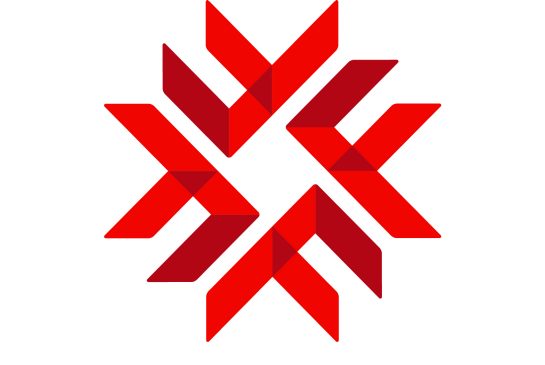
Test Strategy

INFO 6068 Capstone Project

SST3



Lectured by: Professor Kim Gariepy

Prepared by: Bug Benders

Date : 16/02/2018

# **Documentation**

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**Reviewers:**

This document must be reviewed by the following:

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| **Name** | **Signature** | **Title / Responsibility** | **Date** | **Version** |
| Dhruv Dabhi | DD | Project Manager | 16/2/2018 | 1.0, 1.1,1.2 |
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| Meet Patel | MP | Automation Tester | 16/2/2018 | 1.0  1.1,1.2 |
| Dhruv Patel | DP | Manual Tester | 16/2/2018 | 1.0  1.1,1.2 |
| Dip Patel | DP | Test Manager | 16/2/2018 | 1.0  1.1,1.2 |
| Raj Vaghela | RV | Developer | 16/2/2018 | 1.0  1.1,1.2 |
| Jeane | JF | MySQL Developer | 16/2/2018 | 1.0  1.1,1.2 |
| Kim Gariepy | KG | Client | 16/2/2018 | 1.0  1.1,1.2 |

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**Distribution:**

This Document is distributed among group members & Client through the medium of E-mail.

**Related Documents:**

These documents will provide additional information.

|  |  |  |  |
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**Glossary of Terms:**

List any terms used in this document.

|  |  |  |
| --- | --- | --- |
| **Term** | **Acronym** | **Definition** |
| **1.0** | **Escalation** | An escalation plan is a set of procedures set in place to deal with potential problems in a variety of contexts. |
|  |  |  |
|  |  |  |

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# **Introduction**

The EWHEELZ Web application gives the user information about travel Schedules and relevant information and allows them to make necessary travel arrangements. The EWHEELZ application supports only chrome browser. EWHEELZ is built on Java and uses MySQL database. This document defines the guideline for testing and gives a brief description of test techniques, process, vision and approach for testing within the Bug-Benders team.

## **Objectives**

These defined objectives were used to set the standards and principles for testing activities.

* The main objective is to test EWHEELZ application in such a way that it may not leave any critical defects.
* To deliver the effective and efficient application to the customer that matches the main requirements of the customer.
* Start testing activities early into the project life cycle which can be achieved by planning testing early in the project:
* It can be achieved by starting test design in the early phase of the project and matching it with the requirements.
* Reviewing at the beginning of each phase that the Application satisfies the client requirements.
* Engage clients in the testing process and provide regular updates to them through meetings so that, any priorities and risk associated with the testing can be explained.
* Applying risk-based approach for testing: it can be achieved by using defined organization’s principles for testing features and functions.

## **Scope**

Testing EWHEELZ application with defined approaches and delivering a report on how the application performed according to various tests executed on different modules of the application (Administrator module, travels module, routes module, reservations module and Testimonials module).The EWHEELZ application supports on Chrome web browser.

The scope of testing includes the following test areas/types:

* Smoke Testing
* Unit Testing
* Integration Testing
* Systems Testing
* Acceptance Testing
* Security Testing
* Integration Testing
* Performance Testing

# **Roles and Responsibilities**

Roles were assigned to the group members as per their area of expertise. Each group member is responsible for completing their assigned tasks and group members will directly report to Project Manager.

• Project Manager: Dhruv Dabhi

All the members of team report to the Project Manager for any work relevant to the project. Project Manager is responsible for finishing project work accurately on desired time

• Scribe: Rushit Patel

Responsible recording all details relevant to project and helps the project team in delivering desired results as per the requirements.

