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# SOFTWARE TESTING

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## 6.1 DERIVING TEST - CASE SPECIFICATIONS

The specifications for testing are derived from customer requirements, from the study of design

Code of software modules and from screen or visual interfaces through which the user interacts with the system. Test-case specification in performed for system testing by keeping in mind several issues, which are discussed in the following subtopics.

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## 6.2 STATE THE TEST ENVIRONMENT

The software is tested with the required hardware and software requirements. The software configuration is Windows 7 with Eclipse and Android Emulator installed on it,,Wamp Server. The mobile device which is used for testing purpose is Galaxy S II with Android 4.2.2 (Jelly Beans).

## 6.3 TESTING IDENTIFICATION

A specific test is planned for every test level to test all system components.

Our Application divided into following modules:

* Module for Security (Sign Up, Login , Logout)
* Show Subordinate (list of subordinates and their information )
* Manage Subordinate (Add Subordinate, Update and DeleteSubordinate,)
* View logs(Call ,Sms, Contact, Gps location, Pictures, Web Browser History and Apps installed/uninstalled)
* Data transfer from android to server(sending logs to server, check internet connection, exception in connection)

The system is executed systematically, and its output is verified.

## 6.4 TEST PROCEDURE

A testing strategy is decided for testing the system so that all modules are tested to fulfill all user requirements. A test strategy is a methodology that describes the various steps that need to be performed during testing and the time and effort required for performing them. The following strategies are used for testing our application.

## 6.5 UNIT TESTING

Unit testing is a white-box testing technique. The main consideration in this test is verification of all modules of the software system. Each module is unit tested, as follows:

* Unit testing the module to ensure that logs are send to server
* Unit testing the module to ensure connection is established
* Unit testing the module to ensure data storage in SQLite when exception in connection occurred.
* Unit testing the module to ensure that in the absence of internet connection the data is stored in SQLite
* Unit testing the module to ensure system security by Verifying Admin.
* Unit testing the module for Admin Credentials Registration.
* Unit testing the module to Manage Admin Credentials.
* Unit testing the module for Admin Logout
* Unit testing the module for View Subordinate
* Unit testing the module to Add Subordinate and its information
* Unit testing the module to Modify Subordinate’s information .
* Unit testing the module to Delete Subordinate and its information
* Unit testing the module for View Recent Call logs
* Unit testing the module for View Previous Call logs
* Unit testing the module for View Recent Sms logs
* Unit testing the module for View Previous Sms logs
* Unit testing the module for View Recent Contact logs
* Unit testing the module for View Previous Contact logs
* Unit testing the module for View Recent Gps Location logs
* Unit testing the module for View Previous Gps Location logs
* Unit testing the module for View Recent Pictures logs
* Unit testing the module for View Previous Pictures logs
* Unit testing the module for View Recent Web Browsing logs
* Unit testing the module for View Previous Web Browsing logs
* Unit testing the module for View Recent Installed and Deleted Apps logs
* Unit testing the module for View Previous Installed and Deleted Apps logs
* Unit testing the module to verify the working of Reminders Alert System.

## 6.6 INTEGRATION TESTING

Integration testing is the technique for testing the interfaces of software components. Each software components in unit tested, and all the components are integrated to perform together. The tests are conducted to ensure that the components are working properly after interfacing.

All modules are integrated, and integration testing of the system is performed as follows:

* Interface of the applications are integrated together and then tested. The Backend functionality is then added and application is tested again. Following are the interfaces of the application:
  + Data transfer from android service to web Server(connection established, exception condition)
  + Admin Registration ( Sign Up)
  + Admin Login
  + View Registered Subordinate List
  + Manage Subordinate
  + Add Subordinate and its information
  + Modify Subordinate and its information
  + Delete Subordinate and its information
  + View Call Logs (Recent and Previous)
  + View Sms Logs (Recent and Previous)
  + View Contacts Logs (Recent and Previous)
  + View Gps Location Logs (Recent and Previous)
  + View Pictures Logs (Recent and Previous)
  + View Web Browsing Logs (Recent and Previous)
  + View Installed and Deleted Apps Logs (Recent and Previous)
  + Admin Logout

## 6.7 SYSTEM TESTING

System testing involves the set of tests that ensures that the entire system performs according to specifications.

### 6.7.1 Recovery Testing

The software system is fault tolerant. Fault tolerance is the ability of the software system to recover from errors quickly and resume working again. We have developed a fault-tolerant system, keeping in mind all the specifications; as a result, there are minimum chances of faults.

