherited from the Actor class to Brachiosaurus class

3.Indeed, if they step on a bush, there is a 50% chance they will kill the bush.
In the play Turn method for brachiosaurus,check if the current location is instance of Bush and then remove the bush by setting bush to dirt using the setGround() method in Location class
4.A brachiosaur should start out with a "food level" of 100 out of a maximum of 160. A brachiosaur is hungry if its food level is below 140. Their food level should also decrease by 1 on every turn. If the food level gets to zero, the brachiosaur becomes unconscious and cannot move or act unless it is fed. After 15 turns of unconsciousness, the brachiosaur dies.
Brachiosaurus follows the food source in the same way as Stegosaurus. the playTurn method for Brachiosaur class, decrease the hitpoints by 1.When it reaches an unconscious state checked using IsConscious() method within Actor class, then have a counter initialized to be 0 and increment for each time it is unconscious.When 15 is reached on counter, remove the actor from the map and add a corpse on the map which is an instance of Item class.
5.A brachiosaur can eat as many fruits it finds in a tree in a single turn, but each fruit only increases their food level by 5 since they digest fruits poorly. They can be fed by the player. If this happens, each fruit increases the dinosaurs' food level by 20.
In the playTurn method for Brachiosaur class,We keep on healing dinosaur if we keep on finding fruits on Tree.We can use the FeedDinosaur object in getAllowableActions() method in Brachiosaur class

Breeding

There is a 70 percent chance that all dinosaurs will start mating after they have reached adjacent to each and other
1.If a stegosaur or a brachiosaur is sufficiently well-fed, i.e. has a food level over 50 for stegosaurus or 70 for brachiosaur, it has a chance to breed. A dinosaur that wants to breed will try to move towards another dinosaur of the opposite sex
I have added boolean value (ToDinosaur) in Following class which can be set to true when we so that getAction() method inside class returns the MoveActorAction() specifying the path needs to be taken to reach the closest oppsite sex dinosaur.In the play-Turn method,return the object of this class if food level is over 50
2.if there is one nearby. Once in an adjacent square, the dinosaurs will mate (only with those of their same specie)
Add gender to Stegosaurus and Brachiosaurus class.In the play-Turn method,for female, check if there is a dinosaur with opposite sex,Then we turn the status of this dinosaur to pregnant.I have created an enum class that stores the Pregnant attribute and we can add that to dinosaur using the addCapability method in Dinosaur class
3.Ten turns (for the stegosaur) and thirty turns later (for the brachiosaur), the female of the pair will lay an egg.
Create a counter inside the Dinosaur class and when the counter is reached ,We can use the addItem method in Location to add a new instance of egg to the ground.Class of Egg is created as well.
4.Eggs will hatch after a while (experiment to find a length of time that works well), into a baby dinosaur. Baby dinosaurs are hungry: its starting food level should only be 10. Baby dinosaurs cannot breed. The brachiosaur may have higher chances to become extinct.

Create a AgeGroup enum class .In the Egg class, create a counter and when certain value is reached , then removed the egg from the location and add One of three dinosaur instances depending on their parent and use the addCapability method to add status Baby to it using AgeGroup class

5.After 30 turns for the stegosaur and 50 turns for the brachiosaur, the baby dinosaur should grow into an adult

Also create counter in Dinosaur classes and when their value is reached,remove the capability AgeGroup.Baby from it.

Eco points and purchasing

Add eco-points attribute to Player class

1.a ripe fruit is produced by a tree (1 point).

Add 1 to eco-points of Player in tree class for each ripe fruit produced

2.a ripe fruit is harvested from a bush or a tree (10 points)

In HarvestingFruit class(in the execute method),Add 10 to eco-points of Player

3.fruit is fed to a dinosaur (10 points)

In Feed Dinosaur class(in the execute method),Add 10 to eco-points of Player

4.a stegosaur hatches (100 points)

In Egg class,when counter for hatch is reached, Add 100 to eco-points of Player

5.an allosaur hatches (1000 points)

In Egg class,when counter for hatch is reached, Add 1000 to eco-points of Player

6.a brachiosaur hatches (1000 points)

