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Unit Test Plan and Report

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1 Introduction

1.1 Purpose for Test

1.1.1 Reducing bugs in new features

We write new tests as we write new code. We believe that tests do not result in a fully bug proof system, but they drastically reduce the number of bugs as we add new code.

1.1.2 Reducing bugs in existing features

With quality tests in place, adding new features hardly breaks existing features. If a new feature breaks existing functionality, the existing tests fail, which makes it very easy to pinpoint where the errors occurred.

1.1.3 Tests improve design

When writing tests, one is forced to have testable code. We have used a strategy known as TDD(Test driven development) which ensures that you write efficient code that fulfils its basic functionality.

1.1.4 Testing makes development faster

Testing slows you down on a class-by-class basis, however with experience, your overall velocity increases because you need not fear breaking existing code when new features are added. With TDD, we realised that no extra code is written which saves coding hours and increases efficiency.

1.2 Project Outline

The main objective of this system is to allow a delivery person into a demarcated area of your house when you are not there. You should be able to give access remotely and monitor the delivery person while you they are in the area.

This document will demonstrate how the functionality of this system was tested by team codeBlox

1.3 Scope

The scope of this document is structured as follows. The features that are considered for testing are listed in section 3. Tests that have been identified from the requirements are discussed in detail in section 4. Furthermore, this document outlines the test environment and the risks involved in the testing approaches that will be followed. Assumptions and dependencies of this test plan will also be mentioned. Section 7 outlines, discusses and concludes on the results of the tests.

1.4 Test Environment

- Programming Language
  - node js
  - Angular js
  - Python
  - Java (android)
- Coding Environment
  - Node package envrionment (npm)
- Operating system
  - Linux
- Hardware
  - Hardware testing is done on a level of using a voltameter
  - Raspberry Pi 3

1.5 Assumption and Dependencies

- assume that user has android device and is able to use it
- assume that the Pi 3 and camera have been setup in the house

1.5.1 Dependencies

- angular
- bcrypt
- body-parser
- express
- jwt-simple
- mongojs
- mocha
- should
- supertest

all npm node-modules

2 Test Items

3 Functional Features to be Tested

- user registration
- notification when someone is at the gate
- open/close gate
- open camera

Feature ID	RDS source	Summary	Test Case ID
1	server.get('/')	Testing connection to the server	001
2	server.post('/registration')	Persisting new user credentials	002
3	server.get('/returnUser/:email')	Verify credentials and allow/reject access	003
4	newUser.getActivationStatus()	Return true or false	004
5	newUser.getPin()	Get pin for user	005
6	newUser.getStaus()	Get connection status	006

4 Test Cases

4.1 Test Case 1

Test case 1: connection to server
Condition: open home page
Objective: check if the Pi connects to the server
Input: web URL
Outcome: 200 status

4.2 Test Case 2

Test case 2: add user
Condition: user should not exist
Objective: check if user details get persisted to the database
Input: first name, last name, id, email, password1, password2
Outcome: 200 status and user added to database

4.3 Test Case 3

Test case 3: getting user email
Condition: user should exist

Objective: check if user info can be accessed
Input: user name
Outcome: print user email

4.4 Test Case 4

Test case 4: user status
Condition: user should exist and be active
Objective: check if correct status returned is active
Input: end Activation Date
Outcome: active

Condition 2: user should exist and be inactive
Objective: check if correct status returned is inactive
Input: end Activation Date
Outcome: inactive

4.5 Test Case 5

Test case 5: generating pin
Condition: request pin
Objective: generate pin for the back up system
Input: getpin()
Outcome: 8-digit random pin

4.6 Test Case 6

Test case 6: pin status
Condition: pin has been generated and un-used
Objective: check if pin has not been used
Input: getPinStatus()
Outcome: un-used

Condition 2: pin has been generated and used
Objective: check if pin has been used
Input: getPinStatus()
Outcome: used

5 Item Pass Criteria

- The home raspberry pi should be running
- The raspberry pi should be connected to the internet
- The raspberry should have a connection to the server

6 Test Deliverables

7 Detailed Test Results

7.1 Overview of Test Results

All the tests that were carried out passed and meet the expected results. These tests were carried out using the Mocha framework along with an assertion library called Chai.

