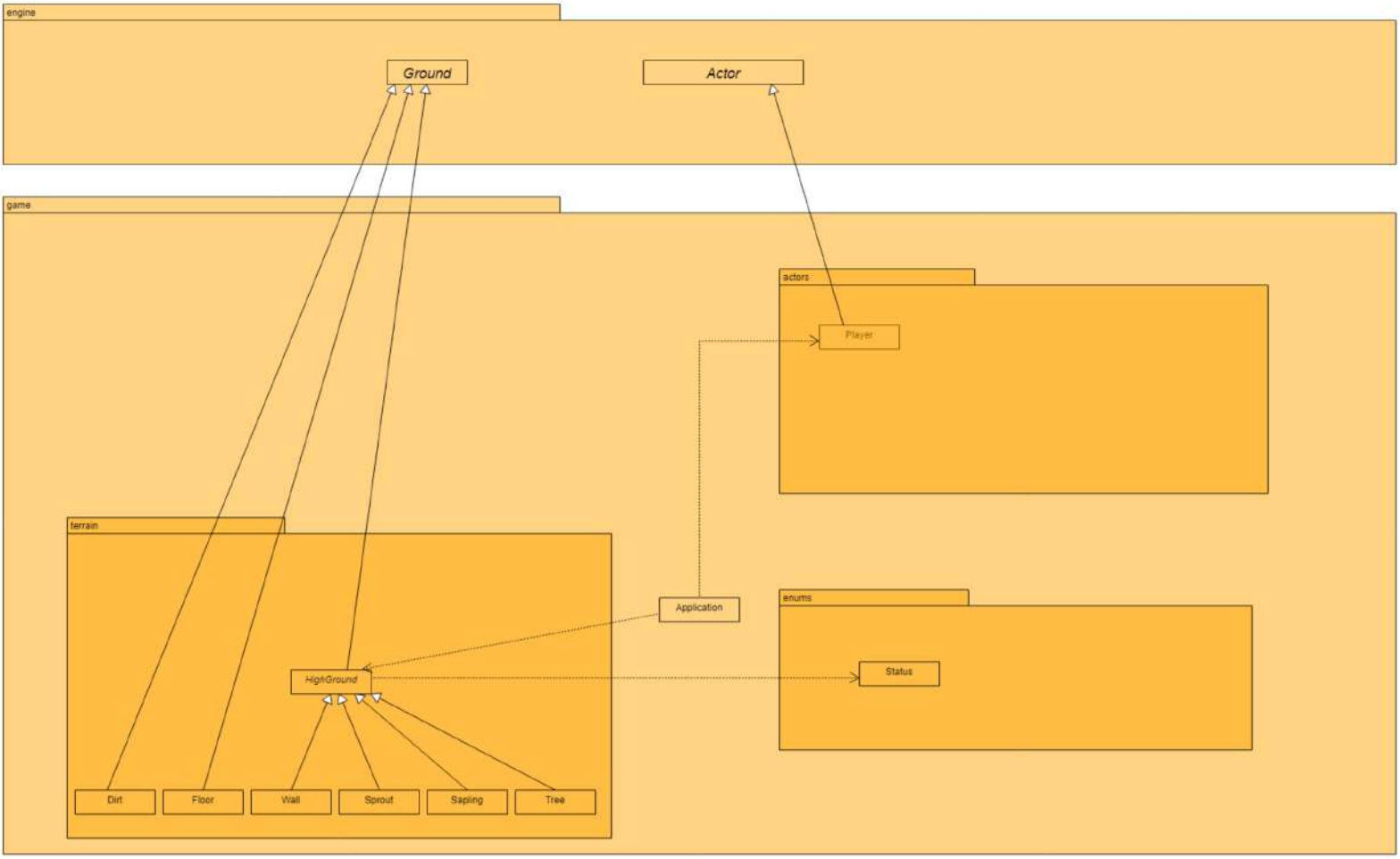

engine
Ground
Actor
game
actors
Player
terrain
Application
enums
HighGround
Status
Dirt
Floor
Wall
Sprout
Sapling
Tree

