**CSCE 2004 – Programming Foundations I**

**Programming Project Report**

Name: TBA

Date: TBA

**Problem Statement:**

* Describe the goals of the programming assignment.
* What are the program inputs?
* What are the program outputs?
* What error handling was required?
* This section should be 1-2 paragraphs long.

**Design:**

* Describe the design decisions you made.
* What data structures did you use?
* What algorithms did you use?
* What were pros/cons of choices above?
* This section should be 1-2 paragraphs long.

**Implementation:**

* Describe your implementation process.
* What sample code did you start with?
* How did you extend or adapt this code?
* What was your development timeline?
* This section should be 1-2 paragraphs long.

**Testing:**

* Describe how you tested your program.
* What were the normal inputs you used?
* What were the special cases you tested?
* Did everything work as expected?
* Include sample input/output from your program.

**Conclusions:**

* Describe the overall result of the assignment.
* Was the programming project a success?
* What would you do same or differently next time?
* How long did the project take to complete?
* This section should be 1 paragraph long.

The goal of this programming assignment is to become familiar with object-oriented concepts such as encapsulation, as well as to become familiar with file handling in C++, copy constructor, default constructor, overloaded constructor, destructor, and some knowledge of encryption and decryption algorithms, as well as to gain an understanding of cybercrime and cyber security. This application reads data from the files accounts.txt and encryptedTransactions.txt and writes the results to the text file decryptedTransaction.txt. In addition, while reading from accounts.txt and encryptedTransactions.txt, the vector's result will be output to the console using the print method of two types of objects. When attempting to prove Donnah's innocence, the outcome is also written on the console if she is innocent. File error handling was necessary in this case.

The algorithms for encryption and decryption were provided. They were implemented as a transaction class method. As a result, this method should be called from within that object, and the object's values will be updated when it is called. As a result, the vector transactions were fully decrypted and sent to the write function before being written to the decryptTransactions.txt file. The suggested approach was utilized to locate the attackers. The user's account information is required to decrypt the transaction. Iterate through the account objects, attempting to decrypt the transactions in the transactions vector using the account information. While doing that keep the track of that account to check whether that account has at least one transaction that is true. If not identified, it as the attacker and print to the console.

The objects formed while reading the files were saved in the vector data structures. Vectors are classified into two types. They are vectors of objects from the Accounts class and vectors of objects from the Transaction class. In here any specific algorithm was not used. But for the search the accounts and its specific transactions linear search was used. Therefore, the time complexity is much higher.

The project was started from the Account class. Created the Account cpp file. Then added the constructors, setters , getters and display method to it according to the Account.h file. Then did some testing of that each method using the main.cpp file. After that account read function was implemented in the main file. And check the results by calling the print method after the creating the objects. Then implemented the rest of method in the Transaction class. Then test some print results on the main file. Then save and print the each objects that created and saved to the vector into the console and check the similarity. Then , try to prove the Donna’s innocence according to the given approach and print the message that saying “Donnah is inncent” if this find atleast one transaction from the vector. After that decrypt the all the transactions using account details of each users. While doing this keep the track of the accounts that do not have at least one transaction in other words when trying to decrypt the transaction using the account details all will be failed. These accounts are identified as hackers and print the results to the console.

In here file handling was tested. Added the message when the file is not found. After reading and create the accounts object from the accounts.txt file print the results of the vector to the console. Also, print the results while the file reading happening, before creating the object. Then check the two results are matching. Same is done to the transaction objects. Then to catch the hacker’s above-mentioned method was used. To test that method initially used the decrypted results to confirm. Then this is done by using encryptedTransaction.txt file and given description.

The overall program is compiled successfully without any warning or any errors. The results is also logically correct when compare the results. Program is successfully do the tasks according to the description given. According to the description if there is an account that is not have at least one record (cannot decrypt any of the transaction) can be suspected as the hacker. According to the results Dulcie and Drash are printed as hackers.