CS-499 Milestone Three Narrative

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1. Briefly describe the artifact. What is it? When was it created?

   This artifact was created for CS-360 and SNHU and is an Android app designed to help track daily weight measurements of a user and then text the user when their desired weight is hit.

2. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?

   My reason for selecting this artifact for a data structure or algorithm enhancement comes in two parts. First, I do not have many projects at SNHU where this type of enhancement could be implemented due to being a transfer student and I do not have access to my old class project from before SNHU. And second, while my proposal was not an enhancement of an algorithm it is still going to show my ability to understand and code effective algorithms.

   What this also provides is a much-needed feature for this system. While the nature of this app may not require a login as this app will only likely be used by one user it does allow me to display a security-conscious design. In the app, before this enhancement, all passwords are stored in plaintext within the database and as many users use the same password in multiple locations leaving passwords in plaintext can compromise our user's safety in the case our app is compromised. This artifact provides guidelines for password

contents as well as hashing for the user's passwords using the SHA-256 algorithm so they are not stored in plaintext.

3. Did you meet the course objectives you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

   The objective of this milestone is to increase security by implementing a hashing algorithm. This could be completed very easily by importing the MessageDigest library in Java and just setting up the method below.

```
public byte[] hashMessageDigest(String input){
	try {
		MessageDigest messageDigest =   MessageDigest.getInstance("SHA-
		256");

		byte[] encodedhash =
		messageDigest.digest(input.getBytes(StandardCharsets.UTF_8);

		return encodedhash;
	} catch ( NoSuchAlgorithmException e ) {
		return null;
	}
}
```

   However, if I implemented this it would be pointless for this enhancement. So using pseudocode located here https://en.wikipedia.org/wiki/SHA-2 as well as this tool https://sha256algorithm.com/ to verify by bits as I process the data I implemented the SHA-245 algorithm.

   At this point, I have dealt with pre-processing the data and processing the words created from that. I have also implemented the final loop and have implemented tests with my algorithm vs standard libraries which have all been successful.

4. Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?

I cannot say I have learned as much as relearned the material for this assignment. I have worked with algorithms involving bitwise manipulation a decent amount in the past but always in C and not since 2018. I can say I have been genuinely quite enjoying this work but have had to spend significantly more learning about the bit sizes of standard variables in Java as well as how I can use them to directly manipulate bits rather than just using uint8_t or uint64_t as I would in C. I also managed to write a piece of code that convinced me that my data was in little endian format which stumped me until I realized my mistake. Beyond this, it has just been time-consuming even given pseudocode and a program that allows me to watch the correct manipulation of bits.