Add a Sprout class, Sapling,

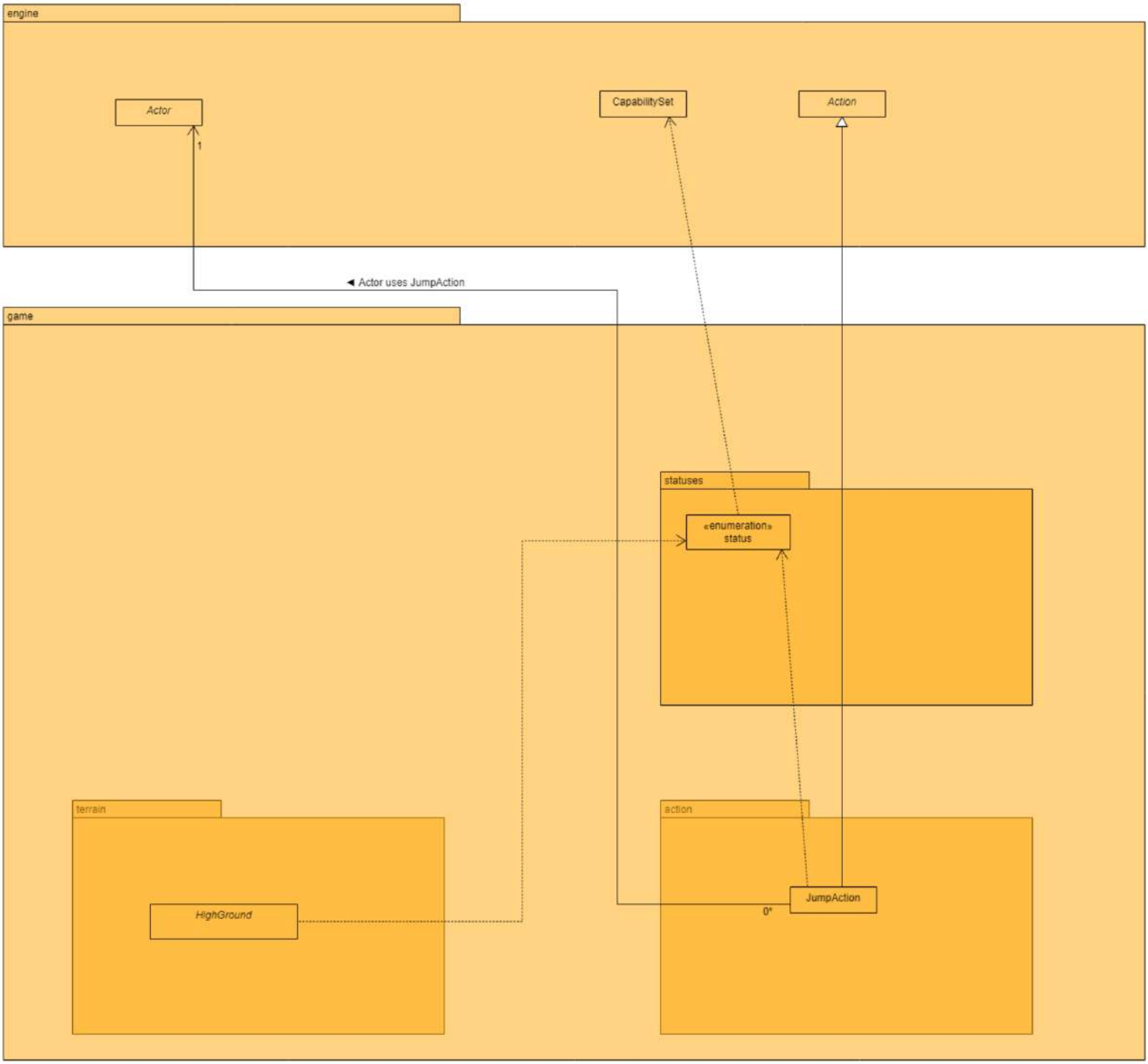
Use GroundFactory to spwan new Sprouts at start.

Sprout, Sapling, Tree and Wall are created as an abstract class of HighGround and then Ground to make it more extendable as what does count as a high ground and what doesnt. As a player has to jump on high ground whereas can walk straight onto floor & dirt.
Hence, following the open closed principle. As it open to extension but not modification.

The HighGround's value is stored in status so we can further find out at what stage the high ground has reached like for Trees.

10% chance for goomba to spawn at Sprout(+) every turn
10% chance to drop a 20$ coin at Sapling(t) every turn
15% chance to spawn Koopa every turn
20% chance tree dies and become dirt every turn

Every turn we have different options possible for each Tree. Which are implemented using the CapabalitySet.


engine
Actor
1
CapabilitySet
Action
◄ Actor uses JumpAction
game
statuses
«enumeration»
status
terrain
HighGround
action
JumpAction
0*

Added JumpAction that extends Action. The JumpAction will be used by player to jump over higher grounds.

Engine to wall: What actions is the player allowed
wall to engine: The player can perform JumpAction
engine to player: You can do JumpAction on wall

Jump option will be displayed to the user in the menu.

Each object will have a debuff option.
Like Wall has 80% success and 20 fall damage
Sprout has 90% success and 10 fall damage
Sapling has 80% success and 20 fall damage
Mature has 90% success and 30 fall damage

