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## American International University- Bangladesh (AIUB)

## Department of Computer Science

## Software Quality and Testing

## Spring 2019-2020

## Assignment: Developing a TEST PLAN for Automated Ticket Issuing System for Dhaka Subway Systems (DSS)

**Subject: Software Quality & Testing**

**Department: Computer Science**

**Section: B**

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| --- | --- |
| Name | ID |
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1. **Test Plan Identifier Name:** DIS\_ATIS\_Version:1.0
2. **References:**

There are some SRS, FRD, user manual and analysis from requirement engineers.

1. **Introduction:**

The following is an introduction of the test plan for the automated ticket issuing system of Dhaka Subway System. According to the requirements and functionality each and every test is designed to meet the customer’s requirements. Every test is correctly executed and the goal for this test plan is to make sure that, for the version of software that we are going to make, everything should be according to the customer needs and should have each and every one of the requirements feature tested. so, that there is almost no chance of the software to crash or to expect any bug that may hamper the system. Most bugs can be removed but some bugs still exist which may be unknown to the developers or may be known but the chance of that bug to occur is very low so, it is best to build the best quality product within time and money.

1. **Test Items:**

All the systems and subsystems needed to be tested are included in this section. All these system/system components are listed by both priority and two different categories.

We have separated our test items in two general categories. Such as-

* Software Components.
* Hardware Components.

As we are considering this as a comparably higher level document, it focused on the functional areas of the system. Detailed test items are described below-

1. **Software Components:**
   * User interactions through the GUI (Graphical User Interface) including touchscreen and keyboard inputs.
   * Access modifier for different users; such as control of modification and configuration when used as admin.
   * Functional menu’s in the home screen.
   * Functional display for following events:
     + See and interact with the list of train schedule; including list of arrival time and departure time.
     + See and interact with the list of real time ticket availability information; including how many tickets available and which seats are available (shown on the display) in each class along with their relative ticket-fair.
   * Select and validate each of the options from the display functionalities.
   * Ticket purchasing options with following functionalities and criteria’s:
     + Multiple tickets purchasing/issuing in one transaction.
     + Simultaneous purchasing of tickets in the transaction.
     + Restriction and limitation on how many tickets can be purchased in same transaction.
   * Ticket cancellation functionality with defined rules:
     + Cancellation during the transaction process but before the final confirmation of purchase.
     + Limited admin level accessibility control for late cancellation.
   * Digital money transaction functionality implemented in the system. Including credit/debit card validation (through secured network and database) method and integrated functionality of money/coin recognition system of the banks.
   * Generate receipt of purchase and issue ticket.
   * All the read only information can be displayed in the website. Though transaction will not be possible.
   * Compatible methods and functionalities for insert, update, delete and save logged information in the designated Oracle database system.
2. **Hardware Components:**
   * Display monitor with touch screen capability.
   * Keyboard for insert input strings and interact with the system.
   * Credit/debit card transaction module.
   * Money/coin transaction module.
   * Impeded POS (Point of Sale) system.
   * The physical server for Oracle database.
3. **Software Risk Issues:**

The ticket system might crash when there is a lot of traffic on it at a certain time like for people going on vacation in EID to mitigate this a backup server should be kept for times like this. Due to political unrest there might be delays in delivery time of the software. Someone might get a wrong ticket than intended, though the chances of it happening is very low. If the internet speed becomes slow due to any reason the information coming to the monitor might become slow and will increase traffic of people waiting in line so, a backup ISP is required for that particular condition.

1. **Features To Be Tested:**

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| **Test ID** | **Features to be tested** | **Level of Risk** |
| V\_1.001 | Interface with display monitor. | High |
| V\_1.002 | Keyboard interaction along with the display screen | Medium |
| V\_1.003 | Menu for train schedule, seat availability information and purchasing ticket in the display screen. | High |
| V\_1.004 | Train schedule showing arrival time, departure time and destination of all available incoming train. | High |
| V\_1.005 | Available seat in different classes of a train is shown with ticket fare for that specific seat. | High |
| V\_1.006 | Purchase/issue multiple tickets simultaneously in one transaction. | Medium |
| V\_1.007 | Cancellation of tickets before final confirmation of the purchase. | High |
| V\_1.008 | Limitation on the number of ticket can be purchased at a time. | Medium |
| V\_1.009 | Admin access control on the number of ticket can be purchased at a time. | Low |
| V\_1.010 | Secured validation process for checking Debit/Credit card information and PIN number. | High |
| V\_1.011 | Secured validation process for checking, receiving or denying physical TK/Coin as inputs. |  |
| V\_1.012 | Issuing purchased ticket along with receipt. | High |
| V\_1.013 | View all the information in the website. | Low |