• Automation Tester: Meet Patel

Responsible for writing automation scripts and doing automation testing which eventually saves the time for testing and helps to focus on other important aspects.

• Manual Tester: Dhruv Patel

Since everything is not possible to test with automation testing, Manual tester checks the software defects manually.

• Test Manager: Dip Patel

Responsible for all Testing process and work. Looks at the issues and progress of the testing.Helps to deliver a quality product. Gives direction to the manual and automation tester in writing test cases, test scripts and preparing use cases for further testing.

• Developer: Raj Vaghela

Does all the coding and writes the programs as per the project requirements. Responds to the issues and responsible for fixing bugs.

• MySQL Developer: Jeane Fernandes

Responsible for all database management and helps at the end to end development of the project. Also runs the queries and gives the useful data.

# **Testing Overview**

## **Test Lifecycle**

Test lifecycle is a testing process in which all steps are performed to improve the quality of the product in a systematic and planned manner.

Following are the phases of the Test Lifecycle:

1. Requirement analysis
2. Test Planning
3. Test case development
4. Environment setup
5. Test Execution
6. Test Cycle Closure.

Each phase has its own goals and deliverables.

1. Requirement analysis: It is the first phase of Software Testing Lifecycle in which the Quality assurance team goes through and understands the Requirement document. If any conflict or confusion occurs then the quality assurance team follow up with the clients and stakeholders (Business analyst, Technical Leads, System Architects etc.) to clarify their doubts.
2. Test Planning: It is considered as the most important phase of Software Testing Lifecycle and starts after the completion of the Requirement analysis phase. In this phase, based on the requirement analysis Test Manager or Test Lead prepares a Test Plan and Test strategy documents.
3. Test case development: This phase starts once the Test planning phase is completed. In this phase, the testing team writes detailed test cases and creates a test data. After the test cases are created, it is then verified by peer members or Quality Assurance Lead. Along with Test cases and Test data, Requirement Traceability Matrix is prepared in which each test case is mapped with the requirement.
4. Environment Setup: Environment Setup phase includes setting up the test environment for testing the application. It is an independent activity and can be started parallel with the Test case development phase. In this phase, the testing team creates the testing environment and performs a smoke test in order to check whether the environment is working fine or not.
5. Test Execution: Before starting this phase, it should be noted whether the test environment setup is ready or not. After which the test team starts executing the test cases and while execution of the test cases if the quality assurance team founds any defect then it is reported to the developer team to be fixed. After the bug is fixed, it is then retested by the Quality assurance team. Test execution will be done in two cycles. Manual Testing will be done into the first cycle and into second cycle Automation Testing will be done.
6. Test Cycle Closure: In this phase, the Quality assurance team meets and discuss what went good and which area needs to improve, as it will help in future projects.

## **Test Approach**

This section has some testing approaches which will be used for EWHEELZ project. Here, the iterative testing approach will be used as the software is already developed and is provided for testing. Test approach will guide the project manager, testers, and developers and other Team members of the team about some key issues of the testing process.

* Unit testing: This testing is carried out to check if there any bugs or errors are in the code or not.
* Integration testing: This testing is carried out to test the integration between components.
* System Testing: This testing is carried out to check if the system meets the specified requirements.
* Acceptance Testing: Testing is done to check if system follows all requirements and is acceptable for delivery.
* Security Testing: Security testing is done to verify secure access and to protect the system from unauthorized access.
* Performance Testing: Performance testing is done to determine how the system performs under the certain workload.

## **Standards**

The following severity levels are proposed for issues arising throughout the Test Lifecycle:

Critical Severity: This is the severity which needs to be addressed immediately and often referred as showstoppers because they are severe enough to prevent further testing. For example, if the User or Admin Login page does not work it will fall Under Critical Severity.

High severity:

This is the severity which can affect the most on the project and can damage whole application in a critical way if it’s there in the system. For example in our capstone project administrator and reservation module can be put to high severity area as it’s the essential part of our project that can affect whole application.

