

CENG 492
COMPUTER ENGINEERING DESIGN II
Test Specification Report



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1. Introduction

In our project, we try to develop software that is enabling of reacting environmental conditions on Android platform. Each group member develops parts of the project that are assigned to him. However developing software is not enough to create a reliable software product. While developing software, we should also make some tests to make sure that our software works correctly and we can continue to develop our system in a safety way.

1.1 Goals and Objectives

In the previous requirement and design reports, we state that our system consists of many parts and each group member is responsible for some of them. In order to make all these components work in a harmony, first one should verify responsibilities of his module for our system and verify whether these components work in a correct way when they are integrated. All of these words mean that testing is very critical for our project. Moreover we should also run many small tests during the development phase. All of efforts that are related to testing procedure give us:

- high performance
- bug-free code
- logically correct system
- usable and reliable product

1.2 Statement of Scope

This document briefly explains the testing process of our project. We start to write code for one month and coding part of the project continue until at the end of the term, therefore we have not start the detailed testing process. However, the main aim and scope of this document is to show testing plan for the remaining part of our project in which the implementation is considered to be nearly complete.

It is very important to say that we decide the details of test plan by considering the major constraints of our project. Moreover we try to develop a testing plan which is enough for context aware UI concept. Therefore, this report reflects our testing criteria and approach.

1.3 Major Constraints

- Time

Actually, time is an important constraint for many projects. However our project is related to capturing the environmental changes and changing UI according to these data. This means that time is very important for us and we should serve a user-friendly UI to the users in a small amount of time. In other words, after we collect the necessary data from environment, we should quickly change UI in order to make our product usable and time-efficient. There is nearly 1 month to complete the project and for this period we will run some tests that measure our product in terms of the time.

- Data

In our project, data is an important constraint, because data is sent and received by the user many times during the application is working. In order words, the user deals with data all the time and the consistency of data is one of the main constraints for us. Of course, we have to create and run some tests that can check the data whether it is correct or not. We have to concentrate on this issue, because wrong data makes also our project wrong and erroneous.

- Efficiency of Test Process

In the previous parts we state that testing is an important and critical issue in order to have a complete product that is working as expected. However, writing tests and analyzing their results brings both human resource requirement and time cost. Moreover our team just consists of three members and concentrating on test too much may gain our performance in terms of software developing. Therefore we try to limit our tests in order to gain maximum performance from them.

- Hardware

As we stated earlier, we develop our system on Android platform and use Android emulator while developing our code. Moreover we want to test our software on a real phone. Therefore the emulator and the performance of the phone limit tests of the project.

1.4 Definitions, Acronyms, Abbreviations

UI: User Interface

1.5 References

IEEE Standard for Software Test Documentation

Test Specification Report Template

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2. Test Plan

The main goal of this document is to describe the whole testing process of our project. What it will be done for testing process for future actions is explained in this document.

Moreover, testing works are tried to equally be distributed to each member of our team. Each member is responsible for his own work.

2.1 Software to be tested

The major components such of our project as Database Manager, Main Server Core and Mobile Application Core and their interactions between each other will be tested to assure the stability of the system. That is, all of these components and subcomponents of them will be controlled in order to get confident results from the tests.

2.2 Testing Strategy

In this part of the document, it will be described the overall testing strategy and procedure of the project.

2.2.1 Unit Testing

A unit is usually a method for object-oriented programming so the important methods of the major components mentioned above. Unit tests are planned to be typically written and run in order to ensure that code meets its design and behaves as intended.

2.2.2 Integration Testing

First of all, the important part of the project, Database and Database Manager, will be integrated to the system so that we can compose the data for the scenario of the system. Then, Main Server Core is integrated to connect with Database via Database Manager so that main server and database can send or receive data between each other. Other integration is to connect the server to Mobile Core Application so that a user can both have a connection and access to the database from mobile device and get current sensor information about user interaction. Finally we will integrate all modules and so the graphical user interface of mobile device can adapt for the data which come from main server and the changable environment conditions.

2.2.3 Validation Testing

The validation testing goal is to validate and be confident about the software product or system, that it fulfills the specified requirements. Our Software Requirements Specification document defines both functional and non-functional requirements. All requirements mentioned before are tried to be considered carefully so that we can take guarantee to satisfy them. Test cases will be occurred according to our system scenarios specified in design report. And then, the test cases and scenarios as a whole will be run to ensure the correctness of the working of the system. The validation testing will be taken in parallel with integration testing. That is, both test methods will use the same order for parts of the project.

