Software Test Specification

Virtual Clinic - An Integrated Care System

Mishal Shah - 16CO125

Samyak Jain - 16CO254

13th April, 2018

Introduction

Project Team:

Team is comprised of undergraduate students doing BTech in Computer Science and Engineering at National Institute of Technology Karnataka, Surathkal. The team members are enrolled in a software lab course which is a core course required of all undergraduate Computer Science and Engineering students. Successful delivery of the desired software product will fulfill the completion of the course.

Name	Email	Phone
Mishal Shah	shahmishal1998@gmail.com	9725801399
Samyak Jain	16co254.samyak@nitk.edu.in	9818099551

Abbreviations, Acronyms and Definitions

Term	Definition
N/A	Not Applicable
SRS	Software Requirements Specification - document that establishes the requirements for the system under consideration
SDS	Software Design Specification
STS	Software Test Specification
Web Browser	An application for making HTTP Requests and handling HTTP responses by rendering web pages and executing their included scripts
Travis CI	It is a distributed continuous integration service used to build and test software projects.

Test Plan Description

The Virtual Clinic is an integrated care system that manages all stakeholders in medical domain efficiently. Each feature is made up of a number of use cases, and each use case can be tested in a number of ways.

Product Summary: Virtual Clinic is an integrated care system. Its an application that a hospital can use to provide better services for its patients. Users of this application are Admin,doctor,patient, chemist and lab. Admin role is to monitor entire system by adding doctors,lab and chemist or by handling invoice details. Patient can register and ask for consultation. Doctor provides consultation, and the required information is seen by chemist and lab to provide their service. Thus it makes the whole healthcare system very efficient.

Test Design Specification

Testing Approach: We have used the SRS and the SDS to prepare the design test cases and their procedures. These tests are designed to verify the documentation previously listed.

To test Virtual Clinic, we have accounted the following testing approaches:

- **Interface Testing:** Virtual Clinic has many modules and components, including, but not limited to, appointment, medical tests, prescription and profile view. Information from these components must be passed between each other and to other components throughout the application. Interface testing will be used to evaluate whether these components and modules pass data and control correctly to one another.
- **Regression Testing:** Virtual Clinic is being developed in Waterfall with Backflow process model. After each code/build change, our development environment is setup to run all test cases against the current code base with each push to main repository.
- **Coverage Testing:** As per the SRS, we will be writing our own unit tests on each new code push. Because of this requirement, in addition to other testing methods, we aim to have near 100% code coverage. This means that 100% (or extremely close to 100%) of the source code written passes through a test at some point in the testing suite.
- **Automated Test & Deployment:** Virtual Clinic is being developed and improvised as per the suggestions from everyone and as and when some bug is found by the developers while using it, as a result is becomes very important for the team to have automated tests after every code push and automatically deploy it to the server where the application is hosted in order to reduce a lot of manual work and get the new application code running in few minutes itself.
- **Functional Testing:** Virtual Clinic is an frontward-facing web application. Due to the nature of this application, we have conducted manual testing on the web page to ensure that the application reacts and responds in the way that it is expected to.
- **Unit Testing:** Virtual Clinic is utilizing unit and integration testing. All of the unit and integration test cases are constructed with detailed knowledge of the code base, and have been automated to run with each code base change.
- **System Testing:** Virtual Clinic is a web application and hence will be needed to setup for different hospital management systems and in a different way and according to their needs. Hence we will be testing the application on different environments and verify the successful working of it.

Features or Combination of Features not to be tested

The following list describes features that will be excluded during the testing phase:

1. **Load Testing -** Ability to cope with volume, load and hardware faults. Test cases will not include testing the systems ability to deal with multiple users and any hardware issues that may arise.
2. **Session Time Out -** Time related bugs such as session time out will not be tested. It is assumed that once a user's session times out the session variables are lost and the user must start over.
3. **Browser Cookies -** The use of browser cookies will not be tested.
4. **Server Reliability -** As we depend on third party for the infrastructure, we won't be able to test the server uptime and reliability.

Environmental Needs

This section contains the properties that are needed to test Virtual Clinic. An environment matching the following criteria can be used to test.

Client :

- The environment should have network connection.
- The environment will be able to run the web browser specified by the given test.
- The web browser should have JavaScript enabled.

Server :

- The environment should have a virtual environment setup and the dependencies mentioned in the requirements.txt file in the virtual environment.
- The environment should have PostgreSQL or MYSQL database installed.
- The environment has access to the source code of the Virtual Clinic application.

Testing Specification

This section contains tables for each of the features to be tested. Each subsection specifies the USE CASES to be tested, the procedures necessary to run the test cases, and the items being tested. Each Use Case includes automated tests. Figures 2.1 to 2.4 depict the output of running these automated tests. Figures 3.1 to 3.7 depict the output on running the tests on Travis CI. The following table (1.1) details the procedures for executing these automated tests automated tests. This procedure is executed for each Use Case:

Automated Test Procedure		
Step	Description	Expected Results
1	Execute testing suite by running `python manage.py test` via command line	All test passes.
2	Execute the testing site before pushing to the main repository via Travis CI build check.	All test passes, code can be merged.