Medium severity:

This severity can affect the system components but it’s not necessary that we have to test all the modules rather we should focus on the modules which cannot impact that much in the system. For example, routes are the module that we can take in this type of severity.

Low severity:

This severity can hardly cause problems on the other parts of the system as it’s not that much critical so if we want to skip it in a critical phase of testing then it’s okay to do so. We can sort it out in next phase of testing. For example, testimonial module can be put in this type of severity standards.

## **Test Stages**

Each test stage is a discrete form of testing with its own objectives, methods and requirements coverage and therefore a set of its own test scripts.

A coverage matrix of all the Test Stages / Test Areas to be covered in each Test Release is appended below

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Areas/ Test Type** | **Unit Testing** | **Smoke Test** | **System Test** | | **Security Testing** | | **Regression Test** | | **User Acceptance Test** |
| Functional |  |  |  |  | |  | |  | | |
| Performance |  | n/a |  | n/a | |  | |  | | |
| Data Protection | n/a | n/a |  |  | | n/a | | n/a | | |
| Usability | n/a | n/a |  |  | |  | |  | | |
| Installation & Configuration |  |  |  | n/a | | n/a | | n/a | | |
| Audit |  |  |  |  | |  | | n/a | | |
| Data Migration |  | n/a | n/a |  | | n/a | | n/a | | |

## **Reviews and Inspections**

### **Reviews**

Each Test Stage will be run according to the Test Plan and Test Specification applicable to that stage. Each document will be reviewed internally and submitted to the business sponsor (professor) for review and approval.

### **Inspections and Walkthroughs**

**Inspection:**

The major objective of doing inspection are as follows:

* It helps to ensure the quality of the project and also provides assistance to team members to improve the overall aspects.
* It also provides help during the application test run and also with the functionality.
* The exchange of the provided information among all stakeholders will help to get a basic understanding which is related to the presented documents.

**Walkthrough:**

The whole review of the test strategy template will be conducted by our team’s project manager. After this, the entire process will be discussed with the client and consider his request for feedback. All the step will be described by each and every member and then we will consider the changes as per client’s request. The walkthrough is an essential part to get the requirement specification and gathering. The major aspects are mentioned below:

* Explain the points which are in the context of team and stakeholder.
* After this process, the document has been presented to the client and other stakeholder and collect the requirements.
* Another major requirement is to understand the test strategy template is also an important factor.
* After all the explanation we have to go through the other valid viable options.

## **Test Documentation**

The test documentation includes the documents which are made before the software testing and also during the software testing. Which shows the estimate project duration and its coverage, and general requirements etc. This documentation will be delivered during the different phases and cycles.

The following table describe commonly used testing documents during our overall project test run:

|  |  |
| --- | --- |
| **Document** | **Phase and cycle** |
| Test Strategy | Planning |
| Test Plans | Design and Planning |
| Test Specifications | Design |
| Test Scripts | Execution |
| Test Report | Test Cycle Closure |
| Final Status Report | Test Cycle Closure |
| Summary report | Test Cycle Closure |
| Bug Report | Test Cycle Closure, Execution |

Test Documentation:

* Test Strategy: This document is created during the planning and analysis phase of the project and it is used as a basic predefined standard during the overall project which is created and approved by the project manager and project team. The test strategy document is also based on business aspects as well.
* Test Plan: This Document will describe the scope of the project as well as activities to achieve that goal. It also includes the resources which are needed and the schedule of each test process.
* Test Specification: It will specify the purpose and the reason of each test phase and gives a detailed description of the step by step process of each executed test phases.
* Test Scripts: It will provide the set of instruction which will determine that each test is done or executed as expected. It is also considered as test cases.
* Test Report: It contains the results of each test cases.

## **Test Execution**

* The design of the test and the overall description of the test will be created before the test execution and the test will be executed as per the scripted basics.
* The test execution will be done in the classroom. The basic software that we are going to use for execution is a MySQL server and Apache Tomcat, which are already installed on our laptops.
* The other required tools and systems are EWHEELZ application, Windows 10, 64-bit OS.
* Test execution will be done in two cycles. Into first cycle Manual Testing and into Second cycle Automation Testing Will be performed.