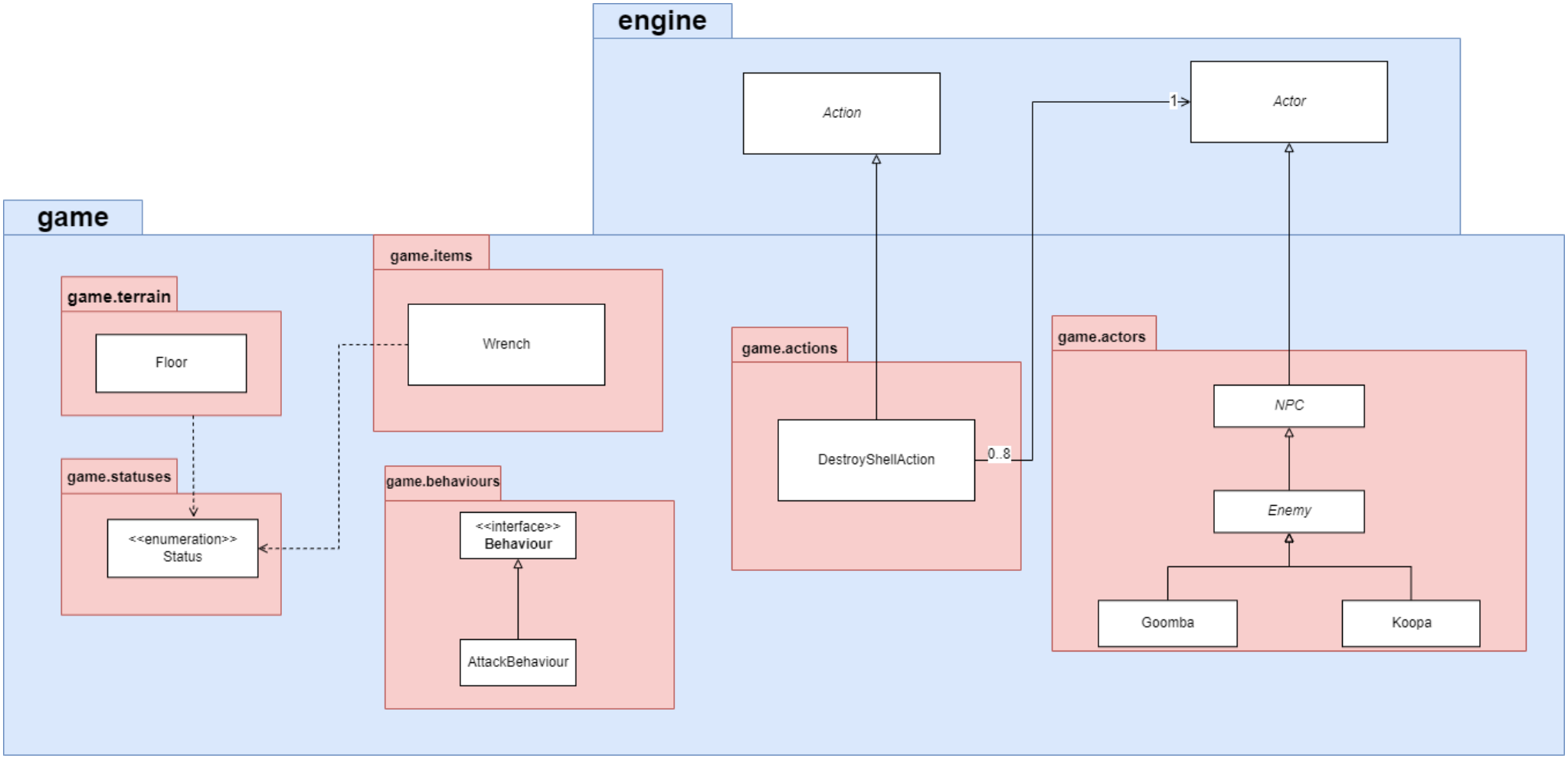
Dependency between HighGround and Status so we can further find out at what stage the high ground has reached li ke
for Trees or if the player has consumed Super star which means it can go over anything without jumping.

Dependency between Status and CapabilitySet, as for each HighGround terrain we need to implement what capabilit ies each
terrain has like the succes rates for each jump of differnet terrain.

Dependency between JumpAction and Status as we need to use this to debuff player depening on different HighGrou nd and different
success rates for each jump.

Requirements 3, 4, 5 UML Diagrams + Documentation by Andy:

Requirement 3 'Enemies' UML Class Diagram



Requirement 3 Documentation

Added NPC abstract class to extend Actor, since all NPCs have some sort of system to keep track of behaviours (HashMap), friendly and hostile included. Allows for extension.

The HashMap of behaviours will be kept in this class with a getter. Also follows DRY

Added Enemy abstract class extending NPC, reason being that ALL enemies cannot enter floor, and it is likely that in the future there will be some other feature exclusive to enemies implemented, follows DRY.

Enemy's constructor's body adds new capability CANNOT_ENTER_FLOOR

All future enemy classes added can extend this class

Added Goomba and Koopa class extending Enemy to diagram

Added AttackBehaviour that implements Behaviour, will scan the actor's surroundings

if it finds an actor with HOSTILE_TO_ENEMY it will return an AttackAction

Modify Floor such that canActorEnter returns False for any actors with CANNOT_ENTER_FLOOR capability

Therefore, added a noteworthy dependency between Floor and Status

Both Goomba and Koopa's attack damage can be handled by overriding getIntrinsicWeapon

Overriding the PlayTurn method can handle the 10% chance of removing Goomba from the map. Additionally, the PlayTurn method can be used to check the enemy's surroundings, if the enemy spots an actor with HOSTILE_TO_ENEMY, a FollowBehaviour will be added to their behaviours

Dormant state will be kept as a Boolean attribute within the Koopa class, and Koopa will behave differently depending on whether it is dormant or not.

isConscious method will be overriden for Koopa to always return true, but if its health points is not greater than 0, then the dormant attribute will be set to true, and its display character will be changed to D