Table 1.1 - Automated Tests

```
(VirtualClinic) mishal23@mishal23:~/Projects/VirtualClinic/virtual-clinic/virtualclinic$ python manage.py test
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
Testing activity view

activity view verified

.Testing add hospital

add hospital verified

.Testing add speciality

add speciality verified

.Testing add symptom

add symptom verified

.Testing backup

test backup verified

.Testing create employee

create employee verified

.Testing export

test export verified

.Testing import

statistic view verified

.Testing restore users

Restore user verified

.Testing speciality view

speciality view verified
```

Fig 2.1 -Automated Test #1

```
.Testing Speciality delete

Speciality delete verified

.Testing statistic view

statistic view verified

.Testing Symptom delete

Symptom delete verified

.Testing symptom view

symptom view verified

.Testing User archive

User archive verified

.Testing users

user verified

.Testing view archive users

View archive verified

.Testing appointment calender

appointment calender verified

.Testing appointment create

appointment create verified

.Testing appointment list

appointment list verified

.Testing appointment update
```

Fig 2.2 - Automated Test #2

```
.Testing appointment update
appointment update verified
.Testing valid profile
Valid profile verified
......Testing register error
register error verified
.Testing login
login verified
.Testing logout
logout verified
.Testing register
register verified
.Testing setup
setup verified
.Testing medical info list
medical info list verified
.Testing medical info update
medical info update verified
.Testing medical test display
medical test display verified
.Testing medical test list
```

Fig 2.3 - Automated Test #3

```
.Testing medical test upload
medical test upload verified
.Testing list messages
list messages verified
.Testing new messages
new messages verified
....Testing prescription list
prescription list verified
.Testing new prescription
new prescription verified
.Testing update prescription
update prescription verified
.Testing setup password
setup password verified
.Testing profile
profile verified
.Testing profile update
profile update verified
..
----------------------------------------------------------------------
Ran 50 tests in 0.402s

OK
Destroying test database for alias 'default'...
(VirtualClinic) mishal23@mishal23:~/Projects/VirtualClinic/virtual-clinic/virtualclinic$
```

Fig 2.4 - Automated Test #4

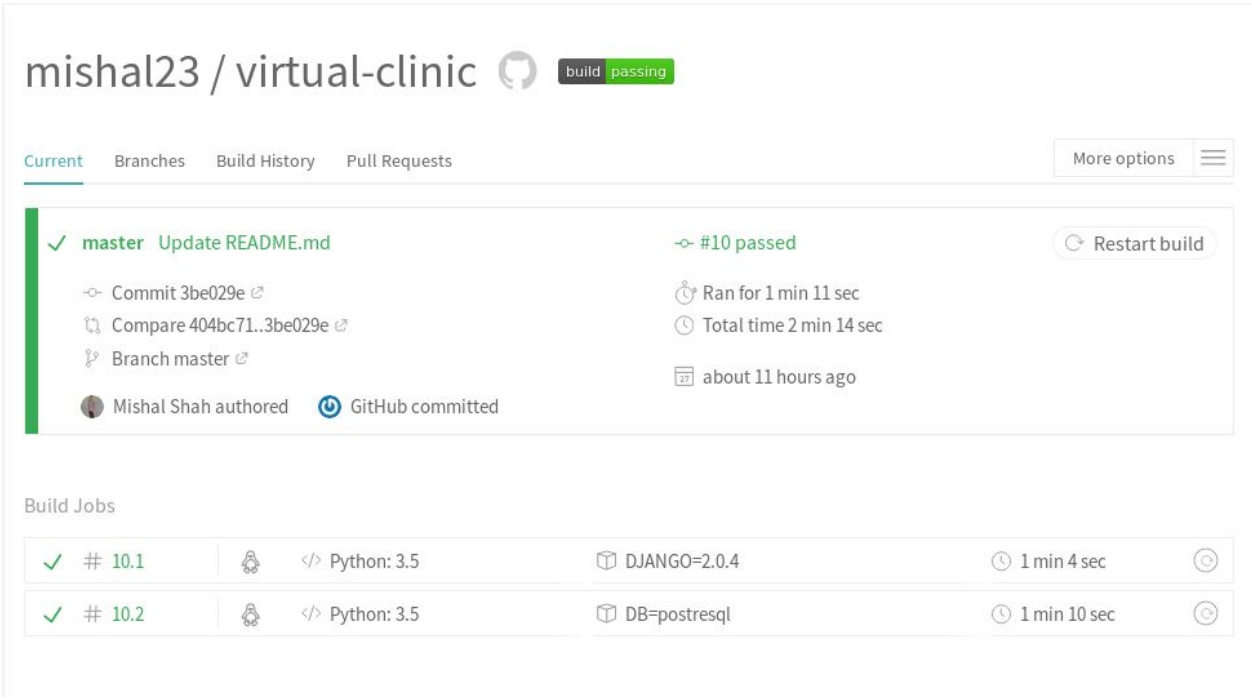

Fig 3.1 - Travis CI - Automated Integration Test Final Result [All tests passed]

