Leave all mobile phones and smart devices outside the hall

National Institute of Technology, Calicut
Department of Computer Science & Engineering

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CS4097D Object Oriented Systems Laboratory

EVALUATION 1 Marks - 20 (5x4)

(Do not use inbuilt functions for stack, queue and linked list.Classes created for one question can be reused in other questions)

1. Given an expression **exp** of length **n** consisting of some brackets.The number of i th left bracket '(' is i and the right bracket ')' gets the same bracket number as its matching left bracket.Implement a java program to print the bracket numbers in the order in which they occur in the expression.

Note: If a right bracket doesn't have a matching left bracket print the string is **INVALID**

Test case 1:
Sample Input : (a+(b*c))+ (e*f)
Output : 1 2 2 1 3 3

2. **n** Racers are participating in a race. The race course has **m** checkpoints.

Each checkpoint has a sensor that records each racer as they clear it and sends a message to the central server notifying this. For the i^{th} checkpoint, the server maintains a list L_i containing the list of racers who have cleared the checkpoint i and have not cleared the checkpoint i+1. The lists contain the racers in the order that they cleared the corresponding checkpoint. Note that no information regarding the actual positions of the racers is known when they are not at the checkpoints.

Note that the actual positions of the racers are known only when they are at the checkpoints.

At any point of time, the rank of a racer is his/her relative position amongst the racers, with respect to the information available at the checkpoints.

Write a java program that takes as input the lists maintained by each of the checkpoints at some point of time t and prints the racers in the order of their ranks at that time.

Input Format

The first line of the input contains two integers **n,m**, where n is the number of racers and m is the number of checkpoints.

Each of the following lines of the input contains one of the following.

The character ‘s’ followed by two integers **c, r**. This instruction notifies the server that the racer **r** has cleared the checkpoint **c**. Note that the server should also verify that **r** had already cleared the checkpoint **c-1**. If not, output the string “INVALID”.
The character ‘p’ followed by an integer **c**. Print the list corresponding to the list of checkpoint **c**.
The character ‘r’. Print the racers in the current order of their ranks at this time.
The character ‘t’. Terminate the program.

Test case 1:
Sample Input

```
4 2
s 1 1
s 1 2
s 1 3
s 2 2
s 1 4
p 2
p 1
r
```

Output

```
2
1 3 4
2 1 3 4
```

3. Implement a queue that uses a singly linked list as its underlying data structure. The queue should support the standard **enqueue()**, **dequeue()** and **isempty()** operations. Now, write a program to reverse your queue by using these three functions **only.** You should not change the key of a node once it is created.

Sample Input

The input is a single line containing the elements of the queue, each separated by a single space.

Output

Print all the elements of queue after reversing all the elements in a single line separated by space.

Test case 1:

Sample Input

4 7 2 12 8 23

Output

23 8 12 2 7 4

4. Consider a Binary Array. Flip the value of any one of the array element so that you will get the longest sequence of ones in the array. Print the length of largest sequence.

Test case 1:
Sample Input

10111001
Output

5

5. Two numbers are represented using LinkedList. Write a JAVA program to add these two numbers using Stack and create a new LinkedList which stores the sum of given two numbers.

Test case 1:

Sample Input

Number 1 = 9 -> 9

Number 2 = 9 -> 9 -> 7

Output

1 -> 0 -> 9 -> 6