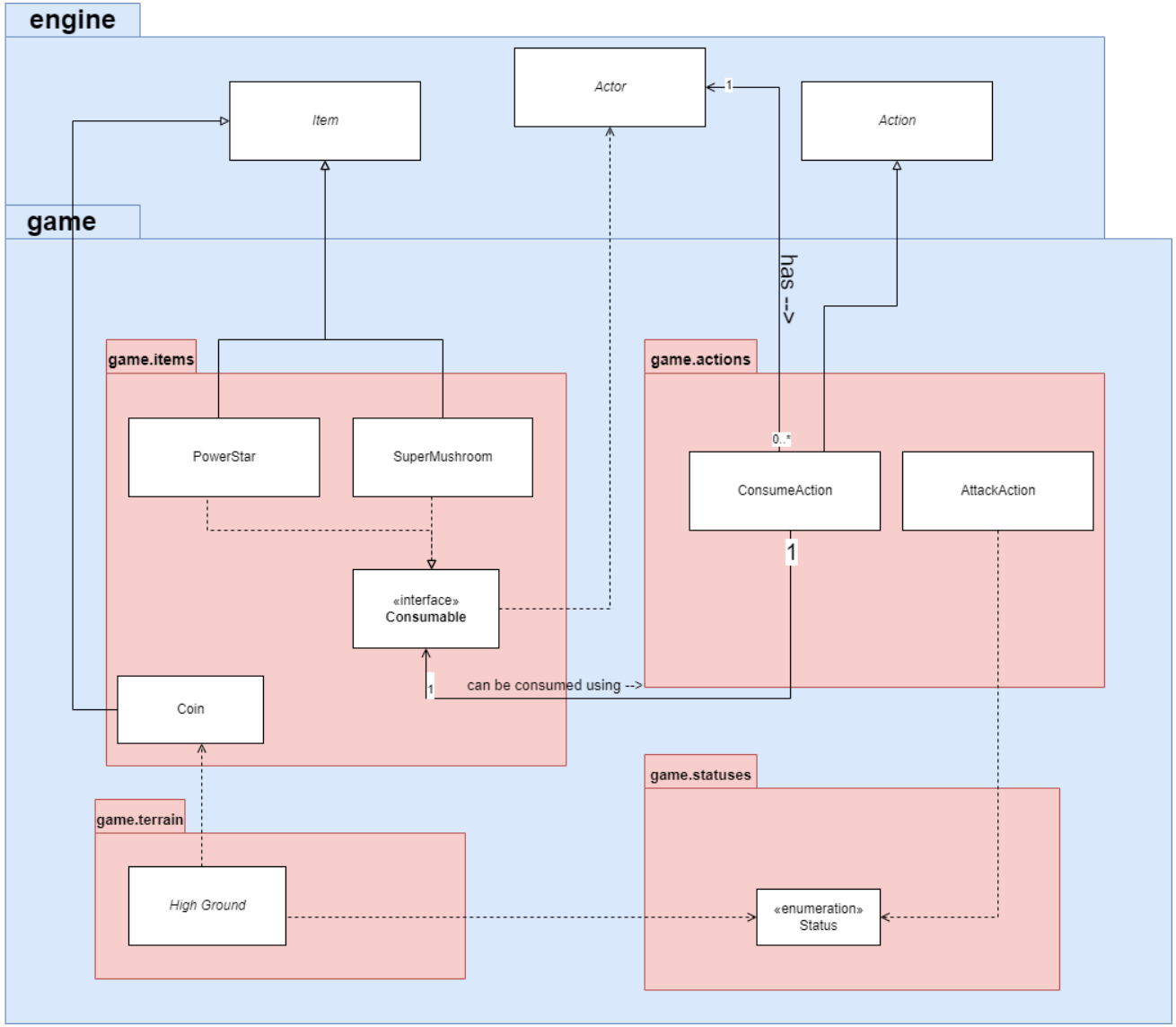
Wrench's shell destroying capability can be implemented by using addCapability in the body of its constructor. Thus, there is a noteworthy dependency between Wrench and Status. (Note: All the relationships missing here for Wrench was already added in REQ5 diagram)

Added DestroyShellAction that extends Action. Basically, this action will just remove the target from the map but prints a custom message.

DestroyShellAction has association with Actor since it needs to keep track of the target of the action.

The 0..8 multiplicity is because theoretically, there can be 8 shells around the player that can be destroyed.

Requirement 4 'Magical Items' UML Class Diagram



Requirement 4 Documentation

Created items package, added Super Mushroom class and Power Star class inside the package, both extending from Item abstract class

in the engine

Since Super Mushroom and Power Star are both consumable items, I will add a ‘Consumable’ interface for consumable items so that OCP is followed if any future consumable items are added.

Both Super Mushroom and Power Star will implement this interface.

Created actions package and added a ConsumeAction class to handle the action of consuming the consumable items, extends the Action class from engine. Has association with Actor and Consumable because both need to be kept track of to complete the action.

Justification for 0..* multiplicity between Actor and ConsumeAction is because there can be multiple items in the actor's inventory that may be consumed

Added dependency between Consumable and Actor

Documenting important dependency between Consumable and Actor:

I will add a consumedBy(Actor player) method to the Consumable interface that generates the effects of consuming a consumable item

(e.g. consuming Super Mushroom grants 50 max hp and TALL status, then the item is removed from inventory, but access to the player is required accomplish this)

Can use tick method to generate ConsumeAction and pass the Actor instance

So far, this diagram follows all the principles. Consumables are easily extendable and existing code do not need to be modified even if

a new consumable has new effects of consumption (OCP).