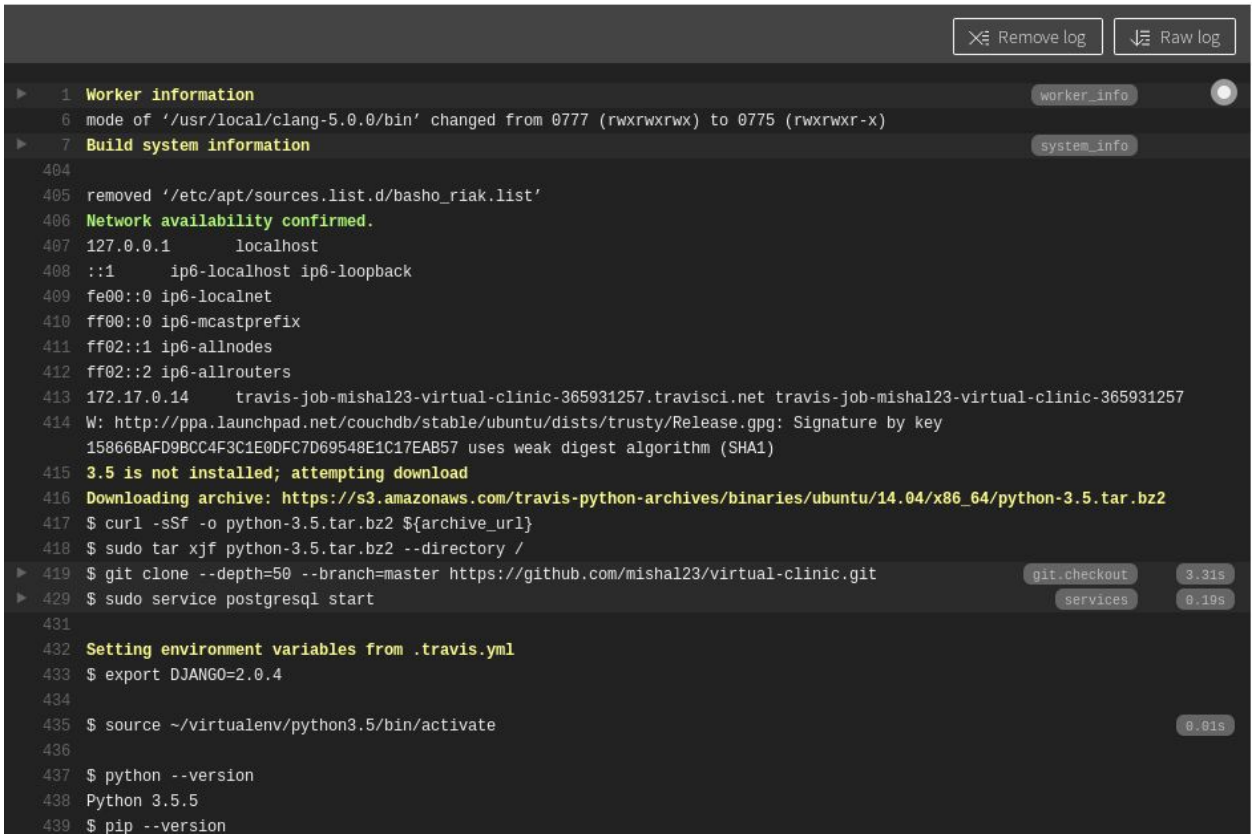

Fig 3.2 - Travis CI -Automated Test #1

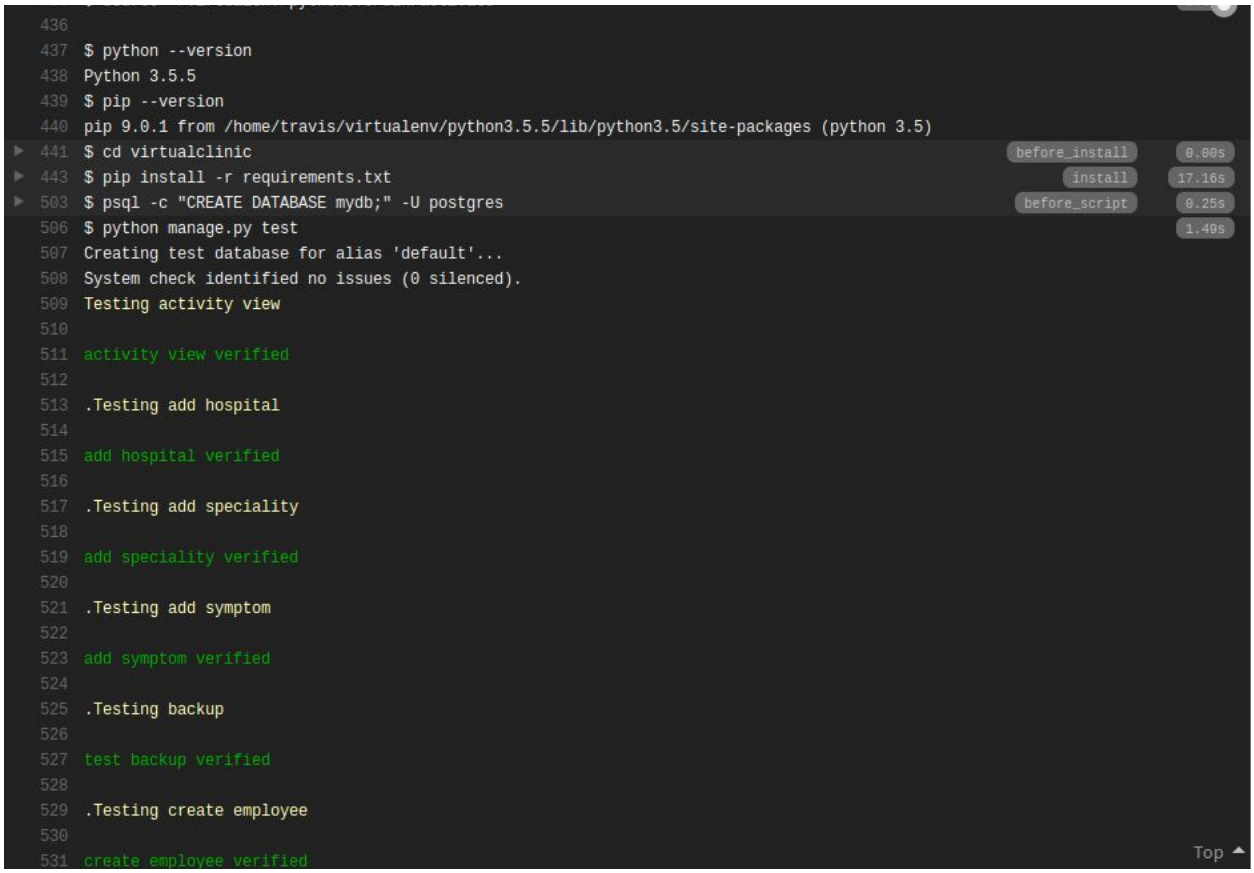

Fig 3.3 - Travis CI -Automated Test #2