1. **Features Not To Be Tested:**

Despite of these features below are not to be tested, if any bug occurs through any of these features below then it also need to be reported in the testing documentation. No bug can be ignored. Because even though we will not test them, bugs generated by these features have to be fixed in order to run the current system.

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| **Features not to be tested** | **Reasons** |
| Physical display installation, setting and configuration in the subway stations. | * System only includes the functionalities and behaviors of the system, not the exact physical layout and design in the subway station. * It doesn’t include in our project. * It is the job for deployment authority of the project. |
| Real time hardware’s and embedded software’s for processing Debit/Credit card system. | * We will use the implemented methods of associated protocol of banking transactions. * It is not in our project to test the system provided by the authority. * We will just integrate our system with the available card transaction system of banks and govt. * We test only the implementation of this feature. |
| Real time hardware’s and embedded software’s for processing money (Taka/Coin) recognition system. | * This feature will also be provided by the authority as it is not secured to implement newly build system for such feature. * Integrating previous system is more secured and reliable. * We test only the implementation of this feature. |
| Physical layout, design and imbedded software configuration of the Oracle server. | * The oracle server has to be purchased by the stakeholder(in this case DSS authority) * Not included in our project. * We test only the implantation, connection and configuration of the database server. |

1. **Approach:**

As this is going to be a brand new project (from Scratch), testing team will follow the Manual Testing approach to test the system on every individual level of testing (Unit Testing, Integration Testing, System Testing, Acceptance Testing).

Automated Testing will be entertained in future, when there will be released of new version of the system. In future, new features will be added to the system which means new test cases will be added with the existing test cases. That means Integrated Testing will be performed. So, every time running this bunch of test cases along with the new one would be difficult for the testers if they follow the manual testing approach as there will be some constrains exist (Time & Money). Hence, Automated Testing will be the ideal approach for integration testing.

1. **Item Pass/Fail Criteria:**

Once all the test cases will be executed successfully, there will be some decisions to make. Depending on the test case execution result, test lead will make these decisions. A software system cannot be released with the confirmation of 100% bug free system. There will be definitely some bugs remaining in the system after releasing of final software. So, test lead and project manager will make the decision on when to release the software and with how much percentage of test case passed. It totally depends on the test lead and project manager. In this case, if 95% of the test cases will be passed during the testing session, we will allow the system to get release.

1. **Suspension Criteria and Resumption Requirements:**

* **High priority features:**   
  **Suspension Criteria**- If any of the high priority features failed in testing.  
  **Resumption Requirements**- After fixing the bug(s) of the specific feature.
* **Prerequisite test items:   
  Suspension Criteria**- If a prerequisite test item fails the test.  
  **Resumption Requirements**- All the prerequisite has to pass the testing in order to continue testing other features depending on this item.

Example: If menu for train schedule, seat availability information and purchasing ticket doesn’t work then testing of other dependent components/features below need to be suspended. Until the bug is fixed.

* **Naturel disasters and calamity:**   
  **Suspension Criteria**- Naturel unavoidable situations, such as Covid-19 outbreak or other naturel disasters.  
  **Resumption Requirements**- When the calamity is gone.
* **Unavailability of external systems:**   
  **Suspension Criteria**- If external systems such as card processing, money recognition, database server etc. are not available or not working properly.  
  **Resumption Requirements**- Having efficient and working external systems available in hand.
* **Deadline:**   
  **Suspension Criteria**- If the deadline is meet/about to meet/not feasible to test within the required time.  
  **Resumption Requirements**- Increasing the dead line or decreasing the test items/components.
* **Resource:  
  Suspension Criteria**- Lack of proper resource (software, hardware & human resource) for specific testing modules.  
  **Resumption Requirements**- Purchase, Increase, addition or training of proper resources.

