CALIFORNIA STATE UNIVERSITY, FRESNO
DEPARTMENT OF COMPUTER SCIENCE

Class:	**Algorithms & Data Structures**		Semester:	**Fall 2023**
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		Laboratory number:	**Lab (1)**	

1. Statement of Objectives

The objective of this lab is to implement a stack data structure and a linked list data structure. Making a stack and using it for push, pop, peek, and print actions are all included in the scope of the stack data structure. While the scope of linked lists involves creating a linked list, executing insertion at the beginning, deletion of the first and last elements, and printing the elements in the list. Their significance lies in learning, practicing and applying their basics in C++ programming.

2. Experimental Procedure

In order to represent a stack data structure, I created a C++ class named Stack. Functions for push, pop, peek, and print operations are included in the class. I stored an integer array and a variable called "top" that records the position of the stack's current top. While the top element in the stack is removed using the pop technique, the top element is displayed using the peek method, and all the elements in the stack are listed using the print method. Whereas to represent a singly linked list data structure for the linked list, I created a class named LinkedList. The class provides methods for printing the list's elements as well as methods for adding elements to the beginning and deleting the first and the last element. Creating nodes and changing their links to carry out the desired actions is how I tries to approach the lab.

3. Analysis

For the stack data structure, I was able to create a stack and perform action like push, pop and peek on the stack and print them.

For the linked list I was able to create a linked list and then perform actions like inserting and deleting (first and last element) and print the updated linked list side-by-side.

(Screenshots are in the end of the report)
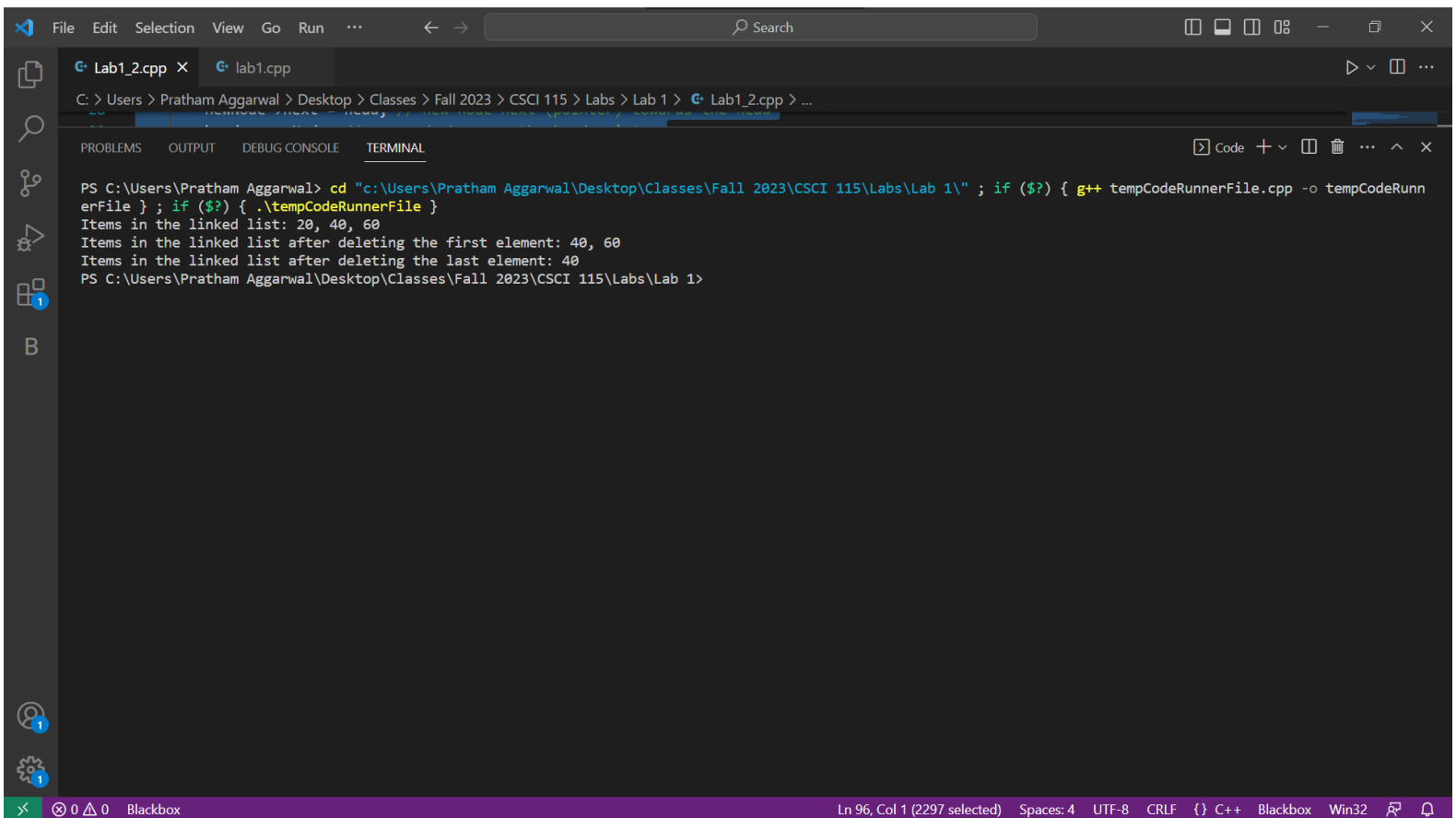
4. Encountered Problems