2.2.4 High-order Testing

In addition the mentioned tests, we plan to use high level tests mainly performance and stress tests. Performance tests are very important for our project because our system need have a good performance while changing the user interface for user. We plan to measure how long tasks, which are important for timing, takes, under normal and peak conditions, to ensure that the system can respond within the specified time constraints. Moreover, Scenario runtime will be tested with possible maximum unit on it and maximum interaction between them for stress tests.

2.3 Test Metrics

- Number of test cases executed
- Number of bugs detected
- Number of bugs fixed
- Number of priority bugs fixed

2.4 Testing Tools and Environment

Following tools and environments will be used for testing purpose.

- Eclipse Debugger: The debugger plug-in of Eclipse includes most of its UI, and the ability to delegate to a specific debugger implementation at the user's request.
- LogCat: It is a debugger system which is designed for Android emulator. We can see information about all running processes. For example, process id and time information about processes during the system is working. It will be very helpful for testing our software.
- WampServer: WampServer is a Windows web development environment. It allows you to create web applications with Apache, PHP and the MySQL database. It also comes with PHPMyAdmin to easily manage your databases. WampServer will be used to check correctness of the data kept in the database.

3. Test Procedure

3.1 Unit Test Cases

Unit test will be held as both black box and white box. Each developer will be responsible for testing his own part of the project he developed. We will test both the correctness of outputs for a given input and the correctness of data flowing inside the system. With black box testing, we will give inputs and analyze the output of the component subject to test procedure. Moreover, we will monitor the change of variables and data through the progress of the application with the help of the debuggers of Eclipse and Android emulator.

3.2 Integration Testing

The project consists of different parts. To be more detailed, we have one mobile application and one desktop application which are also consists of more subcomponents of their own. Therefore in order to achieve a successful, fully working product we need to connect them properly. Integration tests are responsible for ensuring this. We will control the information and data flowing through different components in both sender and receiver parts. We will check whether a defect or a change occurred during connections and integrations. Moreover, we will control whether the correct component are connected and no irrelevant communications are in progress.

3.3 Validation Testing

Validation tests will be the control mechanism for achieving requirements for our software. Validation test will check whether the project output will fulfill the desired specifications described in software requirement report of our project. This test includes all components of the project since they are combined into one working set of software. We will test both the mobile application and the server application to eliminate the errors.

3.4 High-order Testing

High-order testing will be held by testing full performance usage, extreme conditions and overloading the system. Multiple users will be simulated by opening multiple instances of the android emulator. After that, intense network load will be created by sending messages between them. Moreover, we will try to communicate with server from each of them to test the server's reaction time and accuracy. In addition to that, the correctness of the mobile application under huge pressure will be tested as well. We will increase the frequency of the messages and tasks delivered by the server and the information provided to the mobile device to test whether the device fetches them correctly and in time.

4. Testing Resources and Staffing

Most of the testing procedure will be done by developers of our project. Each developer will be responsible for his own part. That is, each developer will test his own code during the development of the project.

After error detections and fixing them, system tests will be done by all development team members. We also plan to test the software in a mobile device that can use android operating system after android emulator to see more concrete results of testing.

Division of work will be equally done between developers so that test procedure will be handled rapidly.

5. Test Work Products

The identification of the bugs, which will be found by the developers, will be the work products produced as a consequence of the testing strategy and testing procedure of our project.

6. Test Record Keeping and Test Log

As mentioned about in Configuration Management Report, we use TRAC system for record keeping. That is, as soon as one of the developers finds a bug of the system, he will make the correction to the developer of the corresponding module by using TRAC if he can find a solution. This method will easily provide us keep records of tests and corrections. Information about kept records such as which developer make correction for that test will be kept and it will be visible for all team members.

7. Organization and Responsibilities

All members will participate in testing procedure. Each member is responsible for performing unit tests for the parts he developed for project. Integration test will be carried out by members responsible for the units to be combined. Validation and high order systems tests will be run in presence of all members

8. Test Schedule

Test processes will be held until the end of May as mentioned in detailed design report.

Unit tests are already in progress adjacent to the development processes.

Integration tests will be from May 1st to May 8th.

Validation and high-order testing will be performed from the end of integration process to the end of May.