Presented by: Herd Immunity

Fontys university for Applied sciences

Rachelsmolen 1, 5612 MA Eindhoven



Test Plan for iteration 3

Herd Immunity simulation

Version 4.0

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# Members

| Name | STN | PCN | Mail |
| --- | --- | --- | --- |
| Alalao Ali | 3107493 | 369697 | a.alalao@student.fontys.nl |
| Bolbol Obaida | 2956160 | 356432 | o.bolbol@student.fontys.nl |
| Nikov Kaloyan | 2961075 | 356847 | k.nikov@student.fontys.nl |
| Sikorska Iwona | 3197980 | 377191 | i.sikorska@student.fontys.nl |

# Version Control

| Version | Description | Distribution date |
| --- | --- | --- |
| 1.0 | First version of test report | 19.03.2018 |
| 2.0 | Unit test has been added | 25.05.2018 |
| 3.0 | Additions for Iteration 3 | 02.06.2018 |
| 4.0 | Iteration 3 Test Report | 14.06.2018 |

# Overview Of Test Results

In this iteration we carried out a unit test to figure out whether application features work as expected. If it doesn’t, certain actions will be made to fix that.

## Rationale For Decision

* **OK**: Test result is set to "OK" when all steps are in "OK" state and actual result complies to expected result.
* **NOT OK**: Test result is set to "NOT OK" when all the steps of the actual test results result into complete diversity from the expected results.
* **Partial OK**: Test result is set to "Partial OK" when at minimum one of multiple tested steps is partially compliant to the expected results.
* **NOT RUN:** Test result is set to "NOT RUN" when the corresponding test has not yet been executed.

#### Unit test

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **01** | Try to kill a person by calling corresponding method | Person’s health sets to 0 (dead) | **OK:** Person’s health sets to 0 (dead) |
| Try to vaccinate evil orcs | Evil Orcs refuse vaccination | **OK:** Evil Orcs refuse vaccination |
| Try to vaccinate a person who is immunodeficient | Immunodeficient person refuses vaccination | **OK:** Immunodeficient person refuses vaccination |
|  | Test if a person is sick or not by calling corresponding method | Person is sick after infection was added and not sick if it wasn’t | **OK:** Person is sick after infection was added and not sick if it wasn’t |

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **02** | Test what will be a color of a person sprite depending on his/her health percentage | If person’s health is more than 50% the color is green, otherwise it becomes red | **OK:** If person’s health is more than 50% the color is green, otherwise it becomes red |
| Try to infect infected person and compare the expected text output with an actual one | The outputs must be equal | **Partial OK:**  testMethod most of the time fails to create an instance of object. Repeat until exception not occuring. |
| Test GetDistance() method form Utility class to make sure that distance between any two points is calculated correctly | Expected result has to be equal to the actual one | **Partial OK:** with longer real numbers after decimal point, distance accuracy varies per calculation |
| Test whether InfoString() generates the correct information (report) | In the first case a report must show that the person is not infected, the second case is opposite | **OK:** In the first case a report must show that the person is not infected, the second case is opposite |

##### configuration window (VALID FOR ALL OF ITS SUB-SECTIONS)

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **03** | In configuration window leave a NumericUpDown box with an empty value (“ ”) | Exception caught displaying a message that a value must be entered. | **Partial OK:** Exception is unhandled throwing a generic exception message about incorrect string format, but you have optionality by pressing “continue” on dialog box to stay on the window, change the value, and attempt to rerun simulation. |
|  | Value of NumericUpDown for Simulation number is set to a real fractional number. (eg. 5.499) | Simulation number value is rounded to the closest integer. (5.499 to 5, 5.50 to 6) | **OK:** Upon entry, value is rounded to closest integer. |
|  | Value of NumericUpDown for Simulation numbers is set to an integer more than 1000 (eg. 2350). | Simulation number value is reset to 1000 (chosen max value of NumericUpDown) | **OK:** Upon entry, value is set to 1000. |
|  | Value of NumericUpDown for Simulation numbers is set to an integer less than 0 (eg. -47). | Simulation number value is reset to 0 (chosen min value of NumericUpDown) | **OK:** Upon entry, value is set to 0. |

