**Source Code**

// Section CSC450 - Programming III

// File Name: Reverse\_STring\_CTA2

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// Critical Thinking Number: 2

// Description: Printing Strings Backwards

// Last Changed: 11/22/2022

#include <iostream>

#include <ostream>

#include <bits/stdc++.h>

using namespace std;

// reverse function that reverses string

void reverse(string str)

{

    int len = str.length();

    int n = len;

    // while loop to reverse and print out string

    while(n--)

        cout << str[n];

}

int main() // start main

{

    char ans; // declare answer for do while loop (if the user wants to run program again)

    cout << "this program prints out 3 strings in reverse" << endl;

    cout << "would you like to continue? ";

    cin >> ans;

    while (ans == 'y' || ans == 'Y')// do at least once

    {

        // declare variables

        string user\_string;

        int count = 0;

        // for loop to get 3 inputs from user

        for (count=0; count < 3; count++)

        {

            cout << "Please Enter any String Input: ";

            cin >> user\_string;

            reverse(user\_string);

            cout << endl;

        }

        // ask the user if they would like to calculate the volume of another sphere

        cout << "would you like to run the program again?\n"

             << "if yes press y \n"

             << "if no press n" << endl;

        cin >> ans; // allow the user to answer an input

    }

    cout << "thank you and goodbye " << endl; // exit gracefully

    system("pause"); // allow for system pause

    return 0; // return

} // end main

**Screenshots:**

**Text

Description automatically generated**

**Analysis**

A major goal of the software development process is to deliver high quality and secure products on time. To achieve this, programmers must focus on writing secure code and resolving potential issues during the code review process. When analyzing my program, I want to look for a couple things when it comes to coding secure strings in C++. The First thing I look for is Invalid string format. Incorrectly formatted strings can lead to abnormal program termination, memory corruption, or any other form of undefined behavior (Biton, 2020). Let’s look my main function and the reverse function.

Main:

    while (ans == 'y' || ans == 'Y')// do at least once

    {

        // declare variables

        string user\_string;

        int count = 0;

        // for loop to get 3 inputs from user

        for (count=0; count < 3; count++)

        {

            cout << "Please Enter any String Input: ";

            cin >> user\_string;

            reverse(user\_string);

            cout << endl;

        }

I see my user\_string is declared correctly, and it is correctly taken as an input and passed to the reverse function. I believe this code looks secure, only thing I could think of including to make it more secure is to make the user\_string a private string and make it accessible only through a parent class.

Reverse Function:

// reverse function that reverses string

void reverse(string str)

{

    int len = str.length();

    int n = len;

    // while loop to reverse and print out string

    while(n--)

        cout << str[n];

}

Here we see the int len is declared correctly. It uses the length of the str aka user\_string. The int n is used as a counter in the while loop. The while loop is used for printing out the string in reverse order. Again, here the only think I would change would be making the str a private string and make it accessible only through a parent class.

**References**

Biton, L. (2020, September 17). Finding and fixing C++ vulnerabilities. SecureCoding. https://www.securecoding.com/blog/finding-and-fixing-c-vulnerabilities/#:~:text=String%20Vulnerabilities,-One%20of%20the&text=When%20you%20use%20an%20I,or%20modify%20a%20memory%20location