Computer Science Senior Capstone
CS486 - Requirements Engineering

ViralTech

Project: PIMpoint Collaborator Data Entry Point

Software Testing Plan

Version 1.2

Overview:

Team Members:
Jialei Chen
Carl Porter
Colton Spector
Weiheng Su
Scooter Nowak - Capstone Mentor

Client:
Jonathan Todd - Associate Bioinformatician

Northern Arizona University
School of Informatics, Computing, and Cyber Systems

TGen North
Flagstaff, Arizona

October 22, 2019

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Introduction and Problem statement

TGen, which stands for the Translational Genomics Research Institute, is a non-profit organization dedicated to being able to genetically analyze the actual disease afflicting a person and prescribe the best treatment on a patient by the patient basis. However, the processes currently in place at TGen aren't efficient. The issues are specifically manifested as manually data entry done by scientists and data they collected are not standardized. Also, collaborators are unable to track the progress of their samples once they've sent them to TGEN. In order to solve these issues and allow the scientists to dedicate as much of their time as possible to actual science, our software product <name of our software product> comes into play.

Our web-based software product enables collaborators to put data into spreadsheet data entry and our system will dynamically save the data into the database. When the data is successfully saved, our system will generate QR code. The collaborators will ship the samples with the corresponding QR code to scientists. So this time, scientists do not need to manually do data entry, they just need to scan the QR code and everything comes up. Also, our spreadsheet data entry enables standardized data collection. Finally, when collaborators successfully enter data and create new packages on our system, they can track the process of their samples on our website.

Software testing is an activity to check whether our product meets the expected needs and to ensure our software is defect free. Software testing is necessary because software bugs could not only cause potentially monetary loss, but also human loss. The software bug is both expensive and dangerous, so we need to do software testing to avoid any software bugs which may cost unnecessary loss. During the process of our testing, the first step is basic functionality. We have to make sure every button on screen successfully works and simply input text without crashing the system. The second step is code view to enable the correctness of code methodology. The third step is unit testing. We need to test each component and the method is working as expected by crossing a range of valid and invalid data. The final step is to do some usability testing. We conclude the feedback from the representative user and evaluate our product.

In our testing plan, we do unit testing, integration testing and usability testing for our project. In unit testing, we make sure each button works by both valid and invalid inputs. In intergate testing, we check data successfully between font-end and back-end. In usability testing, we will let people in tgen company test our project and use their response to evaluate our product.

The aim of our product is to get standardized data collection, so unit testing makes sure the system can report errors when invalid data enters without crashing. Our product is accomplished by group work, so we need to check that data can pass directly between different models.

Usability testing is necessary because we need our customer, tgen company satisfies the products.

Unit testing

To build a complete project, we must have a clear framework and ideas to implement our project. This means that we need to separate our projects into units so that we can carry on the project more effectively. To know if each part is complete or runnable, we need to do unit testing.In computer programming, unit testing tests the control data, usage process, and operation process of a single unit of code. The purpose of unit testing is to determine whether the code and project are complete, correct, and consistent with our standards. And unit tests can help us find the problem effectively and quickly.

Our first unit of code that we are testing is Google Authentication implemented into our project. The authentication of users works by prompting the user to sign in using Google Authentication. Once the user enters their credentials, they are verified by the Google EndPoint server and we are given their user token. We pass this token through the URL and then verify its integrity on the back-end by sending it to the Google EndPoint server one more time before validating the user on the database.

The next test unit is having someone enter the portal and sending data using the Handson table after they have created a package. This unit test will incorporate appropriate database querying, authentication of users, and the upper limits of user input by going through the process of creating a package and submitting sample data. In this unit test we are verifying the transfer of confidential information between the collaborator and the client, which is the most important.

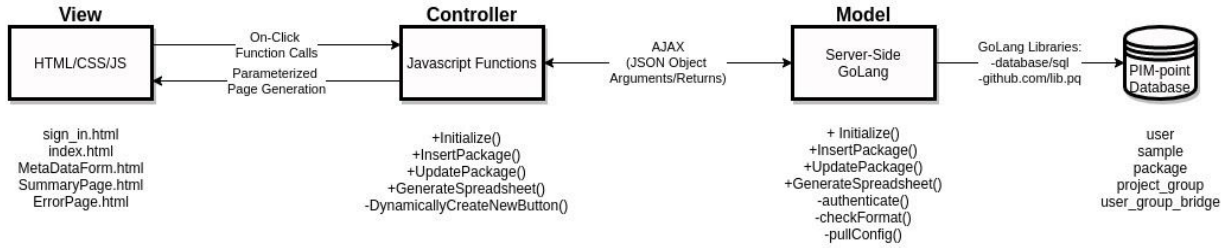
Our last unit of testing is testing the limits of what the user has information to in the summary page and ensuring that they can no longer edit their sample data past the point of it being delivered at TGen North. With this unit of testing we will test the query of the users package delivery number, their viewing of their sample data, and the ability to print their sample QR codes for the convenience of TGen scientists.

Integration Testing

Our product consists of multiple software modules, coded by group members, so integration testing is necessary. Integration testing is defined as a type of testing where software modules are integrated logically and tested as a group. It is the necessary part because this level of testing can expose defects in the interaction between these software modules when they are integrated.

There are three key units in our system, view, controller and the model . Data communication between the view and controller through some Javascript onclick functions and page generation functions. Data communication between controller and model through AJAX call. Here is the

diagram of our model. Data communion between model and database through some go functions.



The details of integration testing are as follows. Firstly, we go into the spreadsheet page, enter the data into our spreadsheet, then click the submit button. After that, we need to go into the database to check whether data exists in the database. If we find the new data, it means data successfully passes from view to the database. When the database successfully gets the data, we can go back to our website and see whether the logo of this new package changes. If the logo changes, it means data successfully passes from the model to the view

Usability Testing

The goal of a product is to meet customer satisfaction, so we need to test how easy a design is to use on a group of representative users. Usability testing a technique used in user-centered interaction design to evaluate a product by testing it on users. It is needed because the designer can get feedback from customers to evaluate the product. During the testing, the user will be going through the website and doing some experiments, After that, the user gives the feedback of the product to the designer.

Conclusion

Our project has gone through the last modifications and additions, and we have completed the overall structure and framework. We implemented the HTTP request and connected to the back-end call database, allowing the user to store data through input. Next, we need to change some front-end styles and add QR code. As for the test part, we first carry out unit tests, and test each function to achieve different specific functions. Then carry out the integration test. After testing all parts of our view,controller and model, we will integrate them together for testing. After our internal testing was completed, we showed the project to TGen, and we did usability testing again for the different requirements of TGen.

So far, the overall framework of our project has been nearly completed. We have a front end and successfully connected to the back end. We can retrieve data from the back end of the database and store data into the database through user input.Our project went on step by step, and although there were different difficulties and problems in each step, we still solved and overcame them. Next, we will modify and supplement our projects to make our customers more satisfied.