**CMPS 5153 Software Engineering**

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**Group: Cloud-MSU**

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1. **Purpose**

*This document outlines testing approaches and methodology for Cloud-MSU’s Nimbus I/O. This document defines the scope of various strategies and techniques of testing, Shows activities to be completed, explains the general resources required and the methods and processes used during testing phase, which should be completed for every increment of the software.*

1. **Overview**

*The following sections will discuss testing strategies and will detail validation techniques as well as give an overview of the schedule followed by a series of test cases and their results as well as a brief summary and conclusion.*

1. **Strategy**

*Testing strategy is a framework, which describes the process of testing a software product. There are various stages in testing software from each module to the whole system. The following Sections describe how and why they will be performed.*

**3.1. Unit testing**

*During unit testing our programmers Vishnu and Taylor attempt to discover any incorrect insufficient or extraneous code. After each module is fully developed it is tested by the programmers for the presence of any bugs in the code and for its functionality. For the project’s purposes, it is the initial stage of product testing. Modules and their functions were implemented by the programmers as discussed during design phases and are roughly defined in the project description by the class diagram. Various other design diagrams created during analysis and design phases are also available.*

* 1. **Integration testing**

*Integration testing is a strategy used to check whether there are any changes in original functionality when different modules are integrated. If any interface defects are found, components will be tested as a single group or organized in an iterative manner. Once programmers have performed integration testing on the modules, the resulting code is pushed to our Github repository and the testing team, Tejaswi and Mounika, can proceed with system testing.*

* 1. **System testing**

*Once the system is completed and the programmers perform integration testing, the software is put in place in a working environment and testers Tejaswi and Mounika**perform a system test. This is preformed as part of the validation phase, and it is here when the system interacts with actual user input. Testing in this stage may or may not include some portion of structured testing based on requirements, use cases, or test cases, and may also include unstructured testing, such as testing for non functional requirements, ‘look and feel’ testing, as well as unexpected usage testing.*

* 1. **Regression testing**

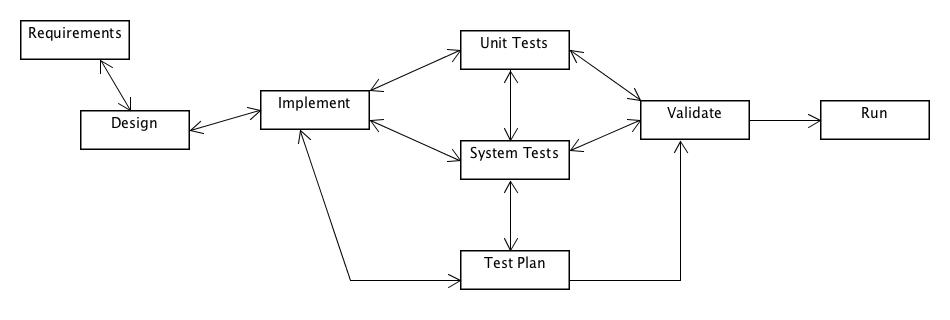
*The purpose of regression testing is to verify that any recent changes, due to problems found during testing have not affected existing features. Our regression testing will be a partial selection of already executed test cases, which will be re-executed by our programmers to ensure existing functionality before deployment. This regression testing happens if changes are made during validation phases after integration testing.*

* 1. **. Continuous integration**

*Is a practice that requires the team keep a shared repository of code. This happens in conjunction with integration testing, where the whole of the system is tested and checked for problems before the code is pushed to the repo. The repository was maintained using GitHub and the Git API.*

* 1. **. Testing process**

*The following diagram (Figure 1) shows the testing process that Cloud-MSU implemented during the testing phase of software development for Nimbus I/O.*



***Fig 1: Testing Cycle***

**4.** **Validation techniques**

These are testing methods performed in testing strategies. This section describes the testing methods performed on the software for the purpose of validation.

* 1. **. Use case testing**

*Use case testing**is a technique that helps us identify test cases that exercise the whole system on a case-by-case basis from start to finish. A use case is a description of a particular use of the system by an actor. Each use case describes the interactions the actor has with the system in order to perform a task. Actors in our system are android users. Use cases are defined in terms of one ‘complete’ task or interaction with a user and the system. The use cases can be found included with our requirements documents.*

**4.2. Code Review**

*Is a systematic examination of code; after unit and integration testing is complete, and before the build was deemed ready for deployment the whole team performed an informal code review. This was done in the hopes of improving the overall quality of the system and to prepare notes for the next increment. Also, the implementations of pair programming sessions have served the dual role of informal code review.*