### 6.7.2 Security Testing

System testing is protection testing that test security methods in the system to avoid invalid intrusions. The system stores secret and sensitive information that is susceptible to invalid intrusions. The Account Configuration Module is built for security of the application.

Several security checks have been included in the system. The system requires a logon ID and password to initiate. For allowing only authenticated users to log on to the system, each user is assigned a user name and password.

### 6.7.3 Stress Testing

A system is evaluated under normal conditions in all previous testing techniques, and no conditions where system can fail are tested. Stress testing evaluates the system under abnormal conditions. Following are the abnormal conditions that may affect the working of the application in different ways:

* Slow internet service, this will result in slow execution of the application
* Huge input data, this will also slow down the application execution.
* GPS system is not working; since one of our application modules is based on GPS this condition will affect the GPS module.

### 6.7.4 Performance Testing

Performance testing uses criteria to check that the system functions according to the specifications. The performance of the software is tested at all levels of testing. All unit modules have been tested successfully. The integration of these unit modules produces reports in the required format and the system does well in handling multiple simultaneous instructions.

## 6.8 TEST PLAN

### 6.8.1 Objectives:

* **System Overview:**

The system is developed to provide a solution to the organizations that provide cell phones to their employees and pay their data packages to ensure that the provided cell phones are been used officially.

* **Document Overview:**

This document contains the plan and schedule for tests to be performed on the system and the mapping of tests to specified system requirements.

### 6.8.2 Software Test Environment

**Name of test Site(s):**UIIT

**Resources:**

**Software:**

The software requirements Android Operating System 4.2.2 (jelly Beans), Web Services, Wamp Server

**Hardware:**

The minimum hardware requirements are a Core 2 Duo with 1 GB RAM, 2.4 GHz speed, and a GPS enabled cell phone with above mentioned version of android. A high speed internet connection is also needed.

**Participating Organizations:** Our Project Team

**Personnel:**

* M.Ahsen Taqi Kazmi
* Sara Waheed
* Saba un Nisa

### 6.8.3 Test Identification

Following are the tests created:

