<Art Walking, Anew> High Level Design (HLD) Document

1. Introduction

A new 24-hour gallery wing is opening in the Louvre Museum in Paris. The curator has hired you and your software engineer to help them maximize foot traffic in the space while maximizing the number of art pieces they can display in the gallery.

2. Subject Matter Experts Agreement List

Name	Title/Role	Mandatory Reviewer (Y/N)	Approved
Apprentice name	Developer	Y	
Phil List	Supervisor	Y	
Eric Horton	Intern-apprentice wrangler	Y	
Mentor	Mentor	Y	

3. Requirements

The gallery will start with three pieces of art located in the gallery. A random number of people (0-4) will enter the gallery every time step.

The guests will enter the gallery from the right and move around randomly trying to view over 50% of the works of art. Guests will keep track of what pieces of art they have viewed. When a guest is next to a piece of art they will stop moving for a random number of time steps (1-5). Once a guest has viewed over 50% of the pieces of art in the gallery, he/she will head directly to the exit out of contentment and wonder (happy). Each guest will have a "crowd tolerance" for how many people are in the room. A guest's tolerance will be a random number (5-25) giving to them upon entering the gallery. Guests will count how many times they cannot move because someone is in their way. When the guest count number equals their tolerance number, the guest will head directly to the exit out of frustration (unhappy).

The curator will count how many people leave happy and unhappy. Every 24 hours the curator will add one new piece of art to the gallery. The curator will keep adding new pieces until the number of unhappy guest is 80%, or the model runs for 30 days, whichever happens first.

One time step = 30 seconds
Gallery size = 20x40
People, entrance, exit, and art work = 1x1 square

The following outline describes each agent and its depictions.

- **Curator**
  - **Stationary**
  - **Count the number of happy and unhappy people and paintings each time step**
  - **Count the number of time step passed**
  - **Adds a new painting every (2 * 60 *24) time step in a random location inside the gallery**
    - ◆ **Stops adding when (2 * 60 * 24 * 30) time step passed or when the proportion of unhappy people are above 0.8**
- **Customer**
  - **Has random tolerance level from 5 – 25 and individual variable named 'count'**
  - **Walks randomly on the gallery**
    - ◆ **Tolerance level decreases by 1 if it cannot move**
  - **If tolerance level = 0, it goes out of the gallery unhappily**
  - **If it saw 50% of the artworks within the tolerance level, it goes out of the gallery happily.**
  - **It walks randomly once outside the gallery, but it may not go back to the gallery.**

- **Paintings**
  - **Stationary**

4. Timeline

This is due within five days of receipt of the task (that would be Friday, June 20 for those receiving this Monday, June 16). It is better to complete this sooner, so that you can begin implementing an HLD that one of your classmates has written.

5. Desired Behavior / Components

- **Counting agents**
  - **At each time step, count each agent and store it to a variable**
    - ◆ **Make sure they do not stack up and resets to 0 when the simulation restarts**

- **Checking the proportion of unhappy people**
  - **When a person goes out of the gallery happily, set variable 'happy' to 'happy' + 1. Initial value of 'happy' is 0.**
  - **When a person goes out of the gallery happily, set variable 'unhappy' to 'unhappy' + 1. Initial value of 'unhappy' is 0.**
  - **Proportion of unhappy people is ('unhappy')/('unhappy' + 'happy')**
    - ◆ **Make sure you avoid the division by 0 error**
    - ◆ **Store the value to a variable 'unhappyProportion'**
- **Decreasing tolerance level**
  - **When people are generated, set variable 'tolerance' to a random number between 5 – 25.**
  - **Set 'tolerance' to 'tolerance' – 1 each time step.**
- **People leaving happily**
  - **People move randomly inside the gallery**
  - **When they are next to an artwork, set variable 'count' to 'count' + 1**
    - ◆ **If 'count' is larger than or equal to number of artworks, they go to the exit.**
- **People looking at artworks**
  - **When they are next to an artwork, a random number is generated between 1 and 5 and is stored to a local variable called 'temp'**
    - ◆ **Each time step, set 'temp' to 'temp' – 1**
    - ◆ **If 'temp' = 0, they move randomly again or goes directly to the exit if satisfied.**

6. Conclusion

The goal is this activity is to simulate a behavior of people in an art gallery. You should be able to make a valid conclusion describing what you observed and analyze the authenticity and possible application of this model.