ConsumeAction depends on the Consumable interface rather than low levels like the items themselves (DIP).

ConsumeAction takes the role of consuming the item, the items themselves take care of their own effects of consumption (SRP)

LSP and ISP are clearly not violated here

Added dependency between High Ground and Status because canActorEnter should return true if player has the

GLOWING Status (from consuming Super Star) and also because High Ground should convert to Dirt IF the player is standing on that location. (Can be implemented by overriding Tick method)

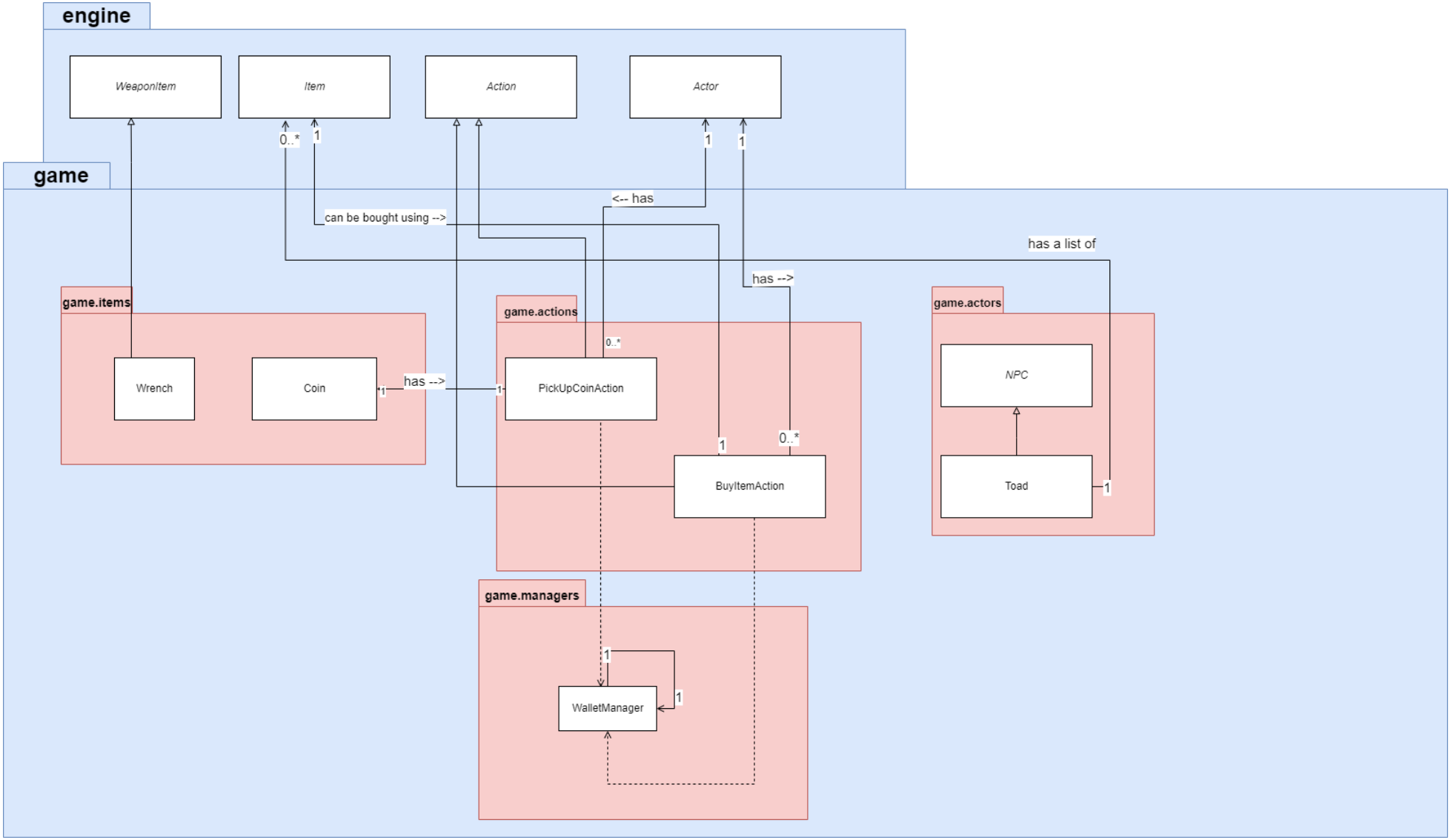
Added Coin class in items package and made it extend from Item abstract class in engine

High Ground has dependency with Coin because tick method should add a Coin to the location of the (former) high ground if a GLOWING

player stands on it

Added dependency between AttackAction and Status because of the GLOWING status check when attacking or receiving damage

Requirement 5 'Trading" UML Class Diagram



Requirement 5 Documentation

Recommending reading REQ4 Documentation and UML diagram first

Added BuyItemAction that extends Action and WalletManager

WalletManager has a private constructor to prevent instantiation and has a private attribute of itself which can be retrieved by calling getInstance. Thus, it has an association with itself

I chose to add WalletManager instead of adding a private attribute called wallet into player so I don't need to downcast Actor to Player when using BuyItemAction to check for wallet. Additionally, by logic, having a singleton wallet manager makes sense because only the player of the game will need access to the wallet. This also allows for extension of the wallet system since it also allows other actors to collect coins FOR the player, such as coin collectors, which wouldn't be possible if we used a wallet attribute for specific actors which requires downcasting.

