Deliverable 3: Design & Build an Automated Testing Framework

Project: Glucosio
By: Dwayne Ferguson, Jason Adler, and Shefali Emmanuel

The Testing Process

The goal is to eventually test 25 cases for the Glucosio Software. The team will identify five methods to test five times each. We will be writing a script to open our driver. The driver will send arguments through the main method, which will create an instance of the class to test. The arguments will be run through the method being tested and then output to a file on the computer. The driver will then locate the file, open it, and compare the outcome with the oracle. Finally, the console will display the expected and actual outcomes.

Requirements Traceability

We do not know the requirements the original developer was trying to meet but as Glucosio was created as a diabetes management tool we have developed a core requirement that will likely envelope all of our test cases.

- Function: Compute Glucose & A1C levels
- Description: Compute glucose and A1C levels at regular intervals throughout the day and when the sensor transmits data to the application or the user inputs data.
- Inputs: User weight, blood sugar reading
- Source: Reading from sensor or user input.
- Outputs: The calculated blood sugar and recommended levels according to the ADA, AACE, and UKNICE.
- Destination: User Screen (MainPresenter)
- Action: Glucose readings are received by a sensor or input from a user. The user's self-entered weight is used with the glucose reading to calculate A1C levels according to the NGSP and IFCC. These values are then compared to the recommended levels by the ADA, AACE, and UKNICE and displayed on the user's screen.
- Requires: User or sensor input of weight and glucose levels.
- Precondition: None
- Postcondition: Read value is stored in a user's profile.

- Side effects: None.

Tested Items

Methods:

glucosio-android -> app -> src -> main -> java -> org -> glucosio -> android -> tools -> ...

1. GlucosioConverter.java -> kgToLb(double kg)
2. GlucosioConverter.java -> lbToKg(double lb)
3. GlucosioConverter.java -> a1cToGlucose(double a1c)
4. GlucosioConverter.java -> glucoseToA1c(double mgDl)
5. GlucosioConverter.java -> glucoseToMmolL(double mgDl)
6. GlucosioConverter.java -> glucoseToMgDl(double mmolL)
7. GlucosioConverter.java -> round(double value, int places)

Testing Schedule

October 1: Deliverable #2 - Complete Test Plan including at least 5 of the eventual 25 test cases that will be developed

October 29: Deliverable #3 - Design and build an automated testing framework that you will use to implement your test plan per the Project Specifications document.

November 12: Deliverable #4 - Complete the design and implementation of your testing framework as specified in Deliverable #3. You are now ready to test your project in earnest. You will create 25 test cases that your framework will automatically use to test your H/FOSS project. Report: This is Chapter 4 of your Final Report. Report on your experiences and provide the details produced in the task above. This is your opportunity to get your report organized into a professional-quality deliverable. Document progress on the wiki.

November 19: Deliverable #5 - Design and inject 5 faults into the code you are testing that will cause at least 5 tests to fail, but hopefully not all tests to fail. Exercise your framework and analyze the results.

Test Recording Procedures

As outlined in "The testing process" above, the team will write a script that will execute the methods with test values. We will identify five different methods to test five different times each. The results of these executions will be outputted to a file on the user's computer. The file will contain the following test cases:

1. Test number or ID
2. Method being tested
3. Expected outcome(s)
4. Test input(s) including command-line argument(s)

Test Cases Example

Hardware and Software Requirements

VirtualBoxVM 6.0.10

Linux Ubuntu (64-bit) 18.04

Android Studio 3.5

Gradle 4.4.1

Java 1.8.0_222

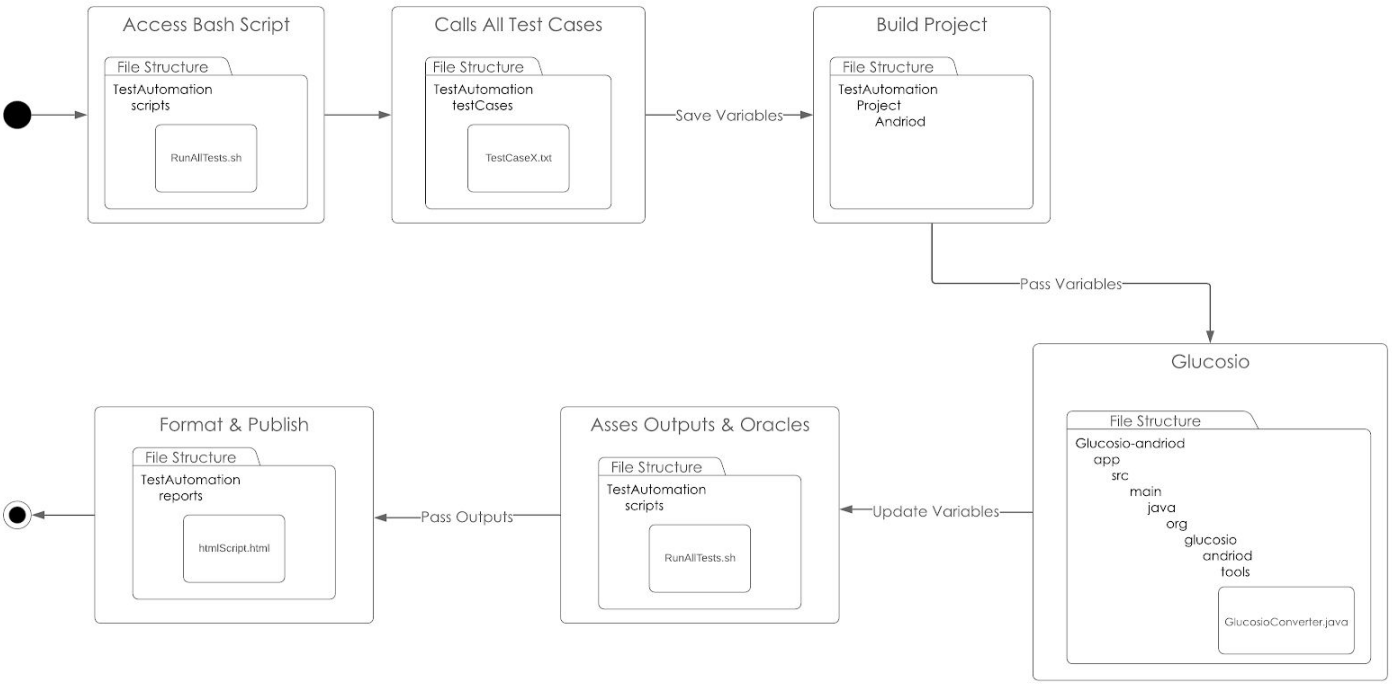
Constraints

- lack of people
- the learning curve with android development
- lack of familiarity with the correct version of the project to utilize from HFOSS Developers
- running into problems

Experiences

We have been having trouble building the entirety of the program on each team member's individual machine. Our hypothesis is that this is a version issue in relation to our project. The creators did not design mandatory version requirements for the project to run efficiently. We are currently performing a brute force approach to this problem. Since the project built on one computer, we were able to find twelve test cases in one sitting, which helped us on our path to completing deliverable 2.

Project Architecture



How to Run All Test Cases

1. Clone project to a computer
2. Open terminal
3. Navigate to Lamp-master/TestAutomation/scripts
4. Use command './runAllTests.sh
5. Testing should complete and output to HTML file in browser

Test Case Examples

Current Progress

- reworking test cases
- revamping knowledge on bash
- sandboxed project is able to build