SENG 637 – Dependability and Reliability of Software Systems

Lab. Report#1 – Introduction to Testing and Defect Tracking

Group #: G08

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Introduction:

Why do we test applications?

Testing occurs when software development is completed and handed over to test engineers in a traditional software development model. The code is subsequently deployed to production after the test engineers have completed their testing.

In a software development project, errors can occur at any stage of the development life cycle (and while there are various types of software bugs, only a few of them are known to be irreparable). To avoid the occurrence of software bugs in important contexts such as production, software testing is essential.

Testing, which has become a vital element of the development cycle in the cloud-native age, plays a large role in reducing the possibilities of production code having functionality or design problems. Although testing has a cost, it is extremely beneficial because the cost of production failures would be far larger and far more damaging.

Any development team responsible for an application must assure service quality in the following areas:

- Performance
- Operative Ness
- Resilience

These are the absolute bare minimums for ensuring software quality. You may want to test for security, availability, usability, UX/UI, and other factors depending on your business logic or market-specific requirements.

Link of demo video

https://drive.google.com/file/d/1qaaYAwBcuKvqlp2aNJkgHiXdxPXA8gLw/view?usp=sharing

Differences between Exploratory and manual functional testing:

- The most basic distinction between exploratory and scripted testing is that in exploratory testing, test design and execution occur simultaneously. Scripted testing, on the other hand, is when test procedures, whether manual or automated, are predefined.
- Scripted tests are defined in before and carried out exactly as planned, whereas exploratory tests allow testers to utilise their reasoning, imagination, and intellect to swiftly identify key issues.

- Exploratory tests encourage testing to be intellectually rich and fluid, making it more likely to come up with the correct tests at the right time, whereas scripted testing aims to modernise the testing process by transferring test concepts from a test designer's mind to paper.

An introduction section including what you knew about exploratory and manual functional testing before this lab:

All the members of the group had a preliminary understanding of the notion of Software dependability and reliability. We all knew about the importance of maintenance of software systems and well versed with debugging the source code. All are good with analysing the program and find any defect, if any, in the logic. So, we had a grasp on the ideas involved in exploratory and manual testing but didn't have a detail understanding about a well-organized structure and classifications involved in the process of software testing.

A high-level description of the exploratory testing plan

Exploratory testing was done on ATM SUT version 1.0. In exploratory testing we decided to test the main ATM functions i.e., the functions which are related with banking which are: 1) Withdrawal, 2) Deposit, 3) Transfer, 4) Balance Inquiry. We felt that any defaults in the ATM transactions can pose a serious threat to both the bank and customer compared to the ATM machine basic operating functions (on, off, enter, cancel). The reason for prioritizing banking is that if there are any bugs in these functions then there are chances that they go unnoticeable at first. If there are bugs in transactions, then the reliability and reputation of bank goes down and can even lead to cases of fraud against the bank. However, during the whole process we realized that almost all the functions of the SUT were tested, so the strategy worked out well for us. Other advantage we had was that there weren't many functions in the system, so it was not much time consuming.

Exploratory Testing:

Card 1

- First balance inquiry is done. In balance inquiry 1) Only checking and money market accounts are displayed in account types. Savings account which is linked to card 1 is not shown which is a bug. 2) While doing the balance inquiry for money market account, in the receipt it shows that inquiry is done for savings account which is correct, and the balance displayed is also correct but 500 $ are dispensed from the atm machine doing balance inquiry which is a bug.

- Moving on to withdrawal function 3) While withdrawing cash from checking account the amount selected from provided options is not withdrawn but different amount is withdrawn for e.g., instead of 40$, 60$ cash is withdrawn. The same bug is encountered while withdrawing from saving account.
- Deposit function has following errors 4) 10$ less than the amount entered gets deposited. 5) The deposited amount is not reflected in available balance. These bugs are encountered in both saving and checking account.
- In transfer function two bugs are encountered 6) 50 cents are deducted from the amount entered to transfer. 7) In receipt the account from which transfer is done is indicated as the account in which transfer is made and the account in which transfer is done is indicated as the account from which transfer is done.

Card 2

- First balance inquiry is done. In balance inquiry 1) While doing the balance inquiry for money market account invalid account type message is displayed.
- Moving on to withdrawal function 2) While withdrawing cash from checking account the amount selected from provided options is not withdrawn but different amount is withdrawn for e.g., instead of 40$, 60$ cash is withdrawn. The same bug is encountered while withdrawing from saving account.
- Deposit function has following errors 3) 10$ less than the amount entered gets deposited. 4) The deposited amount is not reflected in available balance. These bugs are encountered in both saving and checking account.
- In transfer function two bugs are encountered 5) 50 cents are deducted from the amount entered to transfer. 6) In receipt the account from which transfer is done is indicated as the account in which transfer is made and the account in which transfer is done is indicated as the account from which transfer is done.

A comparison of exploratory and manual functional testing (based on the provided test suite) from several perspectives (e.g., benefits, trade-offs, effectiveness, efficiency, etc.):

As mentioned above the strategy of exploratory testing most of the SUT was tested without consuming much time. Some of the functions which went untested were dealt with in manual functional testing. We went to test the banking related functions in exploratory testing and all functions ATM machine related operationalities were covered in manual scripted test. The union of both the tests covered all the functions of the SUT. There were some bugs which couldn’t be detected from the test suite, and which were detected in exploratory phase. Exploratory testing based on our strategy provided a better view of the system and detected important defects in SUT which

weren't mentioned in the test suite. So, in terms of efficiency exploratory testing proved out to be more efficient than manual functional testing.

Notes and discussion of the peer reviews of defect reports created by each pair in a group:

The plan for exploratory was thoroughly discussed among the team members and was executed perfectly. There was a good coordination between team members. The test suite was equally divided among the team members and was completed in short time. Defect reports made, in case of ambiguity were discussed until we reach to a solution.

Any difficulties encountered, challenges overcome, and lessons learned from performing the lab:

The SUT was simple, so we didn't encounter much trouble in doing testing. In starting of exploratory testing went doing it an iterative manner until a proper plan was made. Through the lab we learned how to do testing in a structured manner and get to know how the whole process is executed by industry professionals.

Comments/feedback on the lab and lab document itself. (Did you find it a useful practice? Was it easy to follow?) Please try to keep comments and feedback constructive:

The lab proved to be very informative exerciser in terms of an introductory exercise in software testing.