Added PickupCoinAction that handles picking up coins that instantly add credits to WalletManager

PickupCoinAction has association to Actor and Coin class since they need to be kept as attributes to show the appropriate message in menu.

Also, the execute method needs to know the coin to remove the coin from the map afterwards.

The value of the coin also needs to be accessible.

Justification for the 0..* multiplicity between Actor and PickUpCoinAction is that an actor can have multiple PickUpCoinActions if there are multiple coins in the same location.

PickupCoinAction has an important dependency with WalletManager since it must call getInstance then add the appropriate number of credits corresponding to the coin's worth.

Initially, I wanted to rename Coin to Valuables and make it abstract, create a PickupValuableAction class, then create a Coin class which extends Valuable so that the game can add new valuable items such as Diamonds or Sapphires that give some other functionalities too when picked up. Even though this would follow OCP, I concluded it to be not worth the unnecessary complexity because it seemed highly unlikely a Mario game would add other instantly consumed currency items with different functionalities.

Created Wrench class that extends WeaponItem

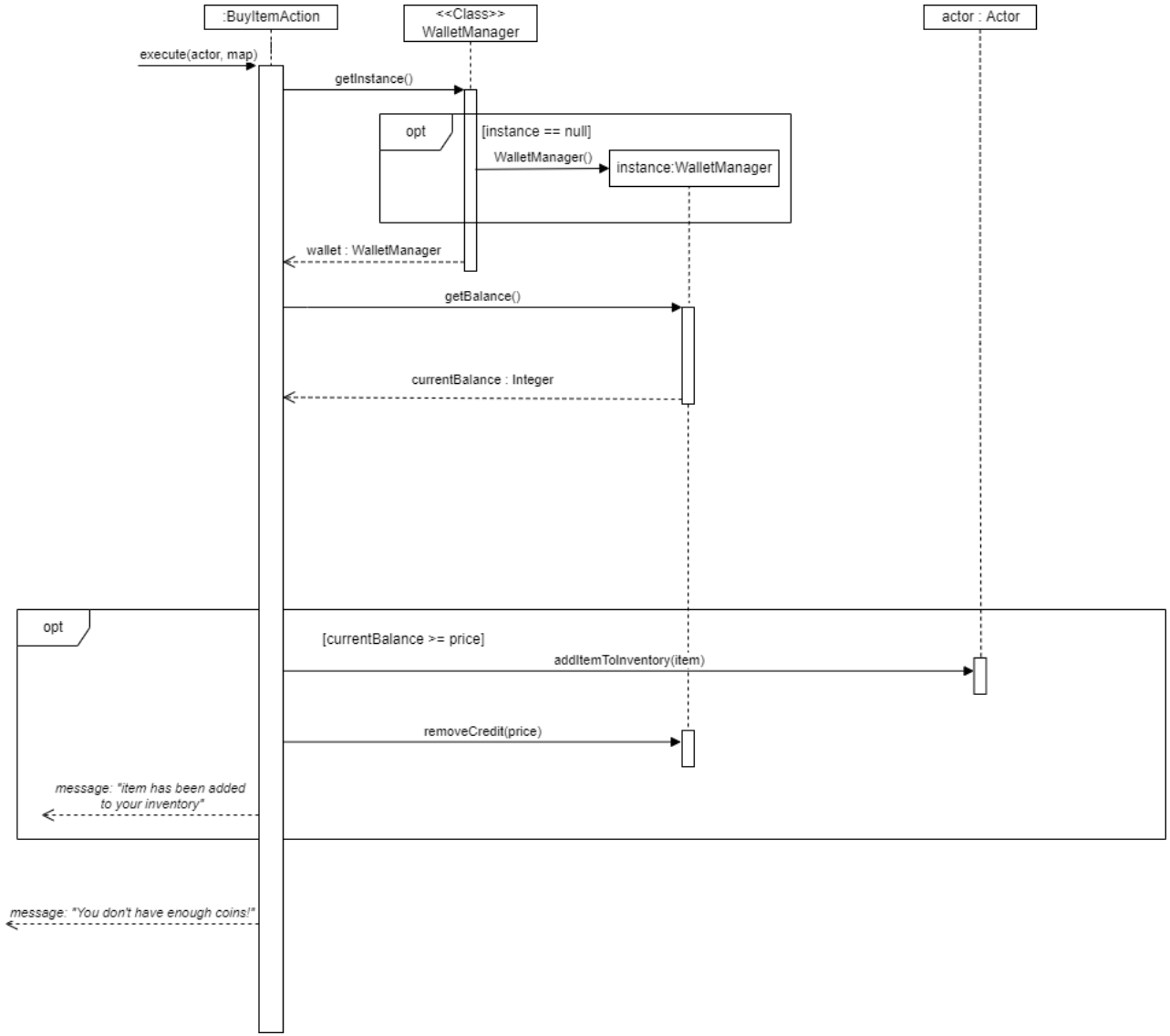
Doesn't have relationship between Item and Super Mushroom/Power Star because it's in REQ4 UML Class diagram