**Test ID:** SAT\_Test\_1

**Test Name:** Security

**Test Level:** Unit and integration testing

**Test Type:** Input tests, output tests, and verification, validation tests

**Test Conditions:** Test will use real-time data

**Test ID:** SAT\_Test\_2

**Test Name:**View Subordinate List

**Test Level:** Unit and integration testing

**Test Type:** Input tests and Output tests

**Test Conditions:** Test will use real-time data

**Test ID:** SAT\_Test\_3

**Test Name:**Manage Subordinate

**Test Level:** Unit and integration testing

**Test Type:** Input tests, output tests, and verification, validation tests

**Test Conditions:** Test will use real-time data

**Test ID:** SAT\_Test\_4

**Test Name:**View Logs

**Test Level:** Unit and integration testing

**Test Type:** Input tests and output tests

**Test Conditions:** Test will use real-time data

**Test ID:** SAT\_Test\_5

**Test Name:**Data transfer

**Test Level:** Unit and integration testing

**Test Type:** Input tests and output tests

**Test Conditions:** Test will use real-time data

### 6.8.4 Test Schedules

**Test ID:** SAT\_Test\_1

**Test Name:** Security

**Test Personnel:**

* + M.Ahsen Taqi Kazmi
  + Sara Waheed
  + Saba un Nisa

**Test Site:** UIIT - UAAR, Rawalpindi

**Planned Date:**19thJune 2014

**Test ID:** SAT\_Test\_2

**Test Name:**View Subordinate List

**Test Personnel:**

* + M.Ahsen Taqi Kazmi
  + Sara Waheed
  + Saba un Nisa

**Test Site:** UIIT -UAAR, Rawalpindi

**Planned Date:**19th June 2014

**Test ID:** SAT\_Test\_3

**Test Name:**Manage Subordinate

**Test Personnel:**

* + M.Ahsen Taqi Kazmi
  + Sara Waheed
  + Saba un Nisa

**Test Site:** UIIT -UAAR, Rawalpindi

**Planned Date:**19th June 2014

**Test ID:** SAT\_Test\_4

**Test Name:**View Logs

**Test Personnel:**

* + M.Ahsen Taqi Kazmi
  + Sara Waheed
  + Saba un Nisa

**Test Site:** UIIT -UAAR, Rawalpindi

**Planned Date:**19th June 2014

**Test ID:** SAT\_Test\_5

**Test Name:**Data transfer

**Test Personnel:**

* + M.Ahsen Taqi Kazmi
  + Sara Waheed
  + Saba un Nisa

**Test Site:** UIIT -UAAR, Rawalpindi

**Planned Date:**19th June 2014

### Requirements Traceability

**Test ID:** SAT\_Test\_1

**Test Name:**Security

**Requirement Met:** Login Module

**Test ID:** SAT\_Test\_2

**Test Name:**View Subordinate List

**Requirement Met:** Authentication

**Test ID:** SAT\_Test\_3

**Test Name:**Manage Subordinate

**Requirement Met:** Authentication

**Test ID:** SAT\_Test\_4

**Test Name:**View Logs

**Requirement Met:** Add subordinate

**Test ID:** SAT\_Test\_5

**Test Name:**Data Transfer

**Requirement Met:** Connection Established

### 6.8.6 Test Cases

A test case is prepared for each test that needs to be performed. The test cases result in the development of test reports, which will be used for test-output analysis.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SAT\_Test\_1** | | | | | | | |
| **Software:**Subordinate Activity Tracker | | | | Module: Login Module | | | |
| **Test Name:**Security | | | | **Test ID:** SAT\_Test\_1 | | | |
| **Test Description:** This test verifies the user name and password to access the system. | | | | | | | |
| **Pre-Condition:**The Login page of the website is opened | | | | | | | |
| **Post Condition:** User is successfully signed up | | | | | | | |
| **Action**  **Performed** | **Action’s**  **Output** | **Valid Input** | **Invalid Input** | | **Input** | **Required**  **Output** | **Output** |
| Enter user  name and  password | Displayed  in allotted  fields | Correct name  and correct  Password, absolutely same as when you sign up a form. | Either of or both the username or password is  Incorrect | | Valid | Successfully signed in. | As required |
| Testing Environment: NetBeans and WampServer | | | | | | | |
| Tested By: M.Ahsen Taqi Kazmi, Saba un Nisa, Sara Waheed | | | | | | | |
| Table 6.8.6.1 Test Case SAT\_Test\_1 | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SAT\_Test\_2** | | | | | | | |
| **Software:**Subordinate Activity Tracker | | | | Module: Show Subordinate | | | |
| **Test Name:**View Subordinate List | | | | **Test ID:** SAT\_Test\_2 | | | |
| **Test Description:**This test will show the list of registered subordinated to the admin | | | | | | | |
| **Pre-Condition:**The information of the subordinate is stored in the data base and Wamp Serveris running. | | | | | | | |
| **Post Condition.:** The admin will have a list off all the registered subordinates and their related information | | | | | | | |
| **Action**  **Performed** | **Action’s**  **Output** | **Valid Input** | **Invalid Input** | | **Input** | **Required**  **Output** | **Output** |
| Show subordinate button is pressed | List of registered subordinated along with the information is displayed | Show subordinate button is pressed | Some other button is pressed | | Show subordinate button is pressed. | List of registered subordinated is displayed | As required |
| Testing Environment: NetBeans IDE 7.4 and Server | | | | | | | |
| Tested By: M.Ahsen Taqi Kazmi, Saba un Nisa, Sara Waheed | | | | | | | |
| Table 6.8.6.2 Test Case SAT\_Test\_2 | | | | | | | |