##### Disease Template Configuration

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **04** | The user fills mortality rate and infection rate for the disease with 101(out of range). | Mortality rate and infection rate set to 100. | **OK:** Values for disease Mortality and Infection get set to 100 |
| The user fills mortality rate and infection rate for the disease with  -1(out of range). | Mortality rate and infection rate set to 0. | **OK:** Values for disease Mortality and Infection get set to 0 |
| The user fills incubation period, latency period, and termination period with 61(out of range). | Incubation period, latency period, and termination period set to 60. | **OK:** Values for disease incubation period, latency period, and termination period get set to 60 |
| The user fills incubation period, latency period, and termination period with -1(out of range). | Incubation period, latency period, and termination period set to 0. | **OK:** Values for disease incubation period, latency period, and termination period get set to 0 |

##### Vaccine template configuration

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **05** | The user fills mortality rate and efficiency rate for the vaccine with 101(out of range) | Mortality rate and efficiency rate set to 100 | **OK:** Values for vaccine mortality and efficiency gets set to 100 |
| The user fills mortality rate and efficiency rate for the vaccine with  -1(out of range) | Mortality rate and efficiency rate set to 0 | **OK:** Values for vaccine mortality and efficiency gets set to 0 |

#### Integration testing

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **06** | The user fills incubation period, latency period, and termination period with the first value 60 and the second value 0. | Message box will display that the incubation period, latency period, and termination period are not correct. | **NOT OK:** No message box is displayed and simulation starts. |

#### SYSTEM testing

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **07** | All NumericUpDown box fields are filled and user presses “Start” button. | Simulation starts. | **OK:** Simulation starts. |
|  | All NumericUpDown box fields are empty (“”) and user presses “Start” | Exception is handled and proper message telling you to fill empty fields is displayed. | **Partial OK:**  Exception is unhandled throwing a generic exception message about incorrect string format, but you have optionality by pressing “continue” on dialog box to stay on the window, change the value, and attempt to rerun simulation. |
|  | NumericUpDown of desired number of Simulations to be launched is set to 0 and user presses “Start.” | Simulation doesn’t run and a message displaying that value should be at least 1 is displayed. | **NOT OK:** Simulation starts, no message is displayed, and on simulation window no interface is displayed due to the simulation not actually running in the background. |
|  | NumericUpDown of desired number of Simulations to be launched is set to X (integer value between 0 – 1000). User has checked checkbox “Open text reports” | Each run of a simulation is not shown. On background X number of simulations are processed and X number of unique simulation report textfiles are created and opened. Only 1 statistics window and text report is generated and opened. | **Partial OK:** Simulation runs are not displayed. X number of unique simulation reports are created and opened.  1 number of statistics window is generated. X number of statistics text report is generated and opened (instead of 1). |

#### ACCEPTANCE testing

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Expected Result** | **Test Result** |
| **08** | Properties, functionality and features of the application (as a whole) conform to the pursued Project Goal (see Project Plan). | **OK:** The applications conforms to testing diseases and vaccinations on population samples, and provides data in results which could be analyzed for decision-making on vaccination laws and protocols. |
|  | **Project Constraint:** The application’s source code was entirely written in C# programming language. | **OK:** All code blocks utilized to run and execute the simulation application are written in C#. |