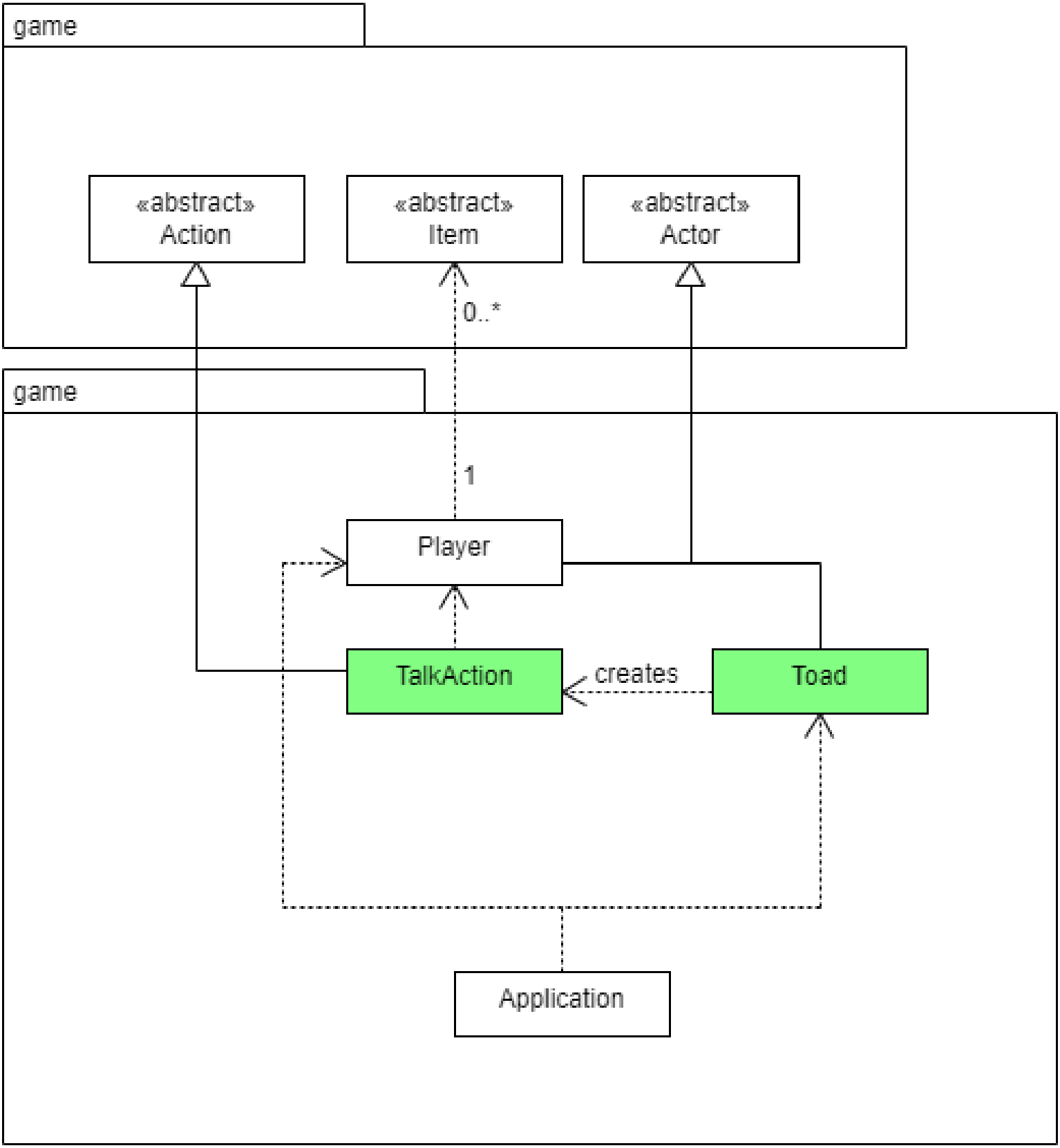
Added Toad class that extends NPC and has an association with Item because he keeps an ArrayList of Items that he can sell by iterating through the array and creating BuyItemActions for each item

BuyItemAction has a dependency with WalletManager and an association with Item and Actor because it needs to be able to add the buyable item to the player's inventory after deducting the balance from WalletManager, or if there are not enough credits, then the item isn't added.