7.2 Functional Requirements Test Results

Two separate tests were carried out to ensure that everything works. The first set of tests were done over the internet to ensure connection to server and correct communication with the server. The second set of tests, tested the functionality of the individual functions in the module locally. The tests are on Github at :https://github.com/billibongers/CodeBlox—Main-Project/tree/master/Code/Interfaces/tests and https://github.com/billibongers/CodeBlox—Main-Project/tree/master/Code/NodeJs/Services/personModule/test

7.2.1 Test Case 1 (4.1)

- The website opened and the video stream started
- Result: Pass

7.2.2 Test Case 2 (4.2)

- New user was added to the system
- server returned status code of 200
- Result: Pass

7.2.3 Test Case 3 (4.3)

- User email was returned
- The data was returned in the correct format
- Result: Pass

7.2.4 Test Case 4 (4.4)

- condition 1 returned active and condition 2 returned inactive
- Result: Pass

7.2.5 Test Case 5 (4.5)

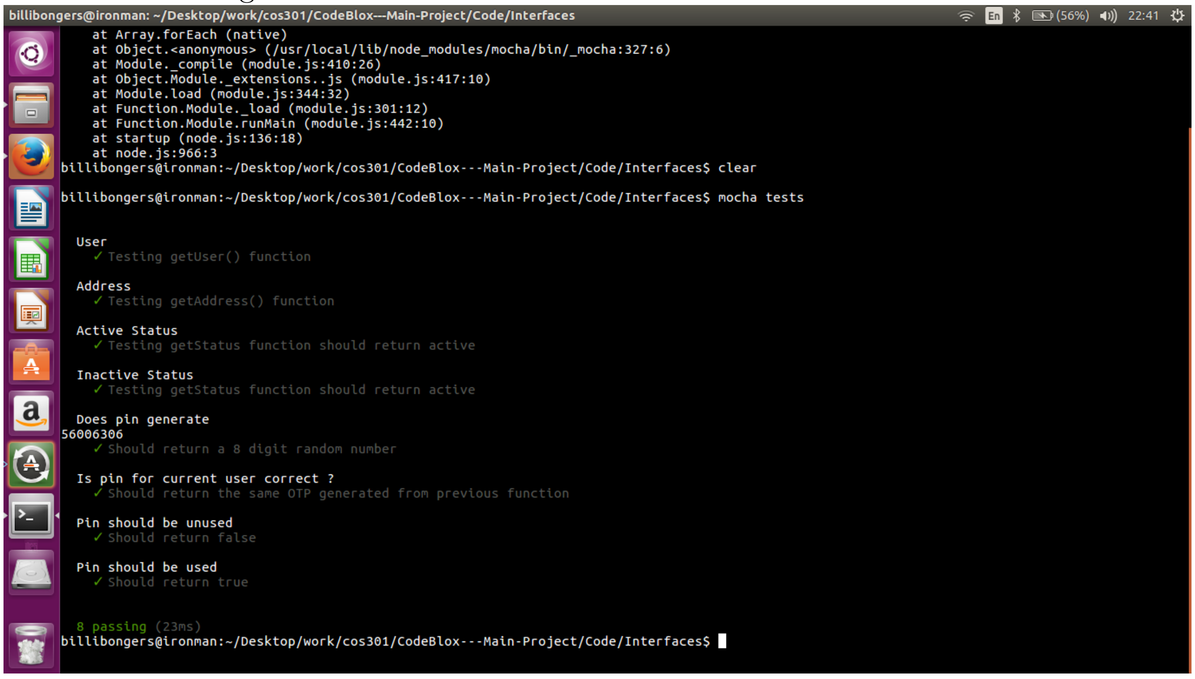
- Random 8-digit pin was created the pin was returned in the correct format
- pin was linked to correct user
- Result: Pass

7.2.6 Test Case 6 (4.6)

- Condition 1 returned un-used status and condition 2 returned used status
- Result: Pass