In Egg class,when counter for hatch is reached, Add 1000 to eco-points of Player

7.You must place a vending machine on the map. This vending should sell:

• fruit (30 eco points)
• vegetarian meal kit (100 points)
• carnivore meal kit (500 points)
• stegosaurus eggs (200 points)
• brachiosaur eggs (500 points)
• allosaurus eggs (1000 points)
• laser gun (500 points)

-Add constant eco-points attribute to Fruit class initialized to 30

-Create class vegetarian meal kit(extending Item class) with constant eco-points attributes initialized to 100

-Create class carnivore meal kit(extending Item class) with constant eco-points attributes initialized to 500

-Create class stegosaur eggs (extending Egg class)with constant eco-points attributes initialized to 200

-Create class brachiosaur eggs (extending Egg class)with constant eco-points attributes initialized to 500

-Create class brachiosaur eggs (extending Egg class)with constant eco-points attributes initialized to 1000

-Create class laser gun (extending Weapon class)with constant eco-points attributes initialized to 500 and damage is set to 50

-Create VendingMachine class(extending Ground class).Create instances of classes created in this block as attributes.Create PickUpFromVendingMachine class extending

PickUpItemAction class.Override the execute method in PickUpItemAction and deduct points of Player whenever purchase is made based on what is purchased.Override the allowable actions() method in Vending Machine class and return actions with instance of PickUpFromVendingMachine for all items that are purchasable.
-In the Application class,Add Vending Machine instance to a random location using setGround() method in Location
-In FeedDinosaur class, also allow the Dinosaur to be healed if the item is an instance of vegetarian meal kit or carnivore meal kit.

Allosaur

1. Breeding

Just like Stegosaur/Brachiosaur, Allosaur has a chance to mate if their food level is higher than a certain level(e.g. 70). They will move towards nearest opposite sex Allosaur by using the followBehaviour() method. Pregnant Allosaur will lay an egg in 20turn and egg will hatch in 50turn.

Baby Allosaur will start with a food level of 20. Food source:

- Attack nearby Living Stegosaur.
- Nearby corpse of Allosaur/Stegosaur/Brachiosaur.
- eggs.

Since they are baby allosaur, they only increase half of the food level value of adult allosaur when attacking Stegosaur(e.g. 10).

Baby Allosaur will grow into adult allosaur in 50turns. We create a counter in Baby Dinosaur classes and when their value is reached,remove the current actor and add an actor with an instance of its Adult Dinosaur with the same food level.

2. Feeding

When Allosaur's food level is below 80, it will move to the nearest food source using the followBehaviour.getAction() method from the followBehaviour(target) class. .

- Attack nearby Living Stegosaur.
- Nearby corpse of Allosaur/Stegosaur/Brachiosaur.
- eggs.

When feeding on corpses of Brachiosaur, increase allosaur food level to maximum value using theheal() method inherited from the Actor class to Allosaur class. If it feeds on corpses of Allosaur/Brachiosaur increase its food level by 50.
When Allosaur feeds on an egg, it increases its food level by 10 and removes the actor(egg) from the map.

3. Attack

When the is a Stegosaur within an adjacent square of Allosaur, allosaur will move towards Stegosaur and Attack it. When Stegosaur is attacked, its food level will decrease(e.g. -20) while Allosaur food level will increase by the amount of damage dealt to the Stegosaur.

We set the status to this dinosaur called ‘attacked’ to True and add a counter of 20. While it is True, the same allosaur will not attack the same stegosaur. When the attacked counter reaches 0, set the attacked status to False. Allosaur will not be able to attack the same Stegosaur for the next 20turn.

If the food level of Stegosaur that is attacked falls below 0, replace the stegosaur with an instance of stegosaur corpse. The allosaur can continue to feed on the corpse.

Functionality 1: If there is a stegosaur nearby> attack. Set stegosaur status attacked=true for 20turn. While attacked = true it will not be attacked.
Functionality 2: Allosaurus can feed on corpses (Stegosaur/Brachiosaur/allosaur).
Functionality 3: They will move towards nearest food source(Living Stegosaur nearby/corpse nearby)
Functionality 4: When attacking stegosaur, stegosaur Food level -20, Allosaur food level +20.