Practical 2 – OO Design and Implementation

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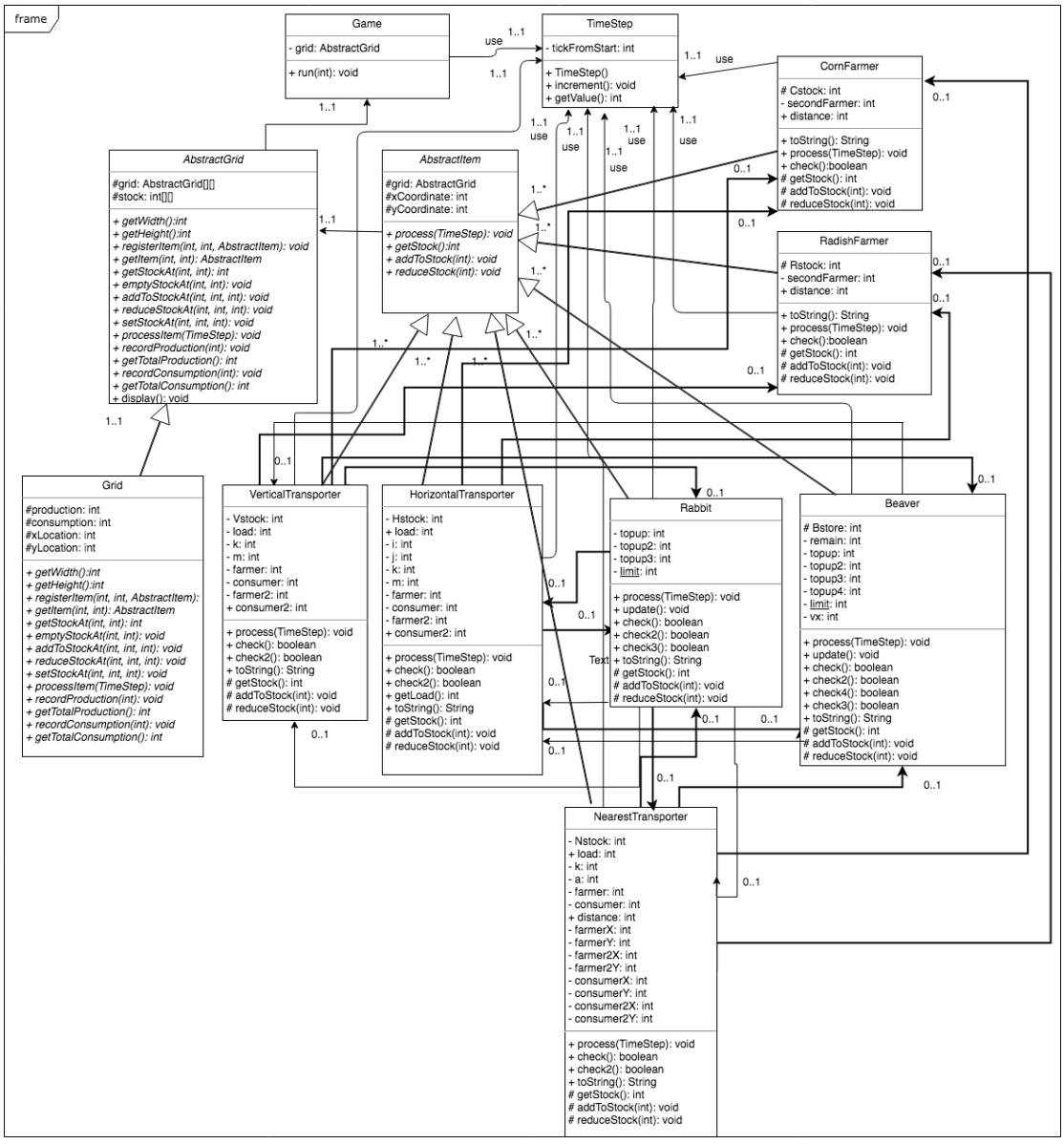
UML class diagram:



The UML class diagram above includes the basic requirement and advance extension requirement (the class is named as "NearestTransporter"). There are 12 classes above, 4 of them are the original file and other 8 classes are the own files I created. Two abstract classes which name "AbstractItem", "AbstractGrid" are the super class which both require at least one sub class to implement them (1..*). The class "TimeStep" is the class

used for counting the program worktime and the other classes which needs to be processed should have exactly one "TimeStep" class to make them loop. There are 2 farmers classes "CornFarmer" and "RadishFarmer" used for producing nutrition and both of them should extend to the abstract class "AbstractItem" and they need to implement all the abstract functions of "AbstractItem" class. There are 2 basic transporter "VerticalTransporter" and "HorizontalTransporter", "VerticalTransporter" needs to check whether one side vertically have the farmer and another side vertically have consumer class and if it works and it will add the nutrition from farmer class(if farmer produce) to its stock, and waits for the consumer class to deal with it. "HorizontalTransporter" class have the similar features with the "VerticalTransporter" but check different directions. "Rabbit" and "Beaver" classes are belong to the consumer class and it will check whether itself has transporter in the correct place and then it will take the nutrition if the transporter has stock. "Beaver" will store the nutrition if it cannot deal with it until the store reach the limit(50) but "Rabbit" not.

In extension part, I have created the "NearestTransporter" class. It will search the grids whether have farmer first and if it searches it, it will check the location whether is within its range and if the farmer class within its range and it will check whether has the second farmer within its range. If it cannot search the second farmers, it will search the grid whether have consumer in the grid , check the consumer location within its range and finally check whether has the second consumer nearby. It will process only if all the conditions above meet the requirements. By the way, I have added one more method in the class "Rabbit" to check whether "NearestTransporter" exists and if it exists and it has stocks, "Rabbit" will consume it as usual. Finally,The "grid" class I have changed the transporter method so that the grid will check whether "NearestTransporter" class exist. Although all the tests have passed, I think my programs still can be improved because I have found that I do not need to modified the "Beaver" class in the extension part and the program will pass all the test as well. Finally, the practical work is not very hard but cost me nearly one and a half week to deal with it, I enjoy it and I hope the deadline can be extended in the future so I can handle other deadline as well.