

# Software Requirements Specification

## Version 2.0

May 11, 2001

**Project Sym-Habitat  
by Team Symplicity (08-2)**

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### 1.0 Introduction

Purpose of this section: General background and reference information

## 1.1 Purpose of this Document

This is the Software Requirements Specification (SRS) for the Sym-Habitat project. This SRS provides a description of the purpose, functionality, and interface of the software product designed by the Symplicity team members in collaboration with Mr. Stewart and his students at Ortega Elementary School. Constraints and other design issues are addressed in this SRS.

## 1.2 Scope of the Development Project

Sym-Habitat's is a web-base application whose goal is to educate 6th grade students the importance of equilibrium in environmental habitats. Students will change factors such as water, shelter, food, and population, see their effects on a simulated habitat, and try to restore equilibrium to that habitat. These simulated habitats range from the rain-forest to the ocean ecosystems.

## 1.3 Definitions, Acronyms, and Abbreviations

- Environment - the natural world, within which people, animals, and plants live. Also: all the external factors influencing the life of organisms, such as light or food supply.
- Environmental factor - something that contributes to or has an influence on the environment
- Habitat - the natural conditions and environment, for example, forest, desert, or wetlands, in which a plant or animal lives
- HTTP - Hypertext Transfer Protocol
- Java - Java is a programming language expressly designed for use in the distributed environment of the Internet.
- Web-based application - software program that is executed using the world wide web.
- World wide web - all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).
- WWW - World Wide Web

## 1.4 References

- Microsoft Corporation. "Encarta World English Dictionary." 2000. Online. Internet. <http://dictionary.microsoft.com>
- TechTarget.com. "WhatIs.com" 2000. Online. Internet.<http://whatIs.techtarget.com/>
- Dr. Almstrum, University of Texas, Austin, Professor
- Mr. Stewart, Ortega Elementary School, Client

## 1.5 Overview of Document

The following sections of this document are descriptions of the product and its of requirements and constraints.

Section 2 provides a preliminary description of characteristics of the product such as data requirements, functional

requirements, and dependencies as well as a general description of the product and its interface. Section 3 covers the more technical aspects of the product, its characteristics, and describes aspects such as the user interface, software interfaces, descriptions of specific functional requirements, and performance requirements.

## 2.0 General Description

### 2.1 User Personas and Characteristics

User A - a male fifth grade student who has limited computer experience. He does not own a computer at home and has little interaction with computers at school. User A is shy and tends to not ask questions when having trouble with a computer.

User B - a female sixth grade student who is fairly familiar with computers since she owns one at home. User B is quick when it comes to learning a new computer programs and likes to help out other students when they are having problems. Educational software easily becomes boring since she does not find it challenging.

Teacher - who is very competent with computers. This teacher is the main source of computer knowledge in his school. The Teacher runs an after school science program and shows a strong interest in educational software.

### 2.2 Product Perspective

The product requires that it be run in a web browser. It is a stand-alone product in that it doesn't interface with other products. Since it is web based, the product will be able to run on any platform that has a web browser. The external interfaces will be the keyboard, mouse, and monitor of whichever computer platform they decide to use.

### 2.3 Overview of Functional Requirements

- Provide an environment selection screen that allows users to select different habitats to simulate.
- A simulation screen that simulates a controlled environment. The users will interact with this screen in hopes of creating and equilibrium with the habitat.
- A help menu that describes features of the product and how to use them.

### 2.4 Overview of Data Requirements

Data shall include information about each environmental ecosystem. This is in general, a number of predatory animals, a number of herbivores, number of plants, amount of water, and amount of shelter.

Data stored in the program includes information about each animal or plant including how much each eats, what shelter it requires, and how much water it

needs to stay alive. Also, information about the animals and other inhabitants will be included in the program.

This data can be modified by the user through a number of slide rules (or other data input mechanisms). Data input will need to be graphical for ease of use for the 6th grade audience. A submit information button will then run the data input into the simulation.

The output of the data will be a graphical representation of the simulated ecosystem. As populations increase in the simulation, onscreen, so do the populations. When there is a problem or deficiency in the environment, the appropriate warnings are displayed onscreen for the student to fix. Finally when an equilibrium is reached the simulation will output the proper reward for student users.

## 2.5 General Constraints, Assumptions, Dependencies, Guidelines

- The product must be web-based.
- The product must be compatible with Netscape Navigator.
- The product must be compatible with the Mac OS/9.
- The product must run reasonably quickly on the IMac system.
- Response time to user interaction must be within a normal time (8 seconds) as limited by the ethernet connection provided by the school.
- Response time to load of any web page must be within a normal time (8 seconds) as limited by the ethernet connection provided by the school.
- There must be some amount of graphical display and sufficient user interaction to hold interest in 6th grade students.
- The product must provide accurate educational material about environmental habitats.