### **Recording Actual Results versus Expected Results**

The overall test report will be created and updated as per the test execution results carried out. The final outcomes will be compared with the expected results and then it will finalize as passed or failed. This data will be collected in the Excel spreadsheet. The test cases will be considered as per each issue in the testing phase, the errors occur while operating application and check that whether it failed or passed. If actual outcomes are equals to the expected then it's considered as the pass otherwise the test will be considered as fail. To do this we are going to use Microsoft Excel 2016 as the management tool. Here we will store the data related to test cases results versus their expected results

### **Escalation of Issues for resolution**

In the first place, we are going to note down each and every issue and will consider solutions and actions accordingly. All the information will be updated every week on the IAD log template with its solution whether it is solved or not. The weekly interaction with the project client will help us to achieve the goal and solve the remaining issues. The testing cycles will be done by the team and the work will be divided equally.

### **Test Execution Roles**

|  |  |
| --- | --- |
| **Roles** | **Name** |
| Test Manager | Dip Patel |
| Test Lead | Dhruv Dabhi |
| Database Tester | Jeane Fernandes |
| Automated Tester | Meet Patel, Raj Vaghela |
| Manual Tester | Dhruv Patel, Rushit Patel |

## **Entry & Exit Criteria**

### **Table of Entry and Exit Criteria**

Following are some general Entry and Exit criteria for testing:

|  |  |
| --- | --- |
| Entry Criteria | Exit Criteria |
| Business owner and every responsible team members must sign off Business requirement documentation. | There should not be any high priority issue. |
| The smoke test must be successfully done. | All the test cases should be executed successfully. |
| Test artifacts should be up to date and prioritized according to risk analysis. | Approval of exit testing by key stakeholder received. |
| Some outstanding issues must be solved before entering any particular support. | If some test cases are not executable by any reason are approved by Test manager and Project manager. |
| Resources should be allocated for particular needs. | Deadlines meet or budget completed. |
| The test plan is ready. | Sufficient coverage of the requirement and functionalities are under the test. |
| Test cases are ready. |  |

We can define some entry and exit criteria for each different levels of testing.

|  |  |  |
| --- | --- | --- |
| **Level Of Testing** | **Entry Criteria** | **Exit Criteria** |
| **Smoke Testing** | * Testing Hardware are configured * Software are installed * Database is Connected | * The web application is ready to test * This page below is visible in the chrome browser   <http://localhost:8080/ewheelz/> |
| **Unit Testing** | * Test Plan is ready. * All the documents like System design, technical design, and other documents are properly reviewed and approved. * Testable units are available. * The test environment is ready. | * Successful completion of all unit tests. * All the identified bugs and issues fixed. |
| **Integration testing** | * Unit testing should be completed. * All the high priority bugs are fixed at the end of unit testing. * Integration test plan is ready. * Integration testing environment is ready. * Each unit has gone through unit testing before entering into integration testing. | * Successful completion of integration tests. * Successful completion of stress, performance and load tests. * All the high priority bugs found and fixed. |
| **System Testing** | * Integration testing should be completed. * All the high priority bugs are fixed which were found in previous testing phases. * Test cases are available to execute. * System testing environment is available. | * Successful completion of system tests. * All the organizational and functional requirements have been met. * All the high priority bugs found and fixed. * The system is ready to run on specific hardware and software. |
| **Acceptance testing** | * System testing should be completed. * All the high priority bugs are fixed which were found in previous testing phases * Functional and organization requirement has been met. * Test cases are available to execute. | * Successful completion of user acceptance tests. * Approval of management for exit test. * All the priority bugs have been fixed. * Signing off documents are reviewed and signed. |
| **Security testing** | * System testing should be completed. * All the high priority bugs are fixed at the end of previous testing phases. * Security test plan is ready. * Security testing environment is ready. | * Successful completion of Security tests. * Successful completion of threats, Availability, Accuracy. * All the high priority bugs found and fixed. |
| **Performance testing** | * System testing and Security testing should be completed. * All the high priority bugs are fixed which were found in previous testing phases * Functional and organization requirement has been met. * Non-functional requirements are cleared. | * Successful completion of performance tests. * Approval of management for exit test. * All the priority bugs have been fixed and the system performs satisfactorily. * Signing off documents are reviewed and signed. |

(ThinkSys, 2017), (SM, 2016)

## **Test Results Capture**

We will make an external excel file to record our test results.

