Merit-Quality-Excellence

Sukkur IBA University Khairpur Campus

Data Structures

LAB No: 08

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Objective of Lab No. 8:

After performing lab 8, students will be able to:

- Tracing recursive code
- Practice Problems

Exercise

1. Write the recursion function **DecimalToBinary**, should return a string that stores the binary equivalent for int variable num.

For example: The binary equivalent of 13 may be found by repeatedly dividing 13 by 2. So, 13 in base 2 is represented by the string "1101".

```
decToBinary(13)
Output:
1101
```

2. **Check for Palindrome (Recursive String Check):** Implement a recursive function to check if a given string is a palindrome.

Input: "racecar"

Output: True

3. **(Undo/Redo Program)**

You know about Undo and Redo operations almost in every software such as: MS Word, Excel and etc. You have to implement Undo/Redo operations using stack, you can use linked list code which you did in class/lab. After completion of this task, program flow will be as follows:

Please enter your choice: (1 for insert, 2 for undo, 3 for redo, 4 display stack)

```
Choice: 1 Input1: This
Choice: 1: Input2: is
Choice: 1: Input3: my
Choice: 1: Input4: stack
Choice: 2 Output: Undo successful
Choice: 2 Output: Undo successful
Choice: 4 Output: is This
Choice: 3 Output: Redo Successful
Choice: 4 Output: my is This
Choice: 3 Output: Redo Successful
Choice: 4 Output: stack my is This
Choice: 3 Output: Redo Unsuccessful
```

Choice: 2 Output: Undo successful

Choice: 2 Output: Undo successful

Choice: 2 Output: Undo successful

Choice: 2 Output: Undo successful

Choice: 2 Output: Stack is Empty

And so on

4. **Apply Greedy approach**

0	-1	-1	1	1	1	0
-1	2	5	4	10	3	-1
3	2	-1	-1	0	3	8
7	-1	10	2	-1	-1	17
4	3	9	-1	-1	8	33
17	-1	-1	1	0	44	100

Given a matrix above, you must start from YELLOW Box and reach to the goal which is Green Box by traversing each cell with maximum value of neighbors. -1 in any cell means BLOCK, you cannot visit that cell. You can move any cell in neighbors ONLY.

In case all the neighbors have -1 value then show message, NO POSSIBLE PATH due to BLOCKs on every side.

START: [0, 0] → YELLOW

GOAL: [n-1, n-1] → GREEN

You have to follow Greedy Approach, Greedy approach means selecting with immediate high reward (short term). In this problem, reward is your neighbors value.

Example of selecting path is given in above matrix, highlighted with ORANGE color

5. Write a function that takes two sorted singly linked lists and merges them into one sorted linked list. The function should return the head of the merged list.