Southern New Hampshire University

Module four Acitivity Exceptions

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Encryption/Decryption Summary Report

**Overview**

This assignment demonstrates file-based encryption and decryption using XOR logic in C++. It simulates a simple banking security application where sensitive text data is encrypted using a key and then decrypted to verify data integrity. The program reads an input text file, encrypts the data with a password key, saves the encrypted output, and finally decrypts it back to its original form.

**Program Features**

* ✅ **XOR-Based Encryption**:  
  Each character in the source string is XOR’d with a character from the key (looped using modulo) to transform the data.
* ✅ **File I/O Implementation**:
  + The program **reads** an input text file (inputdatafile.txt).
  + It **writes** two output files:
    - encrypteddatafile.txt (encrypted content)
    - decrypteddatafile.txt (decrypted back to original content)
* ✅ **Formatted Output**:
  + Each output file includes:
    - Student Name
    - Timestamp (YYYY-MM-DD)
    - Encryption Key
    - Data (Encrypted or Decrypted)

**Process Summary & Debugging**

During development, several issues were resolved:

* Ensured that the file reading function loads the entire file as a string using std::ifstream and std::stringstream.
* Confirmed that the XOR encryption works with varying lengths of keys using i % key\_length.
* Implemented proper error checking and assertions to validate string and key lengths.
* Used std::ofstream to save encrypted and decrypted strings in the correct format.
* Verified that encryption is reversible by reusing the same function for decryption.

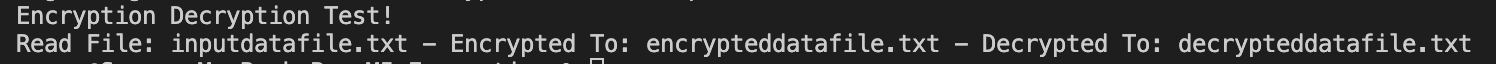
**Testing & Results**

The application was tested with a sample file that included:

* Student name on the first line
* Source reference on the second line
* 3 paragraphs of pirate-themed lorem ipsum text

**Result**:

* The decrypted file matched the original input, confirming the correctness of the XOR encryption/decryption logic.
* Console output confirmed filenames and process success.

**Console Output (Screenshot provided separately)**