OPERATING SYSTEMS ASSIGNMENT #4

Name	Abdul Hadi
Registration Number	200901080
Batch & Section	CS01 A
Instructor's Name	Mam Asia

Task 1:

Code:

```
#include <iostream>
#include <thread>
#include <mutex>
#include <exception>

std::mutex m;
std::string str;
bool input_done = false;

void input_thread()
{
std::cout << "Enter a string: ";
std::getline(std::cin, str);
m.lock();
input_done = true;
m.unlock();
}

void reverse_thread()
{
m.lock();
while (!input_done)
{
m.unlock();
std::this_thread::sleep_for(std::chrono::milliseconds(100));
m.lock();
```

```
}
m.unlock();
std::string rev_str;
for (int i = str.length() - 1; i >= 0; i--)
rev_str += str[i];
std::cout << "Reverse string: " << rev_str << std::endl;
}

void capital_thread()
{
m.lock();
while (!input_done)
{
m.unlock();
std::this_thread::sleep_for(std::chrono::milliseconds(100));
m.lock();
}
m.unlock();
std::string cap_str;
for (int i = 0; i < str.length(); i++)
cap_str += toupper(str[i]);
std::cout << "Capitalized string: " << cap_str << std::endl;
}

void shift_thread()
{
m.lock();
while (!input_done)
{
```

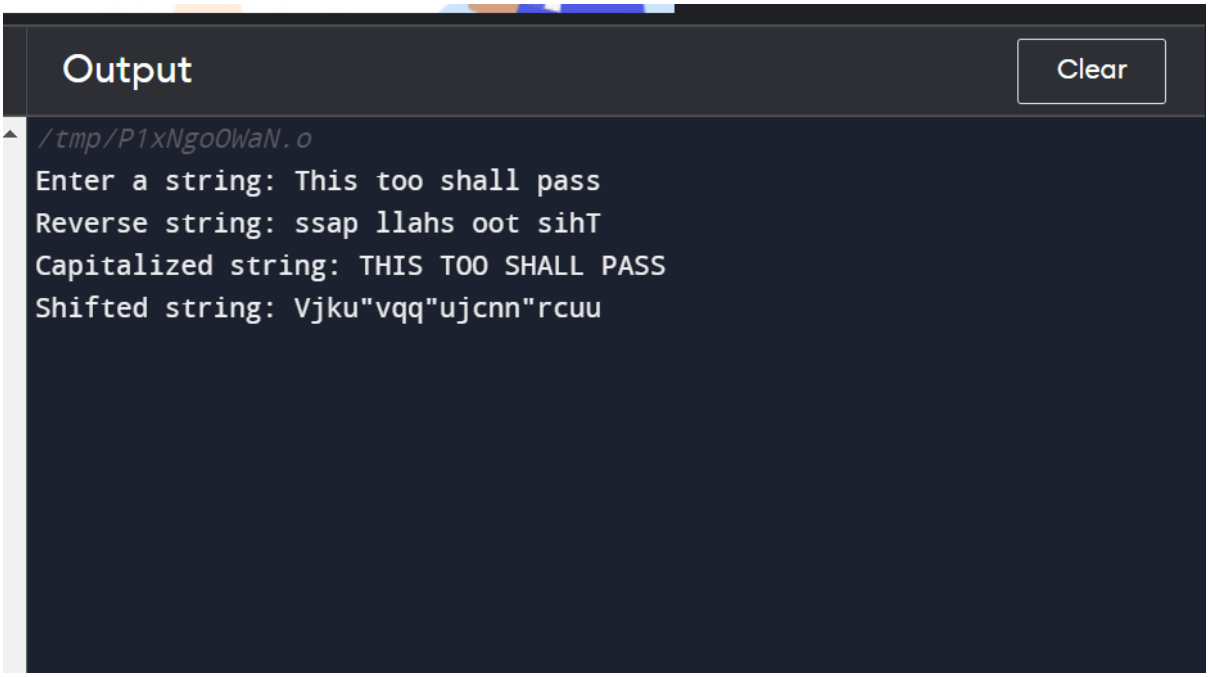
```
m.unlock();
std::this_thread::sleep_for(std::chrono::milliseconds(100));
m.lock();
}
m.unlock();
std::string shift_str;
for (int i = 0; i < str.length(); i++)
shift_str += str[i] + 2;
std::cout << "Shifted string: " << shift_str << std::endl;
}

int main()
{
try
{
std::thread t1(input_thread);
std::thread t2(reverse_thread);
std::thread t3(capital_thread);
std::thread t4(shift_thread);
t1.join();
t2.join();
t3.join();
t4.join();
}
catch (const std::exception& e)
{
std::cerr << "Error: " << e.what() << std::endl;
return 1;
}
```

```
return 0;

}
```

Output:



Explanation:

In this program, we first create an input thread which takes a string input from the user. Then, we create three other threads which are reverse, capital and shift threads.

The reverse thread reverses the input string and outputs it, the capital thread capitalizes the characters of the input string and outputs it, and the shift thread shifts each character of the input string by 2 and outputs it.

We then wait for the input thread to finish before starting the other threads. Finally, we wait for the other threads to finish before ending the program.

Github Link:

https://github.com/ABDULHADI44