1. **Test Deliverables:**

Test deliverables should be included the followings:

* Test Strategy
* Test Plan
* Test Cases/ Suites
* Test Data
* Requirement Traceability Matrix(TRM)
* Defect/Bug report
* Test Execution report
* Test Summary report
* Release Note
* Installation/Configure Guide
* User Guide

1. **Remaining Test Task:**

* Verify the prototypes of Screens.
* Verify the prototypes of Reports.
* Third party components.
* Infrastructure components.
* GPS device of software interaction.
* GUI response and directly database testing.
* Create Acceptance Test Plan.
* Create System Test Plan.
* Define Unit Test rules and Procedures for this system.
* Define Turnover procedures for each level Verify prototypes of Screens Verify prototypes of Reports.

1. **Environmental Needs:**

For environmental needs we need hardware component and software component.

**Hardware Components Are:**

* 1 Network Controller.
* Parallel Computing or DAP Workstation.
* 1 AX1100-Nighthawk tri-band WIFI.
* 1 SQL and Oracle Server.
* 1 Batch Waste Printer.
* 1 Canon ultra laser 10v Printer.
* Touch screen monitor.

**PC Configuration:**  20 PC's required for the test environment will include the following:

* 1 x z300, 1 TB HDD, and 32Gb RAM [ Minimum Specification]
* 3 x z346, 12.5 TB HDD, and 64 Gb RAM [ Standard Specification]
* 1 x z554, 24.5 TB HDD, and 128 Gb RAM TitanX GPU system [Maximum Specification]

These specifications are the various specifications currently in use in different branches. 10 x Intel Cor i9 proccessor running Windows NT is also required as the Test center for controlling and executing the automated testing.

**Software:** System Test will be run on the following Software Versions:-

* Desktop Version 10.2
* Windows 10 Operating System
* Visual Studio 10 Runtime Files
* MS Office 2019
* Windows NT 2019
* Also all other software those are need on the time of developing and testing the software.

1. **Staffing and Training needs:**

This type of section outlines means how to approach staffing and training the test roles for the project. Staffing is fixed for the duration of this project. It is likely most of the staff will assume some testing role that will be discuss in details in responsibilities section bellow.

1. **Responsibility:**

**Project Leader**

* Test progress should be check regular by Test Controller.
* .Manage risk relating to project or outside Test Teams control.
* Review the Test approach, plans and schedule.

**Test Planner**

* Produce High Level and Detailed Test Conditions.
* Produce Expected Results.
* Report progress at regular status reporting meetings.
* Co-ordinate review & signoff of Test Conditions.
* Manage individual test cycles & resolve tester queries/problems.
* Ensure test systems outages/problems are reported immediately and followed up.
* Ensure Entrance criteria are achieved prior to System Test start.
* Ensure Exit criteria are achieved prior to System Test signoff.

**Tester**

* Identify Test Data Execute
* Test Conditions and Mark off results
* Support IMS Regions
* Resolve Spooling Issues (if necessary)
* Resolve queries arising from remote backup

**Technical Support**

* Provide support for hardware environment.
* Provide support for Test software.
* Promote Software to system test environment.

1. **Schedule:**

The section contains the overall project schedule. It discusses the phases and key milestones as they relate to quality assurance. It discusses the testing goals and standards that we’d like to achieve for each phase of testing that will be deployed, e.g., Usability Testing, Code Complete Acceptance, Beta Testing, Integration Testing, Regression Testing, and System Testing.The key dates for overall Automation ticketing application development and Testing are outlined below. For details on the schedule, refer to the Automation ticketing application Project Schedule (this document). For details on general Engineering QA deliverables, refer to the test plan document.

