COSC 2436: Group Assignment 1

Your task for this assignment is to write a program that is able to decode IDs from two different bars (Bar1 and Bar2), check for duplicate IDs, sort the IDs in ascending order, and print a report of the IDs indicating which IDs are guilty and which are innocent. An ID is guilty if it appears **more than** once, and an ID is innocent if it appears **only** once.

Assumptions:

- Each input file may contain a maximum of 100 IDs
- Bar names will always be “Bar1” and “Bar2”
- Each ID may vary in length (i.e. 12345, 9019, 23, etc.)
- Each encoded ID contains only numbers and parentheses
- Each **encoded** ID has *n* characters, where 1 <= *n* <= 30
- Each **decoded** ID has *m* characters, where 1 <= *m* <= 10
- Encoded IDs will always have balanced parenthesis
- There may be empty lines in the input file
- An ID is considered guilty if it appears more than once (regardless of what bar it comes from).

Rules for Decoding and Output:

For decoding the IDs, reverse the numbers in each pair of matching parentheses, starting from the innermost pair. Below are the steps to decode the ID **(4(23)1)**:

Step 1: You start with **(4(23)1)** as your encoded ID. Begin decoding from the innermost parentheses and reverse the numbers, so you reverse the numbers **2** and the **3**. Now your encoded ID is **(4321)**.

Step 2: Your encoded ID is now **(4321)**, so reverse the number **4**, **3**, **2**, and **1** since they are inside parentheses. After reversing the numbers you are left with **1234**. There are no parenthesis left so there is nothing left to decode. Your decoded ID is **1234**.

For the output, you should print both guilty and innocent IDs. You should print guilty IDs first and then the innocent IDs. IDs should be printed in ascending order for both guilty and innocent. The format for the output is shown below.

You must use a linked list to implement your solution.

Directions for submitting group assignment 1:

We expect every student of each group will participate to solve the problem and discuss with each other. The purpose of this group assignment is to learn about string manipulation and linked lists. Every student of each group needs to submit the same copy of the solution. Group assignment 1 needs to be turned into the server for this class. Make sure to create a folder under your root directory, name it **ga1** (must be in lower case). Only copy your .cpp files, .h files, and ArgumentManager.h file to your **ga1** folder. This assignment will only be graded once, so make sure you are submitting the correct solution before the due date because you will not be able to resubmit.

Example input and output:

input1.txt

```
Bar1
10(01)

(4(23)1)

Bar2

(20)02

Bar1
(20)21


Bar2
3(021)
(4321)
```

output1.txt

```
Guilty:
1234
Innocent:
0202
0221
1010
3120
```

Due date: Tuesday, October 3, 2023 by 11:59 pm