**OPERATING SYSTEM**

**A picture containing graphical user interface

Description automatically generated**

**ASSIGNMENT: 04**

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| **Assignment** | OPERATING SYSTEM |
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Q. You have to create four threads other than main thread.

1. Input thread

2. Reverse thread

3. Capital thread

4. Shift thread

Input thread will take string input from user, reverse thread will reverse the string and output it, capital thread will capitalize the characters of string and output it and shift thread will shift each character of the string two time (e.g., a will become c) and output it. All the threads wait for input thread when input thread finishes his task all the waiting thread start their work simultaneously. You also have to handle the exceptions of input thread. Also take care the state of each thread. Do not waste your memory resources.

**CODE**

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| #include <iostream>  #include <pthread.h>  #include <string>  using namespace std;  string str; // input string  // input thread function  void\* inputThread(void\*)  {  try  {  cout << "Enter a string: ";  cin >> str;  }  catch (const exception& ex)  {  cout << "Exception in input thread: " << ex.what() << endl;  }  cout<<endl;  return NULL;  }  // reverse thread function  void\* reverseThread(void\*)  {  cout << "Reversed string: ";  for (int i = 0; i < str.length(); i++)  cout << str[str.length() - i - 1];  cout << endl;  return NULL;  }  // capital thread function  void\* capitalThread(void\*)  {  cout << "Capitalized string: ";  for (int i = 0; i < str.length(); i++)  cout << (char)toupper(str[i]);  cout << endl;  return NULL;  }  // shift thread function  void\* shiftThread(void\*)  {  cout << "Shifted string: ";  for (int i = 0; i < str.length(); i++)  cout << (char)(str[i] + 2);  cout << endl;  return NULL;  }  int main()  {  // create the input thread  pthread\_t t1;  pthread\_create(&t1, NULL, inputThread, NULL);  // wait for input thread to finish  pthread\_join(t1, NULL);  // create the reverse, capital, and shift threads  pthread\_t t2, t3, t4;  pthread\_create(&t2, NULL, reverseThread, NULL);  pthread\_create(&t3, NULL, capitalThread, NULL);  pthread\_create(&t4, NULL, shiftThread, NULL);  cout<<endl;  // wait for all threads to finish  pthread\_join(t2, NULL);  cout<<endl;  pthread\_join(t3, NULL);  cout<<endl;  pthread\_join(t4, NULL);  } |

**Explanation:**

In this we have to input thread after that to reverse and then capitalize and then shift thread this will take input from the user and then this will help us to reverse thread using threads and pthread and null functions this will remove exception from the code.

**GitHub:**