
Burmese Python Invasive Species Agent & System Computer Model

High Level Design (HLD) Document

1. Introduction

This document describes the High Level Design (HLD) for an agent and system computer model of the spread of the burmese python in Florida as an invasive species and how it affects the populations of native species. It lists the personnel involved in the project, the requirements of the end product, a timeline for completion of the project, and a detailed description of the desired behavior and components of the end product.

2. Personnel

The following table lists the personnel who will be involved with this project. Approval must be acquired, as needed, before proceeding to develop the product described in this HLD.

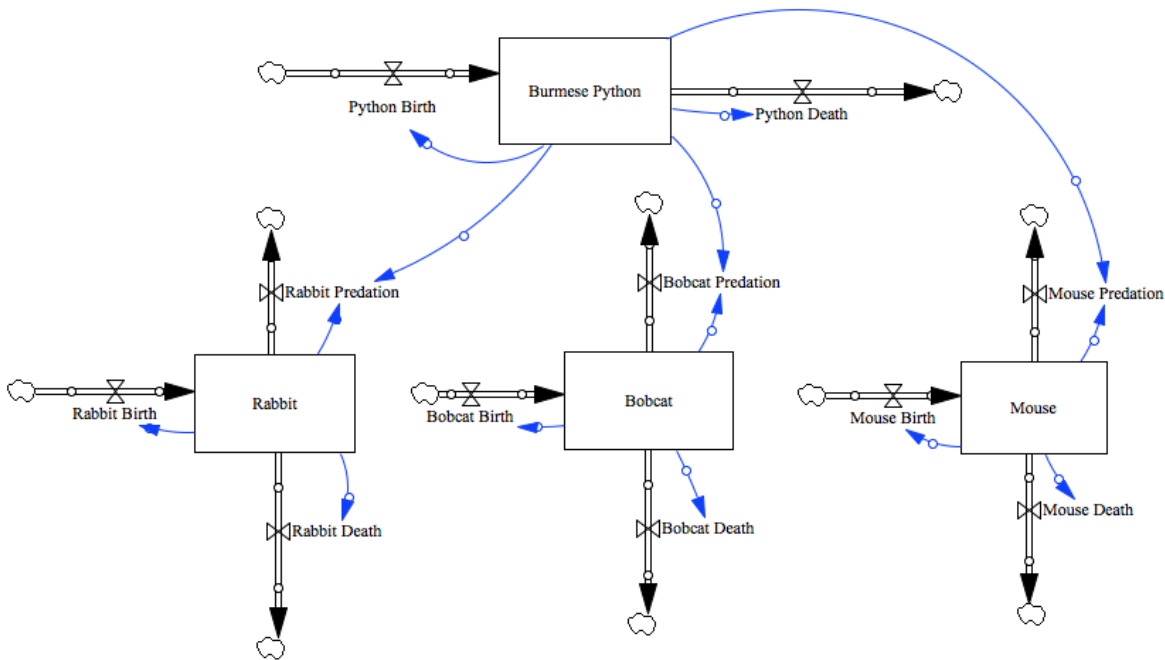
Name	Role	Need Approval? (Y/N)	Approval
Rohan Kashyap	Designer, Developer	Y	Yes
Seokyoung Hong	Peer Reviewer	Y	Yes
Ernest Edinboro	Apprentice Coordinator	Y	Yes

3. Requirements

The following is a description of the requirements for this project.

- System Model
 - Vensim
 - Three Versions
 - Version 1: Python + three prey
 - Version 2: Previous + all prey + predator
 - Version 3: Previous + show comp to endangered Florida panther
 - Graph

- Basic Model:



- Agent Model
 - AgentCubes
 - Three Versions
 - Version 1: Python + three prey
 - Version 2: Previous + all prey + predator + water terrain type
 - Version 3: Previous + show comp to endangered Florida panther
 - Graph
 - Differences from Vensim:
 - Include different terrain: land + water
 - Include more organisms
- Website
 - Presentable
 - Have access to both models
 - Overview of story and both models
 - Explain previous model versions
 - Show agents + colors

4. Timeline

Fill out section 5 (Desired Behavior/Components) and get approval

In section 5, the designers must describe the agents in their model and the behaviors of those agents, as well as any additional user interaction components.

Create models

The developers must create a program that fulfills the desired behavior/components as defined in section 5 of this document.

Create website

Each developer must have a copy of the code in his/her public_html folder. The website should have all aspects listed in requirements.

5. Desired Behavior/Components

- **System Model**

- Box Variables
 - Python
 - All prey
 - Predator/Prey: Alligator
 - Highlighted endangered species
- Behaviors
 - Python eats all
 - Each animal has its own diet, ex. Bobcat eats rabbit
 - Alligator is only predator to python
- User Interaction
 - Able to display graph showing all animals
 - Able to change graph in real time by using slide bars to change values in the model to affect the animals

- **Agent Model**

- Agents
 - Python
 - All prey
 - Predator/Prey: Alligator
 - Highlighted endangered species
- Behaviors
 - Python eats all
 - Each animal has its own diet, ex. Bobcat eats rabbit
 - Alligator is only predator to python
 - Animals move around on world
 - Only specific animals can go in between water and land: birds, alligator, python

- User Interaction
 - A visualization of the model will be shown, indicating the positions of each of the agents in the world at each time step.
 - A graph will show the count of each agent (as a percent of the world's capacity for agents) at each time step.
 - Buttons will allow the user to start, stop, step, and reset the model.
 - Text boxes and buttons will allow the user to control the size of the world in terms of number of rows and columns as well as cell pixel width and height.
 - Text boxes and buttons will allow the user to control the initial count of each agent.
 - A slider bar will allow the user to control the number of simulation steps per second.

6. Conclusion

This project will provide two computer model of the spread of the burmese python that will allow the clients to study the real-world risk the burmese python puts on the Florida Everglades without necessarily needing to run field experiments: saving time, money, and natural resources.