# Changes to Assignment 2 Implementation

* Added **CropCapability** enum to be used in **Crop** and **Farmer** to identify if **Crop** is ripe or unripe. So, there is no need to make assumptions if the crop is ripe or unripe based on the size of **allowableAction** on **Crop**.
* Instead of **CraftWeaponAction** being responsible of creating the upgraded weapon from **ZombieLimb**, the subclasses of **ZombieLimb** are responsible. This is done to follow the Open/Closed Principle. Now **CraftWeaponAction** is open for extension by introducing new upgradable items without modifying it. To achieve this, an **upgrade()** method is added to the **ItemInterface** which returns an upgraded form of the item if it has one, else, it’ll return null.
* Originally, the name of the **ZombieLimb** is used to identify whether the limb is an arm or leg. This is a Connascence of Name (CoN) that an IDE cannot pick up and can lead to a bug that is hard to identify if the name of the **ZombieLimb** is changed. To avoid this, **ZombieLimb** is changed to an abstract class and has two subclasses – **ZombieArm** and **ZombieLeg**. This still has a CoN but it works to our benefit as an IDE can easily identify the bug.
* Removed use of **instanceof** as it is a code smell which restricts polymorphism and reduces code extendibility. It is replaced with the use of **Capabilities** to follow The Open/Closed Principle.
  + Added **EatCapability** enum to identify whether an **Item** can be eaten, rather than checking if the **Item** is an instance of **Food**.
  + Added **GroundCapability** enum to identify whether a **Ground** is sowable, rather than checking if the **Ground** is an instance of **Dirt**.
  + Added **ActorCapability** enum to identify whether an **Actor** drops the crop or pockets it after harvest.
* Refactored some code out of **Human** and **Farmer** so they only have one responsibility, and that is to store the behaviours they exhibit. The responsibilities refactored out are:
  + Eat food from inventory
  + Pick up food on the ground at their location
  + Fertilize unripe crop (Farmer only)
  + Sow crop (Farmer only)
  + Harvest crop (Farmer only)

A class that implements **Behaviour** is created for each responsibility and is appropriately added to their **Behaviour** attribute which is now an array **Behaviour[]**, to hold several behaviours. This now follows the Single Responsibility Principle which makes **Human** and **Farmer** easier to maintain and extend.

* Separated movement related **Behaviour** (ie. **HuntBehaviour**, **WanderBehaviour**) into a different array which will be iterated through after the non-movement **Behaviour** array. This is done to make the code more readable and the **Behaviour** object doesn’t have to be checked if it is a movement behaviour at the start of each iteration.
* Duplicated code that determines a valid location for an **Item** to be dropped has been refactored out of **HarvestAction** and **DropAdjacentItemAction** and made into its own class. This was done to follow the DRY principle.
* The **Food** class was changed to an abstract class so more types of food can be added into the system easily. A **Spinach** class is added and is now created in **HarvestAction** instead of **Food**.
* The spawn responsibility is refactored out of **HumanCorpse** to follow the SRP. The class **SpawnActor** is now responsible for spawning any **Actor**, including **Zombie**.
* Encapsulated tightly coupled classes into packages:
  + **game.attack**
    - contains classes involved in the attack process and events after
  + **game.drop**
    - contains classes that work together to drop items at a valid location.
  + **game.eat**
    - contains classes that work together for the process of eating food. **game**
  + **game.farming**
    - contains classes related to farming, included fertilizing, harvesting and sowing
  + **game.human**
    - contains the **Human** class and its subclasses and **ActorCapability** which are used by the subclasses
  + **game.speech**
    - contains classes responsible for speech
  + **game.zombie**
    - contains the **Zombie** class and its characteristics. It also contains classes closely coupled with **ZombieLimb**.