
2016 Jim Li's "Levi and the Merry Makers"

High Level Design (HLD) Document

1. Introduction

Step 1. Write a story!

-The Story-

"Levi and the Merry Makers"

Levi has fled the "old world" to make a new life in the newly discovered land of the "NEW WORLD" (Such creative names). Levi fled the old world with his band of merry makers in tow; a "x" number of villagers. Levi is a ruthless despot (Interns beware) and will assign the other people their duties later.

In the "new world" there is nothing but forest (trees, smurf berry bushes and a small lake) as far as the eye can see. Levi and his merry makers will arrive in the "new world" and move randomly around as a unit until she randomly decides to start a colony called "New Dali". The goal in New Dali is to expand. It is at this time Levi orders one of his merry makers to become a builder and the others to become a villager.

The builder will have two roles:

1. Gather wood.
2. Build structures.

Builders will do the following

1. The first building that the builder builds is the central storage unit. This building will use the wood from the first tree that is cut down by the builder. This building will only be built once and have unlimited storage capacity.
2. The storage unit will only deteriorate if no people are alive in the world. The builders will then start collecting wood to build houses for the villagers

The builder will then start collecting wood and storing it at the central storage unit. If the population is in need of housing the builder will take "x" pieces of wood to build a new house. Each house can hold "x" number of people. Houses will deteriorate only when no one has slept in it for "x" number of days.

Villagers will need to go out and find food (smurf berries) and water for the village. The villagers bring food and water to the storage building. Villagers can eat and drink when they are at a food/water source or at central storage. Villagers cannot eat/drink when transporting food or water.

When the workers have enough food and water they are happy and will reproduce. build another section to the village. With more sections more people are able to live in the village. If the villages do not get enough food the village will start to deteriorate and the people will soon die.

2. Subject Matter Experts Agreement List

Name	Title/Role	Mandatory Reviewer (y/n)	Approved
Jim Li	Software Project Manager	Y	
Anagha J	Software Engineer	Y	
Ernie Edinboro	Supervisor	Y	

3. Requirements

- Groups of 2
- Document your work in your notebooks
- Project High Level Design WILL be written in shared Google Document
 - Shared with Ernie
- Project HLD will be tool/programming language neutral. Use your programming vocabulary tool box.
 - variables
 - loops
 - conditional statements
 - functions
 - arrays
 - objects
 - Math functions (random, floor)
 - operators (addition, concatenation, subtraction, multiplication, division, modulus, 'and', 'or', 'not', equals, not equals, less than, greater than, less than or equal to, greater than or equal to)
- Project model will be written in Excell, Vensim, or AgentCubes

4. Timeline

- **Project is Due August 19th**
- You will have **5 days** to work on this project. A total of **35 hours**.

- Must have a full plan approved before starting work on coding (this follows the common Shodor-ism, "First we plan, then we get approval, then we implement").
- Use your time wisely.

5. Desired Behavior / Components

- **Website**

- Instructions on how to use the model
- Working Model
- Create link to the following files on your website
 - HLD document, it will be a downloadable file
- **Each person** will host a copy of the group project website from their personal website. Example:
 - shodor.org/~ernest/groupProject2
 - shodor.org/~aweeden/groupProject2

- **The Model**

-Agents-

1. Levi
2. Travelers/Merry Makers
3. People in the Village (Builder, Villagers)
4. Trees
5. Smurf Berry Bushes
6. Small Lake
7. Houses

- Agent behaviors-

- When the world is created a lot of trees and smurf berry bushes are spawned
- Levi and 10 Traveler appear from the right side of the map, and they move randomly for 30 timesteps.
- After 30 timesteps, one Traveler will become a Builder, the rest will become Villagers.
- The Builder, Villagers, and Levi move randomly.
- If the Builder finds a tree and cuts it down, the total amount of wood will increase by 3.

- If the villagers needs a house, the builder will build a house (if there is more than 6 wood) The total amount of wood will decrease by 6.
- If a Villager finds a smurf berry, it will eat and its food level will increase by 1. Villagers can take food from the smurf berry 5 times before the smurf berry disappears.
- If a Villager's food level both reach 5, a new Villager will be created, and the food level of both will be reset to 0.
- If a Villager's food level does not increase for for 30 timesteps, the Villager will die. (number of timesteps might be changed according to how fast the Villagers die out)
- If all the Villagers are dead, the Builder and Levi will both die.

Step 2. List out data you think you will need.

-Variables-

1. Agents
2. World
 - a. Size = 20*35

Step 3. List out functions you think you need.

AgentCubes

1. Draw
2. Erase
3. Next to
4. % Chance
5. Once Every
6. Move random on
7. See
8. On top of

Step 4. What tool or programming language will be used?

List out any tool or programming language specific planning.

1. AgentCubes
 1. Specific Planning listed above.
2. Vensim or Excel
 1. Create a population of Villagers with 10 at the start.
 2. Create a population of Builders with 2 at the start.
 3. Create a population of Trees with 100 at the start.
Trees have 8% chance of making a new tree.
 4. Create a population of Smurf Berry Bushes with 50 at the start.
Smurf Berry Bushes have 5% chance of making a new bush.
 5. Create a population of Houses with 0 at the start.
 6. Create a population of Wood (trees cut down down).
 7. Create a population of Food with 20 to begin with (Smurf Berry Bushes cut down).
 8. Each villager has a 10% chance of finding a Smurf Berry Bush and cutting it down (if bush is cut down, add 1 to Food Population and remove 1 from Smurf Berry Bush Population).
 9. Each villager has a 8% chance of eating from the Food Population.
 10. Builders have a 75% chance of cutting down 1 tree (if tree is cut down, add 1 to Wood Population and remove 1 from Tree Population).
 11. If there are 4 trees in the "Trees cut down" population, and there are not enough houses for the villagers, then the builder will build a house. You must have 1 house per every 5 villagers.
 12. Each villager has a 2% chance of reproducing.
 13. Each villager has a 0.25% chance of becoming a builder.
 14. Each villager has a 10% chance of dying.