

# Harvest Moon High Level Design (HLD) Document By Vikram Aikat

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## 1. Introduction

The Harvest Moon simulation will be made using Agent Sheets, and it will model the following story.

Ernie has recently purchased a farm in rural North Carolina. The previous owner has abandoned this farm a while back, and thus it is in a bad shape. Ernie is unsure of whether or not to continue farming on this farm, and wants you to create a model to simulate what could be done.

The plants will grow at a constant rate. The plants must start from seeds, and grow into full plants. When the plants are at their maximum size, the farmer (Ernie) will harvest them. Ernie will then sell those plants for a profit. After harvesting them, the plants will start growing from seeds all over again. A certain amount of time steps in Agent Sheets should correlate to one day in the real world. The amount of money Ernie makes per day should be graphed.

## 2. Subject Matter Experts Agreement List

Name	Title/Role	Mandatory Reviewer (Y/N)	Approved
<i>Apprentice Name</i>	Developer	Y	
<i>Supervisor Name</i>	Supervisor	Y	
<i>Mentor Name</i>	Mentor	Y	

## 3. Requirements

Look at the story in the introduction and answer the following questions:

- There should be an Agent for the farmer (Ernie), this agent should be depicted as Ernie's Head.
- Ernie will be growing *plantus ernesticusedinboros*, and this should be depicted as however you want, but must be in Ernie's favorite color. You will have to ask him what it is.
- *Optional: When Ernie harvests a plant and sells it, his depiction will show a dollar sign over his head for a few time steps.*

- The plants will have different adjectives describing them. They will have a seed stage, a growing stage and a fully-grown stage.
- What activities does each character do? These are behaviors of the agent.
- The plants will grow, going from a seed to a plant to a fully-grown plant.
- The farmer will harvest the fully-grown plants and sell them for a profit.
- The plants must be fully-grown for the farmer to harvest them.
- The plants will change their adjectives over time, at a set rate. The farmer will move towards the plant when it is fully grown
- **Tip: This harvest/growth process can be done in the following way:**
  - As the plant grows, it has a variable that increases over time.
  - As the variable reaches certain amounts, it will change from a seed to a growing plant, and at another amount it will go from a growing plant to a fully-grown plant.
  - When this variable reaches a certain amount, the farmer will move towards it and harvest it.
  - After harvesting it, the plant will lose the entire amount in that particular variable.
  - The farmer will sell the plant for the amount that the plant had when it was harvested.
  - This amount will be added to a different variable, associated with the farmer, which will be his profit.

**a.** An AgentSheets model showing the interactions of agents which exhibit the following behaviors:

**i.** *Farmer*

- 1.** *To harvest the fully grown plants*
- 2.** *To sell the plants after harvesting them.*

**ii.** *Seed*

- 1.** *Grow over time into a growing plant.*

**iii.** *Growing Plant*

- 1.** *Grow over time into a fully-grown plant*

**iv.** *Fully-Grown Plant*

- 1.** *Be harvested by the farmer*
- 2.** *Continue to grow over time*

**b.** A graph showing the increase in total profit over time as well as the increase in daily profit per day.

- c. Users should be able to change the properties of the simulation to alter the plants' behaviors.

#### 4. Timeline

Your project is due by 6/28/2013. If you can finish it earlier that will be great.

#### 5. Desired Behavior / Components

##### **Farmer:**

To harvest the fully grown plants

- a. If a plant is fully grown walk to it
- b. When adjacent to a fully grown plant, harvest it, turning it back into a seed

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##### **Seed:**

Grow over time into a growing plant

- a. Slowly increase a certain variable called growth
- b. When growth reaches a certain amount, change from a seed to a growing plant

##### **Growing Plant:**

Grow over time into a fully-grown plant

- a. Slowly increase a certain variable called growth
- b. When growth reaches a certain amount, change from a growing plant to a fully grown plant

##### **Fully Grown Plant:**

Continue to grow over time

- a. Slowly increase a certain variable called growth

Be harvested by the farmer

- a. Attract the farmer
- b. When adjacent to the farmer, turn back into a seed, setting growth to zero

#### 6. Conclusion

The goal of this activity is to understand how to design an AgentSheets model based on a story. If you have any questions about my requests, please talk to me.