See BuyItemAction sequence diagram below

BuyItemAction Sequence Diagram

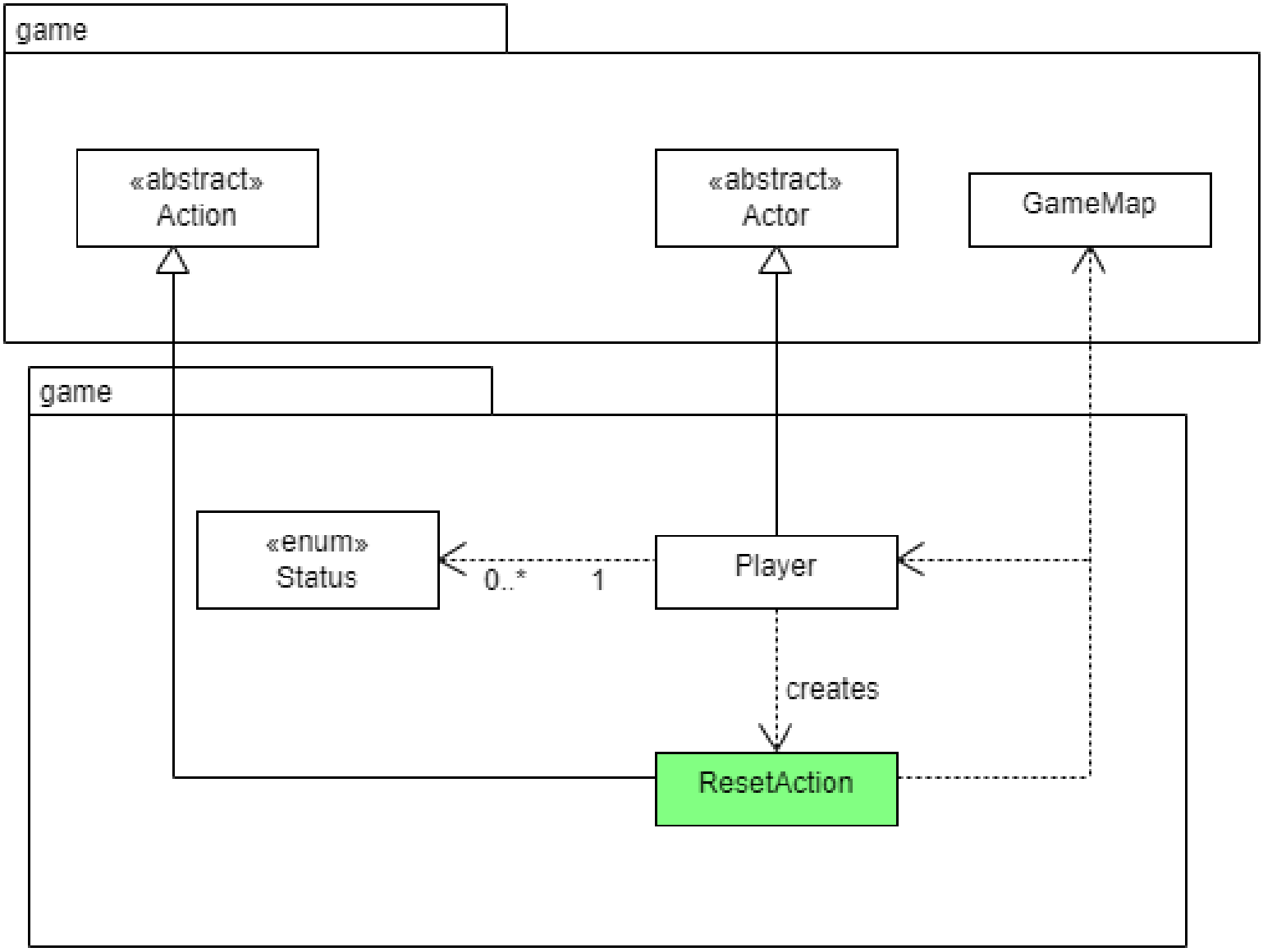



game
«abstract»
Action
«abstract»
Item
«abstract»
Actor
0..*
game
1
Player
TalkAction
creates
Toad
Application

ResetAction is a new class that extends from Action.
ResetAction will be added to the Player's actionList in the playTurn method if the player currently has the status "CAN_RESET".
The enum "CAN_RESET" will be added to the capabilityList in the Player's constructor.
Once the user has used ResetAction the capability will be removed and as a result will no longer be able to use ResetAction again.

ResetAction class has a dependency on the GameMap and the Player. It will iterate through each Location in the GameMap and check the reset
conditions eg. if location contains tree, if location contains actor. It will then "reset" those things eg. if it contains a tree 50%
chance to reset to dirt. Then it will iterate through the Player's CapabilityList and remove any statuses and heal the player to a maximum.

This implementation will only need to add one extra class. As ResetAction extends from Action no other changes need to be made in order to
implement this class other than adding a few things to the Player class and dependencies are kept to a minimum
clearly showing adherence to the Open-Closed Principle and Dependency Inversion Principle.
Implementing the actual "reset" is made easier as there are many helpful methods in Location and Actor that can be utilized.


game
«abstract»
Action
«abstract»
Actor
GameMap
game
«enum»
Status
0..*
1
Player
creates
ResetAction

Add TalkAction to the ActionList in Toad's allowableActions method.
This means anytime Player is adjacent to Toad the TalkAction will be allowed.
This follows the system already in place for actions the player can take.

TalkAction is a class that extends from the Action class.
When the execute method is called from TalkAction it will iterate through the players inventory and capabilityList
and will add sentences to a list based on the given requirements not adding the ones that shouldn't be displayed.
It will then randomly select one to be returned which will then be displayed through the processActorTurn method in World class.

This implementation doesn't modify any existing classes and only adds new ones showing and more conditional dialogue options can be easily added
clearly showing the Open-Closed Principle.