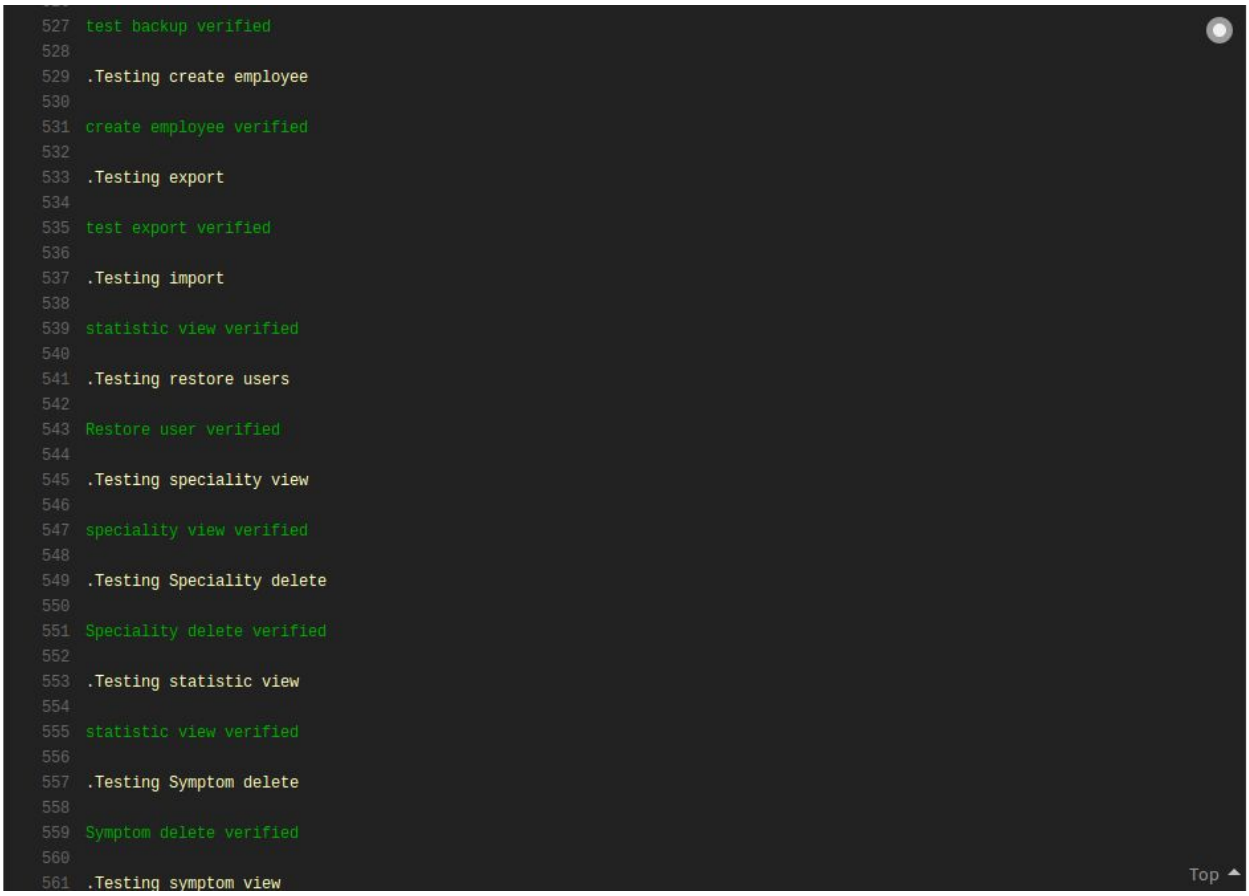

Fig 3.4 - Travis CI -Automated Test #3

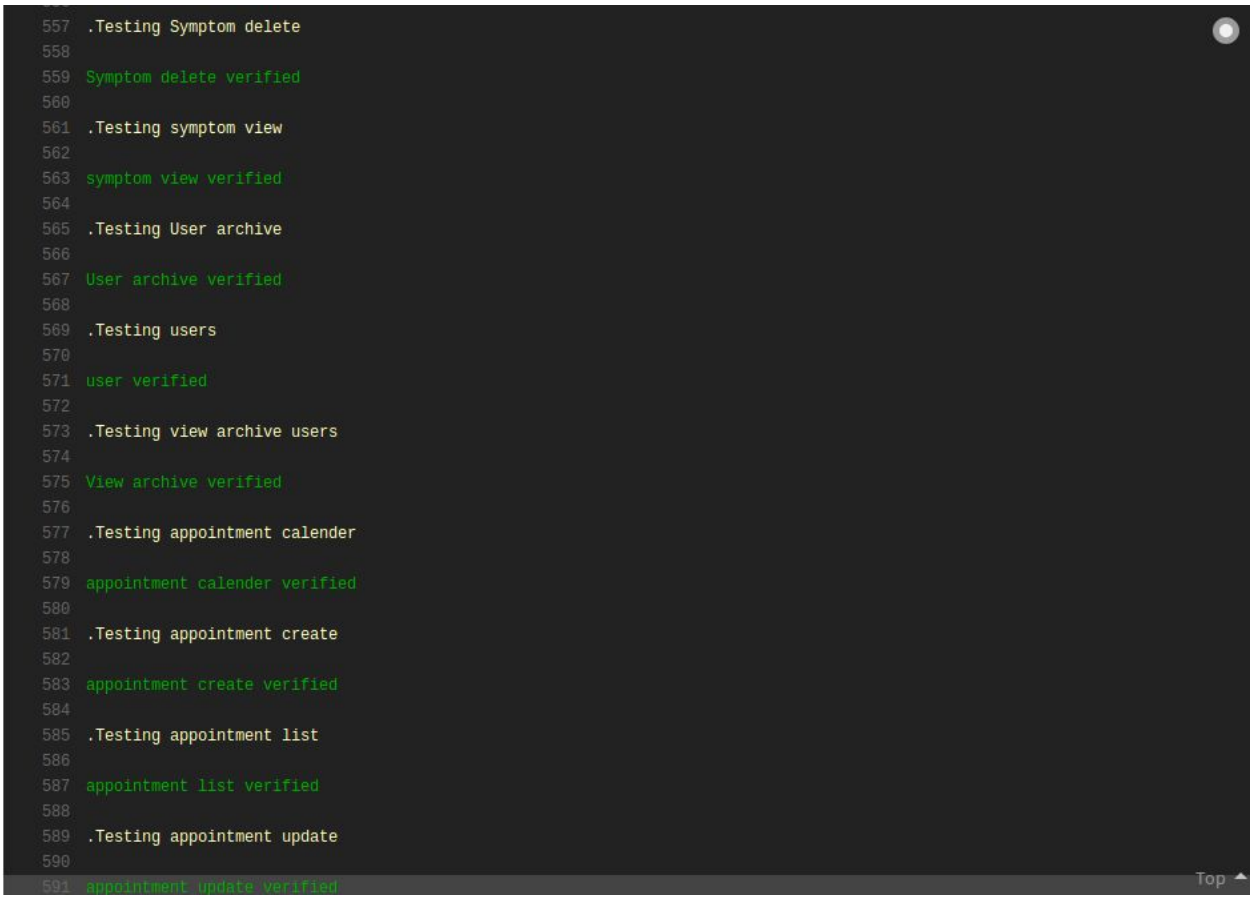

