# Design Rationale for Requirement 5: Trading

## Explanation of system

This system enables the trading functionality, by which the player can interact with Toad, and trade coins for useful items. The system involves Toad’s interactions, which can be to speak to the player, or trade with the player. It also shows that items can be held by Toad, and when traded for can be transferred to the player. (Note: items can also be found on the ground). It also shows that the player can collect coins while playing, and their value will be added to the player’s wallet.

## Choice

Adding Toad as a new actor

## Justification

Toad is a friendly NPC actor who can be interacted with by Mario. He can speak to Mario, or trade with him.

## Choice

Giving Toad the interactions of speaking and trading

## Justification

Toad is given 2 actions, speaking with Mario or trading with Mario. These actions are their own classes, but are extended by the ToadAction class, which will include the shared attributes and functionality that all of Toad’s actions need. This supports the Don’t Repeat Yourself (DRY) principle as we are using inheritance and abstract classes to reduce the redundancy of code, as well as the Open-Closed Principle from SOLID principles, as future actions can easily be implemented by extending from the parent class ToadAction.

## Choice

The Trade function

## Justification

The trade function allows the player to trade coins to Toad, in exchange for a useful item. This is done by checking and subtracting an amount of coins from Mario’s wallet, and moving the item from Toad’s inventory to Mario’s or instantly using it.

## Choice

Movement and storage of Items

## Justification

Items can be stored in Toad’s inventory, or Mario’s inventory when traded for, or can be randomly found on the ground. Items can be moved between these 3 storage locations, and can be used by the player when in Mario’s inventory.

## Choice

Collecting and tracking of Coins

## Justification

Coin objects can be picked up from the ground or from sapling trees that spawned them. When picked up by Mario, the coin object will be removed, and the value of the coin will be added to Mario’s wallet. The wallet will only be an attribute of Mario’s player character, and so the coins are no longer necessary. We decided to implement the collection of coins this way as it is the most efficient since we do not have to store extra objects, and does not lose any functionality as the coin objects are no longer needed after being collected.