For the stack data structure, I was not able to figure out that arrays and stack were two different things that work side-by-side and we work on the arrays to perform functions like pop, peek and push and then print the array like stack. To figure this out I studied from the internet the concept of stack. Then for the linked list I was having problem in remembering the pseudo code for the basic actions, so I looked my previous class notes for that.

5. Conclusions

In conclusion, I was able to learn and refresh the concepts of linked list and stacks like the basic operations to work on both of them. The main concept I learnt was how to use arrays to perform and manipulate the stack data and work on them. Other than that, I also got a look on some pseudo code for working on linked lists.
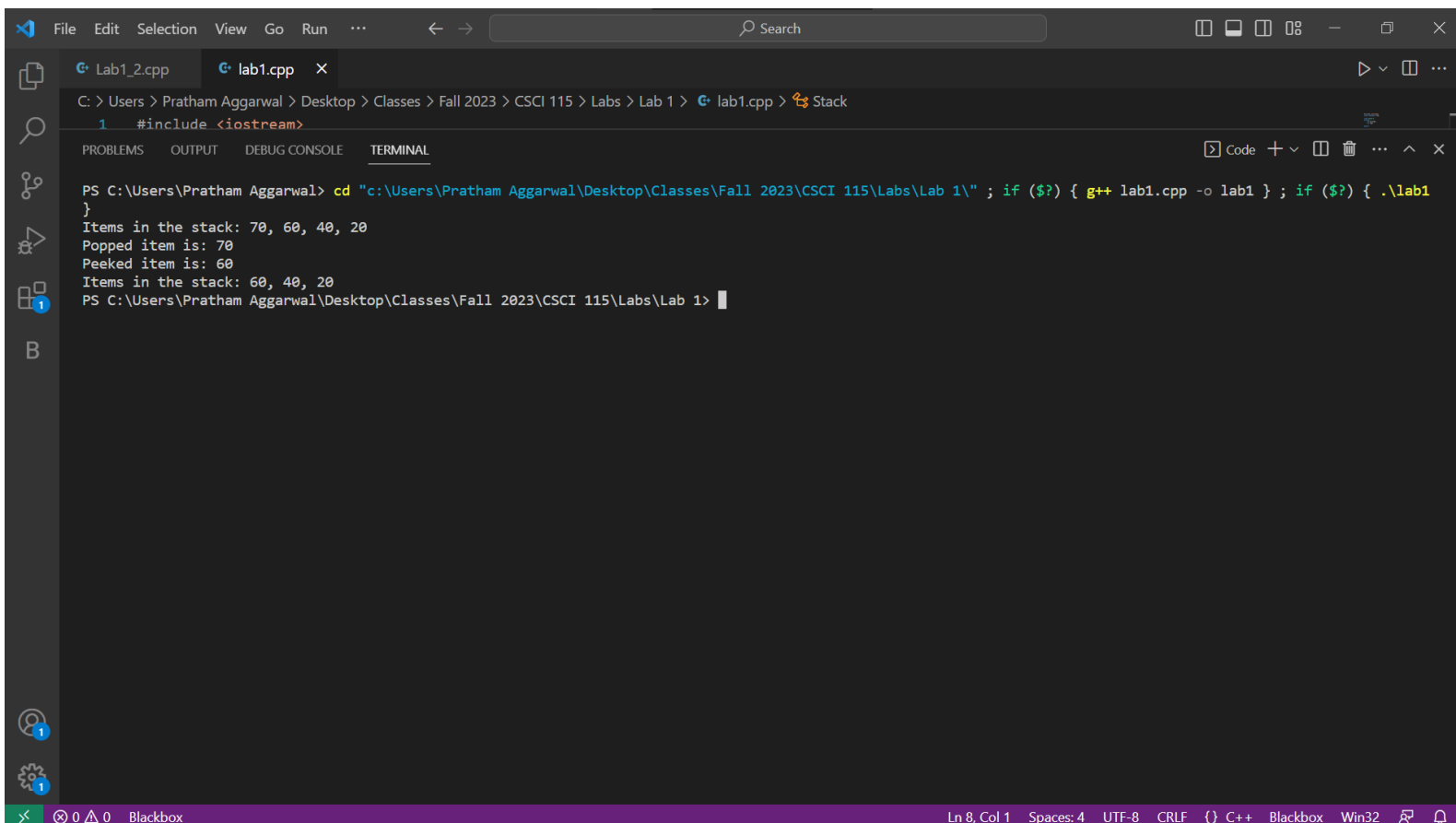
6. References
None