**BioRubeBot Sandbox Simulator**

**Statement of Work**

For

Dr. Sarah Cline Ph. D. (Athens State University)

4/25/2017

Prepared by CS452 - Senior Software Engineering Project

Instructor: Dr. Adam Lewis

Spring 2017

Statement of Work

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| Date | April 25, 2017 |
| Client | Athens State University |
| Job Name | BioRubeBot Sandbox Simulator |
| Requested by | Dr. Sarah Cline Ph.D. |
| From | Senior Software Engineering Project Team – Spring 2017 |

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| **Revised** | **Description** | **Author** | **Latest Version** |
| 2/15/2017 |  | CS 452 Spring 2017 Senior Project Team | Initial Release – Version 1.0 |

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**Purpose**

This document is designed to specify the project plan needed for developing the BioRubeBot Sandbox Simulator for Dr. Sarah Cline. This is an assignment as the Senior Software Engineering Project for CS452 at Athens State University (ASU). This document's intended audience includes the developers of the BioRubeBot, as well as the stakeholders and other interested parties.

**Scope**

The BioRubeBot project will be an easy-to-use cross-platform sandbox simulator that demonstrates protein interactions within biology. The system is based on a subset of biological rules based on these interactions. We hope to provide a tool for education as well as a possible method to perform experiments in a controlled, virtual environment.

**Requirements**

**General Description**

The current model of education pertaining to intracellular interactions requires much lecture and example, but little interactivity. The goal of the BioRubeBot project is the development of an educational and experiment-based tool, to be used by teachers and students, designed to promote interaction and exploration of concepts. This application will allow its users to take their hypotheses and test them in a virtual, sandbox environment that can be controlled explicitly by its user. With the inclusion of template cellular structures and template cells, the creation of a reactive, experimental environment can be achieved. The user will not see latency inside the game as it is functioning. The game currently shows lag when a user moves objects around on the screen. The user should be able to select and play level two to its completion. From this point, the user follows the rules, from cellular biology, of how membranes interact with one another. Level two cannot be completed until like level one all rules and objectives have been followed. The user will see the objects inside the sandbox moving as they place them throughout the simulation. The user will see the correct functionality of the fast forward button. The user will be able to see a design of how level three will be implemented.

**User Stories**

* User would like simulation to be more fluent with objects motion (no lag).
* User would like level two to be designed.
* User would like level two to be tested and implemented.
* User would like fast forward button to function as intended.
* User would like objects to randomly move as they are being placed in the Sandbox.
* User would like level three to be designed.
* User would like level three to be tested and implemented.

**User Characteristics**

Any potential user should be able to successfully use this application. Basic knowledge of current technology preferred.

**General Constraints**

This application must be simple to use, yet be able to exhibit complex interactions within cells. To this end, the user interface must be intuitive, and the rules of the objects and their interactions must be well documented. With these two goals in mind, this application should be simplistic enough to learn 'on-the-fly', yet complex enough to display more intricate experimental interactions.

**Assumptions and Dependencies**

The software functions described herein are dependent upon only the power of the device trying to execute them. It is assumed that this device will be able to run cross -platform, on most devices. It is also assumed that this application will not require any access to any external data, support, tools, or the internet. This application is assumed to be self-sufficient and self-contained. In future implementations, updates may occur that can include: saving of simulations, sharing of simulations, updates from online sources, imports of user-made templates, game-based development, competition-based learning modules, leader-boards, and statistics/data tracking

**Non-Functional Requirements**

**Performance**

The cellular biology rules for all represented objects must be exact in implementation.

**Reliability**

The same simulation must yield the same results consistently.

**Security**

There are no security concerns at this time.

**Maintainability**

Updates to the application must be made upon any change in the rules of the interaction of any represented cellular structures.

**Tentative Iteration Plan**

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| **Review Date** | **First Priority** | **Second Priority** | **Third Priority** |
| January 20, 2017 | Identify cause of lag | Fast Forward Button |  |
| February 3, 2017 | Continue fixing lag behavior | Fast Forward Button | Level two development |
| February 17, 2017 | Continue fixing lag behavior | Continue level two development | Fixing github repository and statement of work |
| March 3, 2017 | Rewrite scripts to remove lagging behavior | Continue level two development | Refactor previous source code |
| March 17, 2017 | Continue rewriting scripts to remove lagging behavior | Continue level two development | Refactor previous source code |
| March 31, 2017 | Continue rewriting scripts to remove lagging behavior | Continue level two development | Level three design |
| April 14, 2017 | Continue level two development | Continue level three design | Refactor previous |
| April 28, 2017 | Final presentation with new objects and better game-like attributes | Continue level three design | Refactor previous source code |