CS1699 - DELIVERABLE 2: Unit Testing and Code Coverage

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Secure File Sharing System

Summary:

We chose to test three main modules of a secure file sharing system that we are developing as part of our Applied Cryptography and Network Security class. This project not only emphasizes correctness of algorithms and interaction of several class files, but it also puts a big emphasis on security and privacy. There are 3 main parts of the system: the group server, the file server, and the client interface. The group server handles the database management of users and which groups they can share files with. The file server handles uploading, downloading, and deleting of such files, and the client interface allows a user-friendly way to interact with the system. At its current state, there are very few security algorithms implemented, but more will be added as the semester continues forward.

One critical area that we tested was the functions that managed the database in the group server. These functions include creating users for the system, creating groups, adding groups, listing members of groups, etc. However, in order to have a secure system, only certain members are allowed to do preform certain actions, and the result of these functions is dependent on who calls them. There is actually one test that fails because when writing the project, we did not add a certain functionality that made the creator of the group also the owner of the group (which was specified in the requirements sheet).

In addition to the group server tests, we also tested functions which transfer important information from one class to another. These functions include Envelope, Token and ShareFile. Envelope allows messages to be sent from the user to various other parts of the underlying system(s) by way of strings. These strings tell the servers what action to perform next (so long as all other requirements are met on the server end). Token is a key that is given to a user after authentication. Token grants the user access to all of the functions of the system. It is critical that tokens are accurate because if a user ends up with an invalid token or the wrong token (such as a basic user receiving an admin token), things can go terribly wrong. ShareFile is the basis for sharing files on the file server portion of the system. This function allows users to call the file server and ultimately upload and access files from group they belong to. It is critical that this function is also tested thoroughly as having bad values appear in any of the function’s associated fields could cause errors within the file system and user-file access.

Other tests were performed on the user interfaces to ensure the correct actions would occur based on the user’s input at prompts. This includes the application displaying error messages when something goes wrong or status messages so that the user know what is happening. The classes that were tested to ensure this are the MainUserInterface and the FileClientSubInterface.

Issues Faced:

The primary issue we faced was that the project for deliverable 1 was an Android based Reddit application that made use of mostly private and protected functions. In many aspects Android applications also seemed to need tested quite differently than other types of applications. Switching to our Secure File System saved us many headaches and helped us comprehend JUnit and Mockito much more than we would have otherwise.

All code is located at the git repository: https://github.com/CS1699-Testing-Group/FileServerTesting