Fig 3.5 - Travis CI -Automated Test #4

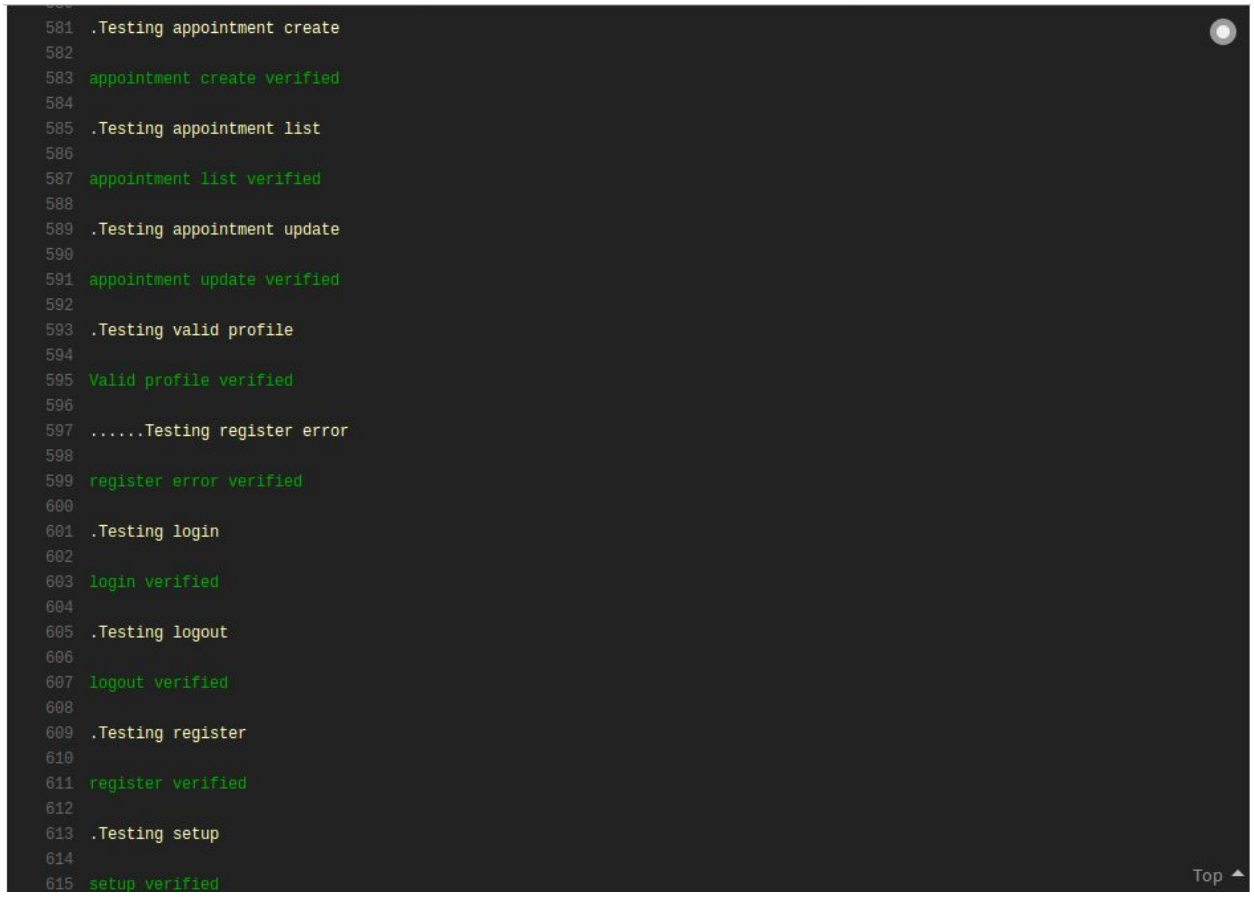

Fig 3.6 - Travis CI -Automated Test #5

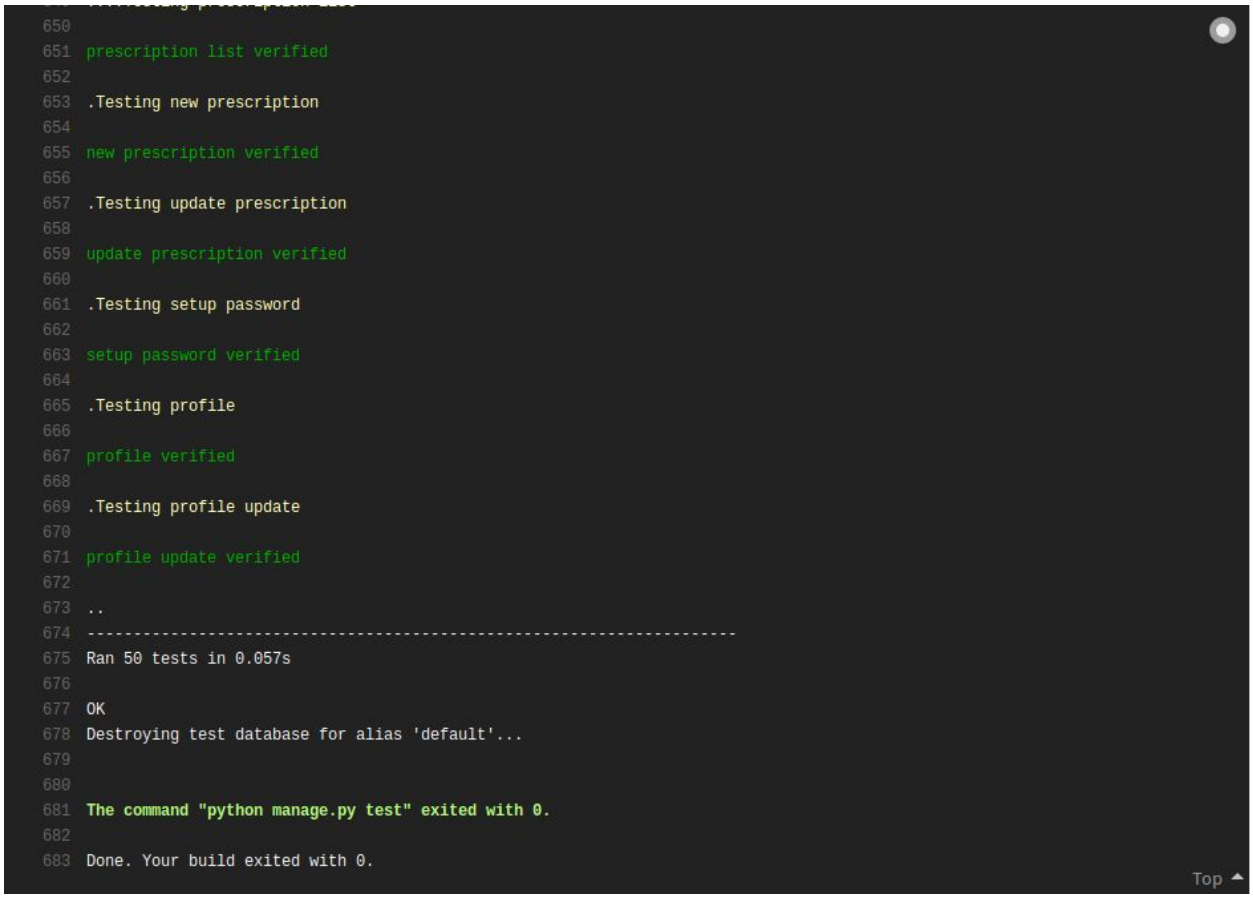

Fig.3.7 - Travis CI - Automated Test #6

Functional Testing: Following is the table for all the functional testing and the expected outcomes and the outcome got.