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| **SAT\_Test\_3** | | | | | | | |
| **Software:**Subordinate Activity Tracker | | | | Module: Manage Subordinate | | | |
| **Test Name:**Manage Subordinate | | | | **Test ID:** SAT\_Test\_3 | | | |
| **Test Description:**this test will display web page where admin can add a subordinate, modify subordinate’s information and Delete subordinate | | | | | | | |
| **Pre-Condition:**Admin must be login, home page is opened and Wamp Server is running | | | | | | | |
| **Post Condition:**Required changes occurred as desired by the Admin | | | | | | | |
| **Action**  **Performed** | **Action’s**  **Output** | **Valid Input** | **Invalid Input** | | **Input** | **Required**  **Output** | **Output** |
| Click on Manage Subordinate | Web page will open, containingthree options i.e. Add, modify or delete subordinate | Click in Manage Subordinate | Back button is pressed | | Managed Subordinate is pressed. | Web page will open, containingthree options i.e. Add, modify or delete subordinate | As required |
| Testing Environment: NetBeans IDE 7.4 and Wamp Server | | | | | | | |
| Tested By: M.Ahsen Taqi Kazmi, Saba un Nisa, Sara Waheed | | | | | | | |
| Table 6.8.6.3 Test Case SAT\_Test\_3 | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **SAT\_Test\_4** | | | | | | | |
| **Software:**Subordinate Activity Tracker | | | | Module: View Logs | | | |
| **Test Name:** View Logs | | | | **Test ID:** SAT\_Test\_4 | | | |
| **Test Description:**this test will display the required logs as desired by the admin | | | | | | | |
| **Pre-Condition:**Admin must login, home page is opened and Wamp server is running. | | | | | | | |
| **Post Condition:**Required logs are displayed to the admin | | | | | | | |
| **Action**  **Performed** | **Action’s**  **Output** | **Valid Input** | **Invalid Input** | | **Input** | **Required**  **Output** | **Output** |
| Click on respective View Log Button | Required logs are displayed on the web page to admin | Click on respective View Log Button | Home button is pressed | | Click on respective View Log Button | Required logs are displayed on the web page to admin | As required |
| Testing Environment: NetBeans IDE 7.4 and Wamp Server | | | | | | | |
| Tested By: M.Ahsen Taqi Kazmi, Saba un Nisa, Sara Waheed | | | | | | | |
| Table 6.8.6.4 Test Case SAT\_Test\_4 | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **SAT\_Test\_5** | | | | | | | |
| **Software:**Subordinate Activity Tracker | | | | **Module**: Data Transfer | | | |
| **Test Name:**Data Transfer | | | | **Test ID:** SAT\_Test\_5 | | | |
| **Test Description:** This test that the data is transferred from android service to the web server | | | | | | | |
| **Pre-Condition:**the logs are maintained and connection is established | | | | | | | |
| **Post Condition:**the logs are updated on the server | | | | | | | |
| **Action**  **Performed** | **Action’s**  **Output** | **Valid Input** | **Invalid Input** | | **Input** | **Required**  **Output** | **Output** |
| Logs are maintained and Connection established and data is send to the | Data is received and updated on server | Connection established and data is send over the network | Connection fails to established or exception occurred | | Logs are monitored and send to server | Map will reached to a desired location of a user. | As required |
| Testing Environment: Eclipse with Android OS version 4.2.2, GPS Cellphone with Android OS version 4.2.2, NetBeans 7.4 web services and Wamp Server are running | | | | | | | |
| Tested By: M.Ahsen Taqi Kazmi, Saba un Nisa, Sara Waheed | | | | | | | |
| Table 6.8.6.5 Test Case SAT\_Test\_5 | | | | | | | |

### 6.8.7 Test Output Analysis

The test output analysis is based one of the following specifications:

* All test components were thoroughly reviewed for errors.
* Testing conforms to test specifications if the test results in faults or errors.
* If the above two specification results in no solution, the system has errors. These errors are re-analyzed by developers and testers.

### 6.8.8 Summary of Test Result

The objective of these tests is to demonstrate that the performance of the software system meets all requirements. All modules have been successfully unit tested. The performance of the test is according to said specifications. The system is also fully tested for recovery testing, security testing, stress testing, and performance testing.

Therefore, the system fulfills all requirements.

### 6.8.9 Deviation from Test Cases

There is no deviation from the test case and the system performs well according to the said specifications and it can be therefore inferred that developing the system as planned was good enough to generate a system that is well equipped with the solution to problems stated earlier in the book.

### 6.8.10 Bug Report:

**Bug Name:** Application crashed when new contact is entered

**Bug ID:** SAT\_Bug\_1

**Area Path:** Application Start ->Contact Log.

**Build Number:** Version Number 1.2.

**Severity:** High (High/Medium/Low)

**Priority:** High(High/Medium/Low)

**Assigned to:** Sara Waheed

**Reported By:** M.Ahsen Taqi Kazmi

**Reported On:** 19 /6/2014

**Reason:** Defect

**Status:** New

**Environment:** Windows 7, Eclipse Juno, SQLite.

**Description:**

Person name or the number was null which caused the application to crash.

**Steps To Reproduce:**

* + Service started on android
  + New contact is entered
  + Person name is null.
  + The Application unfortunately stopped

.

**Expected result:**

The contact name should be successfully saved and monitored by the service

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