#### Use case test

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| 1. Start simulation – normal flow | 1. User fills the population information | User can fill in the population information | **OK:** User can fill in the population information |
|  | 1. User fills the disease and vaccine information | User can fill the disease and vaccine information | **OK:** User can fill the disease and vaccine information |
|  | 1. User fills the environment settings | User can fill in the environmental settings | **OK:** User can fill in the environmental settings |
|  | 1. User chooses the stepping type | User can choose the stepping type | **OK:** User can choose the stepping type |
|  | 1. User sets the simulation number to 1 | User can set the number of simulations | **OK:** User can set the number of simulations |
|  | 1. User presses the begin button to start the simulation. | System starts the simulation, runs it in a separate window and shows simulation report and statistics in the end | **Partly OK:** System starts the simulation, runs it in a separate window and shows simulation report and statistics in the end only if the corresponding checkbox was ticked |
| Alternative flow | 5. User sets the simulation number higher than 1 and presses the begin button | System won’t show the simulation process and will jump directly to the statistics and report and will show the statistics graph as well | **Partly OK:** System will show the statistics graph, but statistics and report are shown only if the corresponding checkbox was ticked |
| 1. Save simulation configuration – normal flow | 1. User fills in the population information | User can fill in the population information | **OK:** User can fill in the population information |
|  | 1. User fills in the disease and vaccine information | User can fill in the disease and vaccine information | **OK:** User can fill in the disease and vaccine information |
|  | 1. User names the file | User can give a name to a file | **OK:** User can give a name to a file |
|  | 1. User clicks on “Save” button | System saves the configuration into a file and shows in the label below that file with a specific name has been saved | **OK:** System saves the configuration into a file and shows in the label below that file with a specific name has been saved |
| 1. Import simulation configuration | 1. User click on the combo box | Combo box has to extend and show the list of the available configuration files | **OK:** Combo box has to extend and show the list of the available configuration files |
|  | 1. User chooses a file he/she wants to load | System overwrites all previously selected values in fields and puts in their place values from the imported file | **OK:** System overwrites all previously selected values in fields and puts in their place values from the imported file |
| 1. Load result from file | 1. User click on the ‘Load results from file’ button | An Open File Dialog window appears | **OK:** An Open File Dialog window appears |
|  | 1. User browses location and selects a file | User is able to browse for a desired location or stay in a default directory where the files are being saved | **OK:** User is able to browse for a desired location or stay in a default directory where the files are being saved |
|  | 1. User clicks on “Open” button | System will open a statistic graph and show it | **OK:** System will open a statistic graph and show it |
| Alternative flow | 1. User clicks on “Cancel” button instead | Dialog closes and user has to return to step 1 | **OK:** Dialog closes and user has to return to step 1 |

## Non-Functional Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Step Description** | **Expected Result** | **Test Result** |
| **01** | Performance test - User has filled all required fields to start the simulation and does it | Simulation should start within 3 seconds | **Partial OK:** On tester laptop over a sample size of 700 causes simulation load of over 3 seconds. |
| **02** | Application was given to a 3rd party person to test its usability | The person didn't experience any troubles while using the application and easily discovered all its features | **Partial OK:**  3rd party person had to ask questions about some of the terminology and consequent functionality. |
| **03** | Application attempted to be run on a PC with specifications which don't match minimal requirements | Application won't run well: it might experience a lack of performance (e.g. response time might extend) | **NOT RUN:** |
| **04** | Application is being tested for its reliability by doing functional requirements tests | Application should not crash at run-time and prevent starting simulation with inappropriate values entered | **Partial OK:** Test showed that some values can be set to out of desired range and that causes the application to run with some faulty logic. |
| **05** | Security test – Person's disease is tried to be changed within Scene class | The operation has to be impossible | **OK:** It is impossible to change because disease variable in Person object is set to private |

# Conclusion:

In conclusion, most of the functional & non-functional requirements tests fulfilled the expected results. We stated in our User Requirements Specification document that our application must be stable and reliable, and as such we believe that we achieved that as both in running and in testing the application, we don’t encounter any crashes to the application and the thrown exceptions allow the user to easily recover to the most recent state of the application without having to lose work he has done. Overall, we believe that the simulation application conforms to our plans and requirements and is usable in the intended specified field.