Green colour in the table indicates the expected outcome and outcome matched and **red colour** shows that the outcome got wasn't same as expected.

Virtual Clinic - Functional Testing & Outcomes					
Test No	**Function**	**Pre Conditions**	**Test Description(steps)**	**Expected Outcome**	**Outcome**
1	Patient Registration	System is setup and functional	1. User clicks on register button 2. User enter email as username 3. User enters password, firstname, lastname 4. User reenters password 5. User clicks register button	Page displays profile page for user and an option to logout	
1.1	Patient Registration	System is setup and functional	1. User clicks on register button 2. User enter email as username 3. User enters password, firstname, lastname 4. User reenters password but different then the above first password 5. User clicks register button	Page displays error message saying second password field doesn't match	
1.2	Patient Registration	System is setup and functional	1. User clicks on register button 2. User enter email as username 3. User enters password 4. User leaves firstname and lastname blank 5. User clicks register button	Page displays error message saying that the fields are missing input	
2	System Setup	System is visited first time	1. First time user enters the email as username 2. User enters the password 3. User reenters the password, first name, last name 4. User clicks on Register account button	Page is redirected to admin profile and displays message saying Successfully setup admin	

				account.	
2.1	System Setup	System is visited first time	1. First time user enters the email as username 2. User enters the password 3. User reenters the password but different from the above first password, first name, last name 4. User clicks on Register account button	Page displays error message saying that the password field doesn't match	
2.2	System Setup	System is visited first time	1. First time user enters the email as username 2. User enters the password 3. User reenters the password,leaves first name, last name blank 4. User clicks on Register account button	Page displays error message saying that the fields are missing input	
3	User Login	System is setup and functional	1. User enters username and password 2. User clicks the login button	Page displays the profile of the corresponding user	
4	Add speciality	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add speciality button 2. Adds speciality name and description 3. Clicks on add speciality button	Speciality page displays the added speciality	
4.1	Add speciality	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add speciality button 2. Keeps one of the fields speciality name or description 3. Clicks on add speciality button	The page shows the user to enter the desired field	
4.2	Add speciality	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add speciality button 2. Fills both the fields(but it already exists) 3. Clicks on add speciality button	The page shows error and says duplicate entry	

5	Delete speciality	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on delete speciality button 2. Cancel confirmation box pops up. 3. Admin clicks on delete the speciality	Speciality page displays the other specialities that were not deleted	
6	Add symptom	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add symptom button 2. Adds symptom name and description 3. Clicks on add symptom button	Speciality page does not get changed	
6.1	Add symptom	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add symptom button 2. Keeps one of the fiels symptom name or description 3. Clicks on add symptom button	The page shows the user to enter the desired field	
6.2	Add symptom	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on add symptom button 2. Fills both the fields(but it already exists) 3. Clicks on add symptom button	The page shows error and says duplicate entry	
7	Delete symptom	System is setup and functional and is on speciality page Admin has logged in	1. Admin clicks on delete speciality button 2. Cancel confirmation box pops up. 3. Admin clicks on delete the speciality	Speciality page displays the other specialities that were not deleted	
8	Employee Registration	System is setup and functional. Admin is logged in	1. Admin clicks create new user option 2. Admin enters email, password, and fullname 3. Admin re-enters password . 4. Admin chooses the role of the new user 5. Admin clicks register button	Page displays that account for the user has been successfully created	
8.1	Employee Registration	System is setup and functional. Admin is logged in	1. Admin clicks create new user option 2. Admin leaves fields blank	Page displays error message highlighting the	

			3. Admin clicks register button	input fields to fill them.	
9	Archive Users	System is setup and functional. Admin is logged in and is on Manage Users page	1. Admin clicks on Archive user option for the user wanting to archive 2. Pages shows a confirmation box to archive the user. 3. Admin clicks Confirm User archive	The user is successfully archived and doesn't show the user in the users list	
10	Restore Users	System is setup and functional. Admin is logged in and is on Archived Users page	1. Admin clicks on Restore user option for the user wanting to restore 2. Pages shows a confirmation box to restore the user. 3. Admin clicks Confirm User restore.	The user is successfully restored and shows the name on the users page	
11	View Activity	System is setup and functional. Admin is logged in. A Patient account has been created. A Patient has succesfully logged in, created anappointment, cancelled the appointment, and logged out	Admin is on Activity Page	The page shows in a table format, the activities done login, appointment creation, cancellation of appointment, and logged out along with the time of each activity.	
12	View System Statistics	System is setup and functional. Admin is logged in.	1. Admin is on View System Statistics Page 2. Admin chooses the start date 3. Admin chooses the end date 4. Admin clicks Get Statistics button	The page shows the system statistics in the given period	
12.1	View System Statistics	System is setup and functional. Admin is logged in.	1. Admin is on View System Statistics Page 2. Admin leaves the date fields blank. 3. Admin clicks Get	The page shows an error message saying those are required	