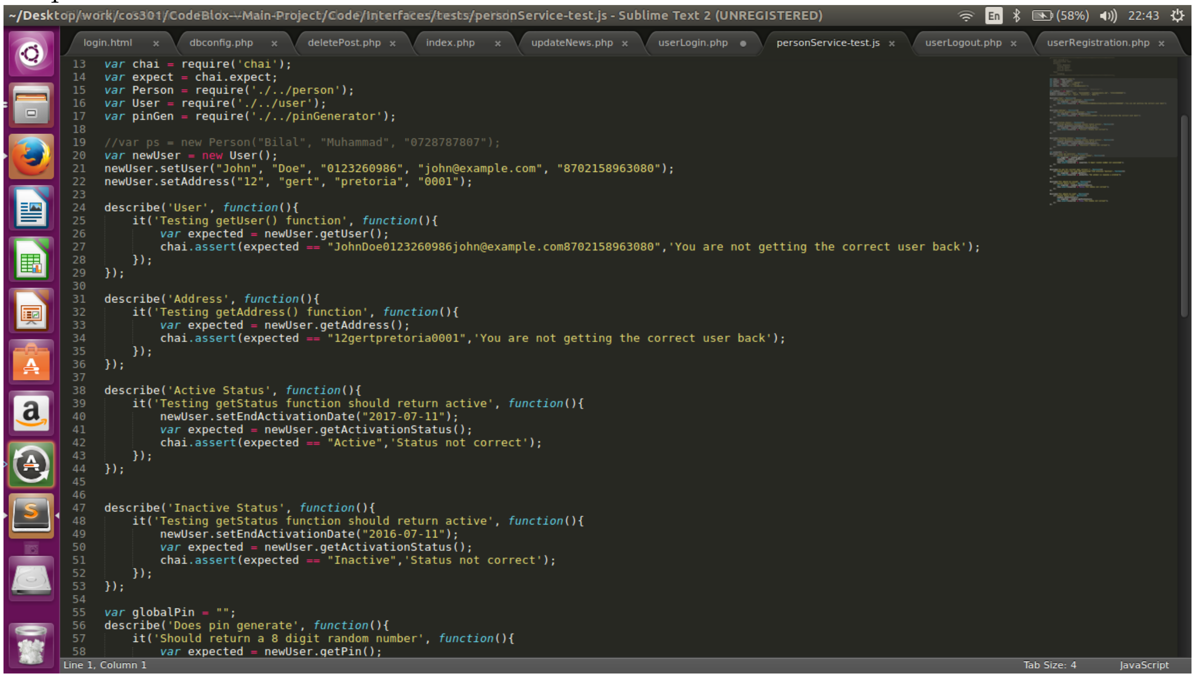
8 Other

Picture of running tests

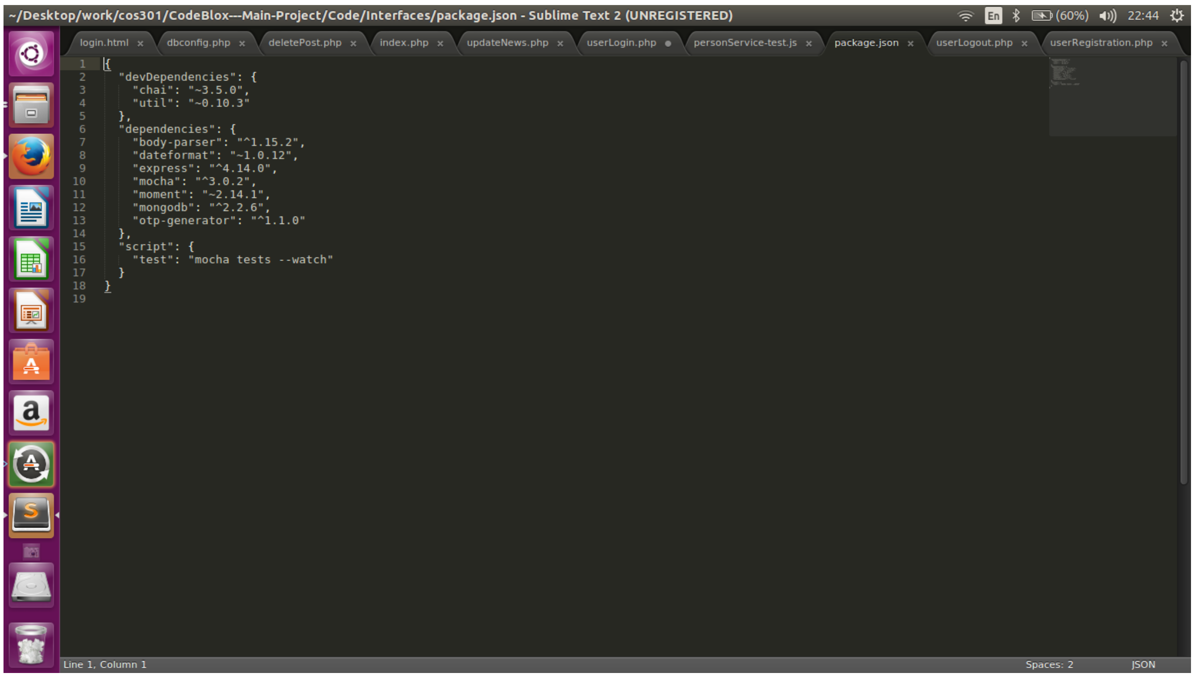


```
billibongers@ironman: ~/Desktop/work/cos301/CodeBlox---Main-Project/Code/Interfaces
    at Array.forEach (native)
    at Object.<anonymous> (/usr/local/lib/node_modules/mocha/bin/_mocha:327:6)
    at Module._compile (module.js:410:26)
    at Object.Module._extensions..js (module.js:417:10)
    at Module.load (module.js:344:32)
    at Function.Module._load (module.js:301:12)
    at Function.Module.runMain (module.js:442:10)
    at startup (node.js:136:18)
    at node.js:966:3
billibongers@ironman:~/Desktop/work/cos301/CodeBlox---Main-Project/Code/Interfaces$ clear

billibongers@ironman:~/Desktop/work/cos301/CodeBlox---Main-Project/Code/Interfaces$ mocha tests


  User
    ✓ Testing getUser() function

  Address
    ✓ Testing getAddress() function

  Active Status
    ✓ Testing getStatus function should return active

  Inactive Status
    ✓ Testing getStatus function should return active

  Does pin generate
56006306
    ✓ Should return a 8 digit random number

  Is pin for current user correct ?
    ✓ Should return the same OTP generated from previous function

  Pin should be unused
    ✓ Should return false

  Pin should be used
    ✓ Should return true


  8 passing (23ms)
billibongers@ironman:~/Desktop/work/cos301/CodeBlox---Main-Project/Code/Interfaces$ 
```

