White and Black Box Testing

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White and Black box testing are tools that are an integral part of developing secure software. ATMs are exposed to threats daily and it is imperative to make sure that the software that is running on those machines are the most secure because of information such as account holders banking and routing numbers.

What is White Box Testing?

White box testing is testing a software solution's internal structure, design, and coding that is typically executed by developers. The code is visible to the tester and “focuses primarily on verifying the flow of inputs and outputs through the application, improving design and usability, strengthening security” (What is BLACK Box Testing? Techniques, Example, Types & Tools). White box testing is based on the inner workings of an application and revolves around internal testing to make sure that the software will have the expected results for each function of the code.

What is Black Box Testing?

Black box testing is a “testing technique in which functionality of the Application Under Test (AUT) is tested without looking at the internal code structure, implementation details and knowledge of internal paths of the software” (What is BLACK Box Testing? Techniques, Example, Types & Tools). This testing is based on the requirements and specifications of the software being used. Focus is placed on inputs and output of the system without bothering about internal knowledge of the program.

Feature of the ATM

The feature of the ATM system that will be running through the black box and white box testing will be an enhancement of security for all account holder’s information. This feature will add a layer of security to prevent attackers from being able to access an account. The testing will have multiple steps that will ensure that the account holder will be the only person that can access their account. With the ATM system, multiple tests will be done making sure that functions added to the ATM will function as expected. With the ATM system, testing will be done to ensure that only the account holder will be able to access their account and that any hacking will be caught and reported to the bank.

Tools for Testing

During the testing phase of the Software Development Life Cycle (SDLC), bugs and defects are found that need to be mitigated. "The target for the security tests is the complete system that will be potentially attacked and includes both the whole source code and the executable. One peculiarity of security testing during this phase is that it is possible for security testers to determine whether vulnerabilities can be exploited and expose the application to real risks" (Meucci & Muller). The development team continuously finds and addresses the bugs as they are found, until the software is bug-free, and usable for the company that requested the developed software. It is important that tests be "conducted by testing experts at various levels of code such as module testing, program testing, product testing, in-house testing and testing the product at user's end. Early discovery of errors and their remedy is the key to reliable software" (Software Development Life Cycle).

A testing tool that would be useful for testing this software would be Veracode. Veracode's white box testing tools help identify and resolve the problems with the software. It supports several application languages such as .NET, C++, and JAVA. "It also enables you to test the security of desktop, web as well as mobile applications" (White Box Testing: A Complete Guide with Techniques, Examples, & Tools). This will be important for software running at an

ATM. The same type of software can be used for the desktop running on the ATM as the software that runs the banking application on mobile devices and the software that runs the website.

Test Case for White Box Testing

Test Step	Actions	Expected Results
1.	Lockout Function that triggers lockout of account and alerts the bank of any suspicious activity.	When the function is triggered, the account becomes locked out for one day or until the bank is contacted. Alerts the bank of what security function was triggered so the bank can mitigate the problem quickly.
2.	Contact Function that triggers an email or text to be sent to account holder.	When the function is triggered, the account holder receives and email or text with the information on what is being executed at the ATM including location of ATM, amount requesting to be withdrawn, PIN code fails, etc.
3.	Pin Function that verifies the account holders PIN code is entered correctly and counts the number of failed attempts in a day.	If the PIN code is entered correctly, the user gains access to the account. If the account PIN code is incorrectly entered more than three times, the Lockout Function and Contact Function are triggered.
4.	Withdraw Function that tracks the average withdraw amount and allows for withdrawing of money from account.	Tracks average withdraw amounts. Allows user to withdraw money from account unless the amount is excessively higher than average. If the amount is excessive, the Security Question Function and Contact Function are triggered.
5.	Withdraw Per Day Function that tracks the amounts of withdraws in one day.	If there is more than two withdraws that occur from the same account in one day, the Lockout Function and Contact Function are triggered.
6.	Security Question Function that is triggered when the amount to withdraw is excessively higher than average.	When triggered, a security question that is linked to the account is asked before the user can proceed with the transaction. Three failures will trigger the Lockout Function and Contact Function.

Test Case for Black Box Testing

Test Step	Actions	Expected Results
1.	(Positive) Log in with correct PIN code into account.	User gains access to account to make a deposit or withdraw.
2.	(Positive) User makes a withdraw that is in range with the average withdraws that they make regularly.	User withdraws money successfully.
3.	(Positive) User makes a withdraw that is higher than the average withdraws that they make regularly.	Triggers the Security Question Function and Contact Function.
4.	(Positive) User correctly answers the security question.	When answered successfully, the user will be allowed to withdraw the amount requested.
5.	(Negative) User incorrectly answers the security question.	When answered unsuccessfully, the Lockout Function and Contact Function will be triggered.
6.	(Negative) User incorrectly enters PIN code three times.	The Lockout Function and Contact Function will be triggered.
7.	(Negative) User tries withdrawing money three times in one day.	The Lockout Function and Contact Function will be triggered.

Conclusion

Adding features that enhance the security for the information of the account holder is beneficial for everyone involved. Testing that these new features work as expected is also important as the user should not be unnecessarily locked out of their account. Furthermore, the features should be robust enough to stop any unwanted activity and report any suspicious activity back to the bank. These are what make accurate and in-depth white box and black box testing so important.

References

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