**5. Test schedule**

*Testing is divided into phases and scheduled as below (Figure 2):*

*The unit testing is done during application integration as each module becomes ready. After all units become developed integration is performed. Once the system is ready, the team will move into the system-testing phase and will perform use case testing as well as a code review. Because issues will be found we have scheduled several days for each task. After correcting any defects, we will perform regression testing. The whole system-testing phase should take 5-10 days.*



***Fig 2: Test Schedule***

**6. Test Cases**

*Test cases attached on the following pages summarize the formal tests performed on the system during the validation phase.*

**Test cases for Login Page**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1  (valid input) | Input username as "stringfellow", password as "project" and click on login button | Logins Successfully and welcome page gets displayed | Logins Successfully and welcome page is displayed and Account, Show Servers, Add servers, Payment info, Logout tabs are seen at left side slide out navigation bar | Test pass |
| 2  (invalid username) | Input username as "baduser", password as "project" and click on login button | Login fails and error message will be displayed as enter valid credentials | An error message is displayed “**username not found, please check your username or consider sign up**.” | Test pass |
| 3  (invalid password) | Input username as "stringfellow", password as "badpassword" and click on login button | Login fails and error message will be displayed as enter valid credentials | An error message is displayed **“incorrect password, Please try again!”** | Test pass |
| 4  (blank field for password) | Input username as "stringfellow", leave password as blank and click on login button | Login fails and error message will be displayed as please enter valid credentials | An error message is displayed  **“Please enter username and password.”** | Test pass |
| 5  (blank field for username) | Leave Username as blank, password as "project" and click on login button | Login fails and error message will be displayed as please enter valid credentials. | Error message is displayed as  **“Please enter username and password”** | Test pass |
| 6  (blank field for both username and password) | Leave both Username and Password as blank and click on login button | Login fails and error message will be displayed as please enter valid credentials. | Error message is displayed as  **“Please enter username and password”** | Test pass |
| 7  (Sign up) | Click on the Sign Up button | Sign up page should be displayed. | Sign up page is displayed showing all the user details fields. | Test Pass |

**Test cases for Sign Up Page**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1  (valid input) | Do the following and click save button  a)Input Firstname: “Stringfellow”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”project”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041” and click on sign up button | Sign up Successfully and welcome page gets displayed | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041”, Balance$: 10 | Test pass |
| 2  (invalid first name) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”project”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041” and click on sign up button | Error message should be generated showing the instruction on how to input the firstname field | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow05”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041”, Balance$: 10 | Test Fail |
| 3  (invalid lastname) | Do the following and click save button  a)Input Firstname: “Stringfellow”, Lastname: “Catherine05”,  Username:“catherine05”,  Password: “project”, Confirm password: ”project”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041” and click on sign up button | Error message should be generated showing the instruction on how to input the lastname field | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow”, Lastname: “Catherine05”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041”, Balance$: 10 | Test Fail |
| 4  (invalid username) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“!@$^&^&”,  (OR)  Username:”1234”  Password: “project”, Confirm password: ”project”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041” and click on sign up button | Error message should be generated showing the instruction on how to input the username field | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow05”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041”, Balance$: 10 | Test Fail |
| 5  (password miss match) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”projecjbfikbgtrnt”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041” and click on sign up button | Error message should be generated showing the instruction on password does not match | An error message is displayed showing  **“Password does not match. Please re-enter”** | Test pass |
| 6  (invalid Email ID) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”project”, Email id : “catherine123”  b)Phone: “9400004041” and click on sign up button | Error message should be generated showing the instruction on email id is invalid | An error message is displayed showing  **“Please enter valid Email ID”** | Test Pass |
| 7  (invalid phone number) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”projecjbfikbgtrnt”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “9400004041119999”  and click on sign up button | Error message should be generated showing the instruction on phone number is invalid | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow05”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041119999”, Balance$: 10 | Test Fail |
| 8  (invalid phone number) | Do the following and click save button  a)Input Firstname: “Stringfellow05”, Lastname: “Catherine”,  Username:“catherine05”,  Password: “project”, Confirm password: ”projecjbfikbgtrnt”, Email id : [“catherine@gmail.com”](mailto:)  b)Phone: “@#$%%^^&”  and click on sign up button | Error message should be generated showing the instruction on phone number is invalid | A message is displayed showing, correct data entered, account created  and welcome page is displayed showing Firstname: “Stringfellow05”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “0”, Balance$: 10 | Test Fail |

**Test cases for Account page**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1 | Click on Account tab located at the left side slide out navigation bar | Should display welcome page with user details. | welcome page is displayed showing Firstname: “Stringfellow”, Lastname: “Catherine”,  Email id : [catherine@gmail.com](mailto:catherine@gmail.com),  Phone: “9400004041”, Balance$: 10 | Test Pass |