picture of unit test code



```javascript
var chai = require('chai');
var expect = chai.expect;
var Person = require('./../person');
var User = require('./../user');
var pinGen = require('./../pinGenerator');

//var ps = new Person("Bilal", "Muhammad", "0728787807");
var newUser = new User();
newUser.setUser("John", "Doe", "0123260986", "john@example.com", "8702158963080");
newUser.setAddress("12", "gert", "pretoria", "0001");

describe('User', function(){
    it('Testing getUser() function', function(){
        var expected = newUser.getUser();
        chai.assert(expected == "JohnDoe0123260986john@example.com8702158963080",'You are not getting the correct user back');
    });
});

describe('Address', function(){
    it('Testing getAddress() function', function(){
        var expected = newUser.getAddress();
        chai.assert(expected == "12gertpretoria0001",'You are not getting the correct user back');
    });
});

describe('Active Status', function(){
    it('Testing getStatus function should return active', function(){
        newUser.setEndActivationDate("2017-07-11");
        var expected = newUser.getActivationStatus();
        chai.assert(expected == "Active",'Status not correct');
    });
});


describe('Inactive Status', function(){
    it('Testing getStatus function should return active', function(){
        newUser.setEndActivationDate("2016-07-11");
        var expected = newUser.getActivationStatus();
        chai.assert(expected == "Inactive",'Status not correct');
    });
});

var globalPin = "";
describe('Does pin generate', function(){
    it('Should return a 8 digit random number', function(){
        var expected = newUser.getPin();
```



```json
{
  "devDependencies": {
    "chai": "~3.5.0",
    "util": "~0.10.3"
  },
  "dependencies": {
    "body-parser": "^1.15.2",
    "dateformat": "~1.0.12",
    "express": "^4.14.0",
    "mocha": "^3.0.2",
    "moment": "~2.14.1",
    "mongodb": "^2.2.6",
    "otp-generator": "^1.1.0"
  },
  "script": {
    "test": "mocha tests --watch"
  }
}

```

9 Conclusions and Recommendations

We have gained much insight in terms of testing and its uses. We switched to a testing strategy called Test Driven Development, hereto referred as TTD. With TTD, we are able to write tests without any code written to pass it. This enables the user to write unbiased code because we have no knowledge of the inner code.

We have also learnt to write tests that test a function in depth. This was achieved by using a special library called chai that is used in conjunction with mocha. It has a vast library of asserts that can be used.

Overall, we are happy with our progress as far as testing is concerned. After completion, if time allows, we wish to carry out a usability test.