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# CS 305 Project Two

**Practices for Secure Software Report**

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## Document Revision History

| **Version** | **Date** | **Author** | **Comments** |
| --- | --- | --- | --- |
| **1.0** | **April 12th 2021** | **Samuel Bailey** |  |

## Client



## Instructions

Deliver this completed Practices for Secure Software Report documenting your process for writing secure communications and refactoring code that complies with software security testing protocols.

Respond to the steps outlined below and replace the bracketed text with your findings in your own words. If you choose to include images or supporting materials, be sure to insert them throughout.

## Developer

Samuel Bailey

## 1. Algorithm Cipher

Determine an appropriate encryption algorithm cipher to deploy given the security vulnerabilities, justifying your reasoning. Be sure to address the following:

* Provide a brief, high-level overview of the encryption algorithm cipher.
* Discuss the hash functions and bit levels of the cipher.
* Explain the use of random numbers, symmetric vs non-symmetric keys, and so on.
* Describe the history and current state of encryption algorithms.

Encryption turns normal text into cipher text that is most unreadable to the human eye. More specifically it’s a mathematical formula that mixes up words and can only be reused with a public and private key in most cases. Hashing is the process of turning plan text into cipher text in the world of ciphers, although it really depends on the context of use. Through ciphers the plan text is usually randomly numbered or in most cases systematically changed based on a mathematical formula. Encryption algorithms have been around for a long time and have been consistently upgraded through they years for increased security. The chances of someone breaking the modern ways of encryption is almost impossible.

## 2. Certificate Generation

Generate appropriate self-signed certificates using the Java Keytool, which is used through the command line.

* To demonstrate that the keys were effectively generated, export your certificates (CER file) and submit a screenshot of the CER file below.

A picture containing graphical user interface

Description automatically generatedA picture containing text, electronics, display, screenshot

Description automatically generatedA picture containing text, screenshot, electronics, display

Description automatically generated

Here are some screenshots of proof of using the java keytool

## 3. Deploy Cipher

Refactor the code and use security libraries to deploy and implement the encryption algorithm cipher to the software application. Verify this additional functionality with a checksum.

* Insert a screenshot below of the checksum verification. The screenshot must show your name and a unique data string that has been created.

Graphical user interface, text, application

Description automatically generated

## 4. Secure Communications

Refactor the code to convert HTTP to the HTTPS protocol. Compile and run the refactored code to verify secure communication by typing **https://localhost:8443/hash** in a new browser window to demonstrate that the secure communication works successfully. Graphical user interface, text, application, email

Description automatically generated

## 5. Secondary Testing

Complete a secondary static testing of the refactored code using the dependency check tool to ensure code complies with software security enhancements. You only need to focus on the code you have added as part of the refactoring. Complete the dependency check and review the output to ensure you did not introduce additional security vulnerabilities.

* Include the following below:
  + A screenshot of the refactored code executed without errors
  + A screenshot of the dependency check report

Text

Description automatically generated

## 6. Functional Testing

Identify syntactical, logical, and security vulnerabilities for the software application by manually reviewing code.

* Complete this functional testing and include a screenshot below of the refactored code executed without errors.

Timeline

Description automatically generated with medium confidence

## 7. Summary

Discuss how the code has been refactored and how it complies with security testing protocols. Be sure to address the following:

* Refer to the Vulnerability Assessment Process Flow Diagram and highlight the areas of security that you addressed by refactoring the code.
* Discuss your process for adding layers of security to the software application and the value that security adds to the company’s overall wellbeing.
* Point out best practices for maintaining the current security of the software application to your customer.

In this project we changed the security of the API’s cryptography, client/server and code quality. We did this by making our own certificates and keys. In this application we can connect to a AES encryption. This level of communication is imperative for a software security especially in finance. If it wasn’t for this encryption then anyone can see the information being send and received by the server and stolen. For best future practices.. I would recommend pushing the code into a container that can be updated at once command. Instead of having to ‘running’ the software every time you want to test it.