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| **Milestones** | **End Date** | **Notes** | **QA Deliverables/Roles** |
| Planning  Phase | 4/5/2020 | At this Milestone,the high level planning should be completed. Some of the deliverables are: Project Plan, Program function specifications. | High-level test planning activities, which include preliminary development of Master QA Plan (this document, QA schedule). |
| Code  Complete  -  Infrastructure | 4/8/2020 | This milestone is when all infrastructure development and functions should be  complete. The testing team should have performed unit & integration testing before checking the code into any build. | The Test Engineers should have completed or in the final stages of their preliminary Infrastructure Test Plan, test cases and other QA documents related to test execution for each feature or component such as test scenarios, expected results, data sets, test procedures, scripts and applicable testing tools. |
| Code  Complete  -Function | 5/12/2020 | This milestone includes unit testing and code review of each function component prior to checking the codeinto the test phase. The deliverables include systemtesting specification, Unit  testing specifications,  Integration plan. | The Test Engineers should have provided Code Complete  Assessment Test to Development  Engineer one week prior to Code Complete Review date. The Test  Engineers should also have completed or in the final stages of their preliminary White Box Test Plan, test cases and other QA documents related to test execution for each feature or  component such as test  scenarios, expected results, data sets, test procedures, scripts and  applicable testing tools. |
| Feature  Complete | 6/03/2021 | This phase allows for  feature clean up to verify remaining bug fixes and regression testing around the bug fixes. This milestone indicates that the feature is ready for Beta regression. | bugs verified and QA  documentation is finalized. The test Engineers should assess that Automation ticketing application features are ready for Beta regression and have started their preliminary Test Summary Reports. |
| Regression  Test | 9/05/2021 | This milestone represents that all Automation ticketing  application code and GUI interface to the Automation ticketing application is ready  for Regression Testing. | Complete regression test  execution of complete system and update Test Summary Reports for  regression. |
| Ship/Live | 12/6/2021 | Product is out. | Any unfinished Testing documents  should be complete. |

1. **Planning Risks and Contingencies:**

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| **Risk** | **Probability** | | **Risk Type** | **Owner** | **Mitigation Approach** |
| Unable to acquire the necessary number of skilled personnel as the components become ready to test | 40% | | Personnel Schedule | Test Manager | Resources for components will be split between the existing resourcesSchedule must be adjusted accordingly. |
| Unable to acquire some of the necessary hardware and software required for integration and | 30% | | Schedule | Development Manage | Utilize existing acquired hardware. Split test execution into morning and evening shifts such that testing can occur for |
| Third party services utilized in the system become unavailable during testing | 10% | | 3rd Party | Alliance Manager | Setup a communication channel to 3rd party to report and handle issues when they occur. Use the communication channel above to stay aware of planned outages and maintenance to help schedule test execution. |
| Components are not delivered on time | | 10% | Schedule | Test Manager | Integration testing with those components must be delayed until the component is delivered. Overall integration test approach may be modified to do an appropriate amount of bottom-up as well as topdown or sandwich integration. Schedule must be adjusted accordingly.  Turnover |
| Coverture /Turnover | | 10% | Personal | Test Manager | Testers will work in pairs on components. If a single member of the team decides to leave, a secondary testing with the knowledge of the component will still be able to train a new tester or finish the work. Schedule must be adjusted accordingly. |

**Risks and Contingencies:**

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| **Risks** | **Contingencies Approach** |
| Requirements Inflation | Purchase requirements . |
| Personnel shortfalls | Staffing with top talent;Job matching;Teambuilding;Training and career development;Early scheduling of key personnel |
| Developing the wrong software functions | Improved software evaluation;Formal specification methods;User surveys;Prototyping;Early user manuals |
| Unrealistic time and cost estimates | Multiple estimation techniques;Design to cost;Incremental development;Recording and analysis of past projects;Standardization of methods |
| Employee Turnover | Increased collaboration and information sharing on the team. |

1. **Approvals:**

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| --- | --- | --- | --- |
| Name | Designation | Sign | Date |
| Sayed Ahmed Sarker | Test lead  Datasoft, Inc. | Sayed | 17-04-2020 |
| Fatema Farhana Rinky | Project Manager,  Datasoft, Inc. | Rinky | 17-04-2020 |
| SYED ISHMAM SHAHIR | Technical Manager,  Dhaka Subway Systems (DSS) | Shahir | 17-04-2020 |

THE END