Excel file will contain following columns to record data.

1. Test case ID.

2. Test case description.

3. Test case expected result.

4. Actual result.

5. Test case pass/fail.

To capture divergence between the expected and actual results we will add a column of Test case pass/fail.

So if the actual result differs than expected than test case is fail

## **Progress Reporting**

### **Test Report**

The overall report will be provided after the completion of testing. The project manager and the scribe are majorly responsible for the completion of the report on estimated time. This test report will include each and every document which are created during the entire project.

Test reporting will be done every week and test reports need to prepare for the ongoing phase of testing.

After the successful completion of the all the tests each and every test willbecategorized in the following status:

* **Blocked**: The test that is not started for execution or still remaining to execute will fall in this section.
* **Failed**: The test where the actual result is not same as the expected result are considered as failed tests.
* **Passed**: The test where the actual result is same as expected result is considered as passed tests and fall under this category.

Other key metrics which are also reported are:

* Number of tests that are done on that time period
* Number of tests that are passed as expected
* Number of tests failed
* Remaining tests
* Description of the defects which are found ( Hardware, Software, Configuration)

### **Test Deliverables**

The listed aspects will occur during the testing phase of the project:

* The test strategy template will be created which describe the scope, testing approach, resources and the schedule of the testing cycle.
* The test schedule will be created which will include task time its sequence and duration and the role which will assign to that particular task.
* Test Cases: It includes the detail description of the test steps and description. And also compare the actual results with the expected results.
* The progress report and updates
* Reporting of the found bugs
* The final summary report.

# **Test Data**

Test data is essential for testing any number of test cases as they provide the input for a particular element which is under testing. However, it is important that we have both type data at our disposal – Good Data and Bad Data. Although there is nothing like ‘Bad Data’, we can use this type of data on EWHEELZ application and see how the application reacts to the data it does not expect. Test data for EWHEELZ app will be obtained as described in the table below.

|  |  |
| --- | --- |
| **Test Type** | **Source of Test Data** |
| Functional Testing | Manual entry, automated test data generation |
| White-Box Testing | Manual entry by inspecting the code,  Automated data generation covering all the branches of the software. |
| Black-Box Testing | Use cases, requirements analysis |
| Performance Testing | End users, domain experts |
| Security Testing | User database |

# **Testing Environments**

**Specification**

**Identification of the physical components, the communications, the system and middleware necessary**

Following are the components that are required to form a testing environment for EWHEELZ application:

* Physical component: Laptop with minimum 8 GB of RAM & i3 processor.
* Software components:
* Java
* Eclipse oxygen-0.1
* Apache Tomcat-9.0.4
* MySQL -5.7.20

### **Other software or supplies needed to support testing**

* Eclipse or Notepad++
* Web browser (Mostly Chrome as we are going to use Selenium)

### **Security and access requirements to the test area and equipment**

* Need to have EWHEELZ Admin credentials
* Need to have EWHEELZ User credentials
* Need to have MySQL Database credentials

**Test tools and utilities required**

Software tools required for testing:

* Selenium ([Selenium - Web Browser Automation](http://www.seleniumhq.org/))

# **Testing Tools**

## **Test Management Tools**

* Microsoft Excel 2016, Microsoft Word, Microsoft Project

## **Test Automation Tools**

* Selenium IDE-3.0.1
* Selenium Chrome driver-2.38

# **References**

SM, R. (2016, July 20th). *Entry and Exit Criteria in the Process of STLC*. Retrieved February 8th, 2018, from www.softwaretestingmaterial.com: https://www.softwaretestingmaterial.com/entry-and-exit-criteria/

ThinkSys. (2017, January 20th). *Entry & Exit Criteria in Software Testing*. Retrieved February 8th, 2018, from www.thinksys.com: https://www.thinksys.com/entry-exit-criteria.shtml