## 2.6 User View of Product Use

Common View - The product will begin at a screen with several choices of ecosystems, such as rainforest, ocean, etc. Each is represented by a picture depicting each habitat plainly. Once inside the simulation, instructions will be displayed along with the current state of the simulation. Here types of flora and fauna are displayed along with links to information about the species. Now students are allowed to input values for populations to build and affect the ecosystem. Once each number of predators, prey, and vegetation has reached a balanced amount, the equilibrium is reached and the ecosystem is in a self-sustaining state. Once this state has been reached the game is won and a graphical reward is given to the student.

User A - As a basic computer user, User A will still find the product easy to use with perhaps a little teacher support. Controls on the website are graphical and intuitive. To enter a specific ecosystem, he must only click on the picture showing it. By moving sliders up, he will be able to increase a population. By moving sliders down, he will be able to decrease populations. The graphics and pictures should be fun and help him

learn about the environment.

User B - User B quickly masters the simulation but never gets bored with the game. She has fun entering many different factors just to see how an environment will function with different animals and plants interacting. Also, the information about each animal and plant will allow her to read about her favorite species. Keeping her interest will also be a number of random factors and variables taken from real world situations such as pollution, hunting, or fishing. These will give her an interest in nature and the environment.

Teacher - As a teaching tool, sym-habitat will be a fun way to introduce students to the ecosystem and the interbalancing of factors in the environment. If not balanced, the ecosystem will die. This lesson as well as the information about different species will help the teacher in his/her lesson plans and get the students excited about learning.

### 3.0 Specific Requirements

#### 3.1 External Interface Requirements

##### 3.1 External Interface Requirements

The Sym Habitat interface will be completely mouse driven. The operating system must support a screen resolution of at least 640x480 due to the substantial use of graphics in this application. The Sym Habitat application will also interface with a web browser. The web browser being used must be capable of handling HTML, Java applets, and Macromedia Flash.

#### 3.2 Detailed Description of Functional Requirements

##### 3.2.1 Template for describing functional requirements

<b>purpose</b>	a description of the functional requirement and its reason(s)
<b>inputs</b>	which inputs; in what form/format will inputs arrive; from what sources input will be derived, legal domains of each input element
<b>processing</b>	describes the <i>outcome</i> rather than the <i>implementation</i> ; include any validity checks on the data, exact timing of each operation (if needed), how to handle unexpected or abnormal situations
<b>outputs</b>	the form, shape, destination, and volume of the output; output timing; range of parameters in the output; unit measure of the output; process by which the output is stored or destroyed; process for handling error messages produced as output

### 3.2.2 Environment selection screen

<b>purpose</b>	This serves as a menu allowing the user to select either an environment to simulate or the tutorial.
<b>inputs</b>	The user will use the mouse to click on links to navigate between program components.
<b>processing</b>	The web browser is responsible for interpreting user input and for making the transition to the next component.
<b>outputs</b>	This component will transfer control to another component within the application.

### 3.2.3 Simulation screen

<b>purpose</b>	This allows the user to learn and understand the relationship between a population of animals and the environment.
<b>inputs</b>	The user will use the mouse to manipulate environmental settings via scroll bars. The user will use the mouse to learn about specific animals and environments via button clicks.
<b>processing</b>	The web browser is responsible for interpreting user input and for depicting the results of the changes made to the environment.
<b>outputs</b>	A two dimensional image depicting the environment along with several graphical indicators will indicate the condition of the animal population.

### 3.2.4 Tutorial / Help screen

<b>purpose</b>	This will provide the user with instructions concerning program usage.
<b>inputs</b>	The user will use the mouse to click on links allowing navigation within the tutorial component.
<b>processing</b>	The web browser is responsible for interpreting user input and for depicting the results of the changes made to the environment.
<b>outputs</b>	The appropriate information concerning program usage will be displayed as needed.

## 3.3 Performance Requirements

- The S2S web site will be the host system, therefore the number of connections and simultaneous users, will be determined by the capacity of the UT-Austin Department of Computer Sciences web server.
- The application will be implemented in Java, the response time should be quick enough (one to two seconds) so that the user will not lose interest in the application.
- The system will contain approximately ?? files: 6 initial scenario image files (approximately 15-20K in size), 25 to 30 interactive image files (approximately 15-25K in size), a few Java program code files, and 3 to 4 ending sequence animated gif files (approximately 30K in size).

### 3.4 Quality Attributes

- The system should be extensible, that is, more scenarios can be added to the application easily.
- The system should provide correct information, which is at a level that sixth grade students can both understand and find entertaining.
- The product is expected to run smoothly without causing the user's web browser or machine to crash or otherwise perform incorrectly.
- The product needs to be easily maintainable. Error messages should display a helpful error message and further extension of the applications functionality should remain simple.

### 3.5 Other requirements

No other requirements are applicable at this time.

## 4.0 Appendices (Currently Empty)

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Change log for the Software Requirements Specification Document:

May 11, 2001	Final Version of Sym-Habitat Software Requirements Specification (version 2.0)
February 26, 2001	Initial version of Sym-Habitat Software Requirements Specification (version 1.0)