**Test cases for show servers page:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1 | Click on the show servers tab located at the left side slide out navigation bar | Should display the list of servers that are added from the add servers page | A page is displayed showing the list of servers. | Test Pass |

**Test cases for Add servers:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1 | Click on the add servers tab located on the left side slide out navigation bar | Should display the add servers page with show server list tab and configure server tab. | A page is displayed with show server list tab and configure server tab. | Test Pass |
| 2  (show servers list) | Click on the show servers list tab located in the add servers page | Should display the show servers list page with list of all preset servers. | A page is displayed with the list of all preset servers. | Test Pass |
| 3  (Configure server) | Select any one of the following from the dropdown menu list and click on add server button  a) Processor: AMD A8-7670K (OR) Intel Xeon E5-2670 (OR) Intel Core i3-6100 (OR) AMD Sempron 3850 (OR) Intel Core i7-6700K (OR) AMD FX-8320E  b) Memory: 256 (OR) 512 (OR) 1024(OR) 2048 (OR) 4096 (OR) 8192  c) Storage space:  10240 (OR) 20480 (OR) 40960 (OR) 81920 (OR) 163840  d) server name: nimbus\_server  e) software stack required: MySQL, Linux, Apache, PHP | Should display a message “service added to the account” and server configuration details should be shown in the show servers page | A message is displayed showing that “service added to the account and server configuration details are shown in the show servers page | Test Pass |
| 4  (invalid server name and software stack required) | Select any one of the following from the drop down menu list and click on add server button  a) Processor: AMD A8-7670K (OR) Intel Xeon E5-2670 (OR) Intel Core i3-6100 (OR) AMD Sempron 3850 (OR) Intel Core i7-6700K (OR) AMD FX-8320E  b) Memory: 256 (OR) 512 (OR) 1024(OR) 2048 (OR) 4096 (OR) 8192  c) Storage space:  10240 (OR) 20480 (OR) 40960 (OR) 81920 (OR) 163840  d) server name: blank (or) “@#$%^”  e) software stack required: blank (or) “@#$%^” | An error message should be displayed showing that the server name and software stack required should consists of alphabets | A message is displayed showing that “service added to the account and server configuration details are shown in the show servers page | Test Fail |

**Test cases for payment info page:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected output | Actual Output | Status |
| 1  (valid input) | Input card number as “5412 5379 6537 8996”, name on card as “Stringfellow”, Expiration date as”09/21”, Card issuer as "visa", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Successfully updates the information | Displays payment information updated successfully! | Test pass |
| 2  (invalid card number) | Input card number as “5412 5379 6537 89”, name on card as “Stringfellow”, Expiration date as”09/21”, Card issuer as "visa", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Error Message:  "Please enter the valid card number."  Card number should consists of only 15 or 16 digit number. | Error message will be displayed as "enter a valid card number" | Test pass |
| 3  (invalid name) | Input card number as “5412 5379 6537 8996”, name on card as “@#$%^^&010”, Expiration date as”09/21”, Card issuer as "visa", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Error Message:  "Please enter the name on the card."  Given name is incorrect. | Displays as Error: Name cannot contain special characters and numbers | Test Fail |
| 4  (invalid expiration date) | Input card number as “5412 5379 6537 8996”, name on card as “Stringfellow”, Expiration date as”0”, Card issuer as "visa", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Error Message:  "Please enter the valid expiration date." | Displays payment information updated successfully! | Test Fail |
| 5  (invalid card issuer) | Input card number as “5412 5379 6537 8996”, name on card as “Stringfellow”, Expiration date as”09/21”, Card issuer as "12345", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Error Message:  "Please enter the valid Card issuer" | Displays payment information updated successfully! | Test Fail |
| 6  (invalid security code) | Input card number as “5412 5379 6537 8996”, name on card as “Stringfellow”, Expiration date as”09/21”, Card issuer as "visa", Security code/CVV as “0010”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “76308” and enter update card button | Error Message:  "Please enter security code"  Security code must be 3 digit number | Error message is displayed as  “Security code cannot be more than 3 number” | Test Pass |
| 7  (invalid zipcode) | Input card number as “5412 5379 6537 8996”, name on card as “Stringfellow”, Expiration date as”09/21”, Card issuer as "visa", Security code/CVV as “001”,Addressline1 as”5213 Elmwoodavenue, Apt#164”, Addressline2as “ Wichita Falls,Texas”, Zip code as “7630809090909090909” and enter update card button | Error Message:  "Please enter valid zipcode." | An error message is displayed as Zipcode must be 5 numbers | Test Pass |

**Test case for Logout page:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | Actual values | Expected Output | Actual Output | Status |
| 1 | Click on logout tab located at the left side slide out navigation bar | Should get logged out from the application | Logs out of the application and login page is displayed | Test Pass |