			Statistics button	fields	
13	Import Users	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin browses the csv to upload 3. Admin clicks on Import button	The page displays message saying the users are successfully uploaded	
13.1	Import Users	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin browses the csv to upload but doesn't have the required fields 3. Admin clicks on Import button	The page displays message saying the users couldn't be uploaded, please check the CSV format	
14	Import Hospital	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin browses the csv to upload 3. Admin clicks on Import button	The page displays message saying the hospitals are succesfully uploaded	
14.1	Import Hospital	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin browses the csv to upload but doesn't have the required fields for hospital registration 3. Admin clicks on Import button	The page displays message saying the hospitals couldn't be uploaded, please check the CSV format	
15	Export Users	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin checks the Export Users radio button 3. Admin clicks on Submit button	The CSV for the users will be generated and admin can save it wherever required	
15.1	Export Hospitals	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin checks the Export	The CSV for the hospitals will be	

			Hospital radio button 3. Admin clicks on Submit button	generated and admin can save it wherever required	
15.2	Export Users/Hospitals	System is setup and functional. Admin is logged in.	1. Admin is on CSV Management Page 2. Admin does not check any radio option 3. Admin clicks on Submit button	The page will show an error message showing to select a radio button option	
16	Create an appointment	System is setup and functional user is logged in	1. User clicks on appointment button 2. User clicks on new appointment. 3. Fills the appointment form correctly 4. user clicks on create appointment	Appointment gets created	
16.1	Create an appointment	System is setup and functional user is logged in	1. User clicks on appointment button 2. User clicks on new appointment. 3. Fills the appointment form incorrectly (start time after finish time) 4. user clicks on create appointment	Page displays to enter correct information	
17	Provide consultation	System is setup and functional doctor is logged in	1. Doctor clicks on prescription button 2. Fills the prescription form correctly 3. Doctor clicks on add prescription	Prescription gets added	
17.1	Provide consultation	System is setup and functional doctor is logged in	1. Doctor clicks on prescription button 2. Fills the prescription form not completely 3. Doctor clicks on add prescription	Page displays to fill the desired entry	
18	Deliver Medicines	System is setup and functional chemist is logged in	1. Chemist clicks on prescription button 2. Updates its delivery status	Delivery status gets updated	

			3. clicks on update prescription		
19	Perform Lab tests	System is setup and functional lab is logged in	1. Lab clicks on prescription button 2. Uploads the test results 3. Updates the precription	Prescription gets updated	
19.1	Perform Lab tests	System is setup and functional lab is logged in	1. Lab clicks on prescription button 2. Display the test results 3. clicks on return to medical tests	Test page shows the desired medical test result then return to lab page	
20	Patient display	System is setup and functional patient is logged in	1. Patient clicks on medical info button	Page displays the medical history of patient	
20.1	Patient display	System is setup and functional patient is logged in	1. Patient clicks on medical test button	Page displays the medical test results of patient	
20.2	Patient display	System is setup and functional patient is logged in	1. Patient clicks on prescription button	Page displays the prescription of patient	
21	Update Profile	System is setup and functional. Patient is logged in	1. User clicks on Update Profile 2. User updates the fields 3. User clicks on Update Profile button	Page displays message that the profile is successfully updated.	
21.1	Update Profile	System is setup and functional. Patient is logged in.	1. User clicks on Update Profile 2. User updates the field, but enters date later then current date 3. User clicks on Update Profile button	Page displays message showing to enter correct birthdate	
21.2	Update Profile	System is setup and functional. Patient is logged in	1. User clicks on Update Profile 2. User updates the field, but enters date 200 years ago 3. User clicks on Update	Page displays message showing to enter correct birthdate	

			Profile button		
22	Change Password	System is setup and functional, user is logged in	1. User is on Change Password page 2. User enters current password 3. User enters the new password and then reenters the new password. 4. User clicks on Change Password button	Page displays that the password is successfully updated	
22.1	Change Password	System is setup and functional, user is logged in	1. User is on Change Password page 2. User enters current password 3. User leaves all the fields blank 4. User clicks on Change Password button	Page displays an error message saying all fields are required.	
22.2	Change Password	System is setup and functional, user is logged in	1. User is on Change Password page 2. User enters current password 3. User enters the new password but renters then new password wrong 4. User clicks on Change Password button	Page displays an error message saying the passwords are different.	
22.3	Change Password	System is setup and functional, user is logged in	1. User is on Change Password page 2. User enters current password 3. User enters the new password and reenters the new password but password is same as previous password 4. User clicks on Change Password button	Page displays error message saying the new password should be different from the previous one.	

Summary

The Software Test Specification shows the various types of testing done on the product Virtual Clinic. Unit tests were done on 50 use cases and all of them gave positive results. Functional testing was done on all functional requirements and results are displayed in the form of a table shown in the functional testing table. Automated integration testing was done with the help of Travis CI to automate the deploy and get clear insights that the system won't break after adding a new code. Interface Testing, Regression Testing, Coverage Testing and System Testing were also covered properly.