Data Structure

Homework 2

Deadline: 2021/11/10 Mon. 23:55

Task 1: (I/O: 35points, coding style: 5 points)

Please implement several basic operations related to linked list:

Creating a Node(with **int value** and **linked list pointer**)

Add a node to the linked list

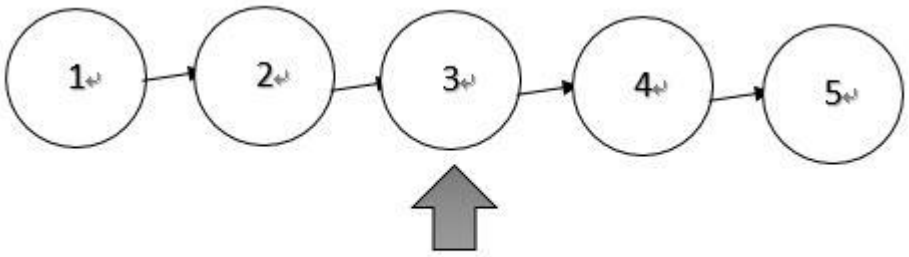
Traversing the list

Reverse the linked list

Given total numbers of node and value , return *the middle node of value and rest of the node of value* and reverse linked list.

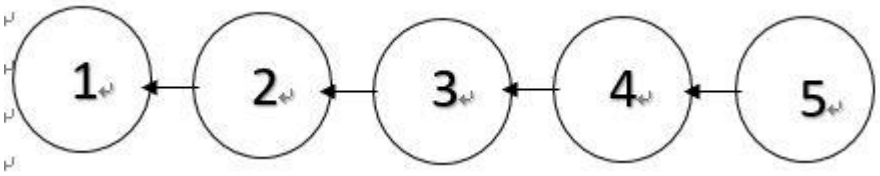
NOTICE: Your source code must be implemented in linked list or get zero point.

Example 1:



The middle of node

Reverse the linked list

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Input:

1 2 3 4 5

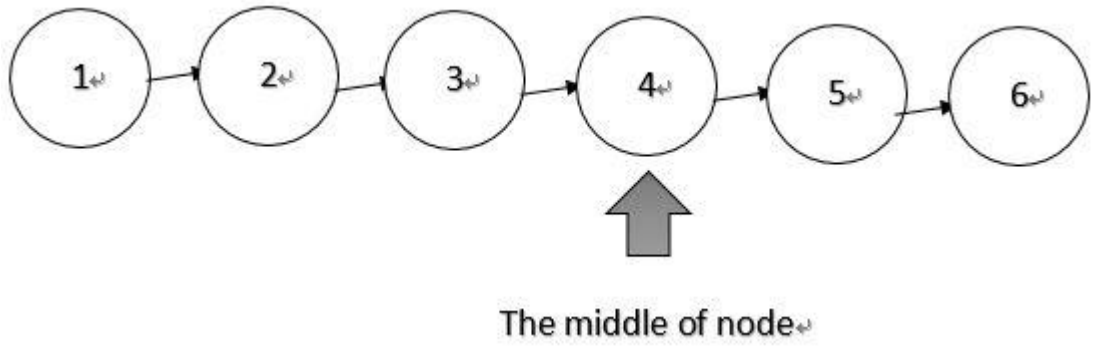
Output:

> 3 4 5

> 5 4 3 2 1
```

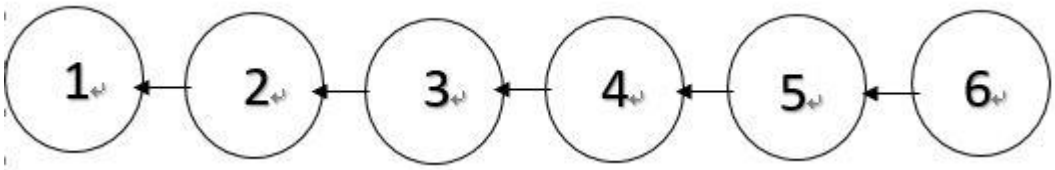
Explanation: The middle node of the list is node 3.

Example 2:



The middle of node

Reverse the linked list



Input:

1 2 3 4 5 6

Output:

> 4 5 6

> 6 5 4 3 2 1

Explanation: Since the list has two middle nodes with values 3 and 4, we return the second one.

Example:

Input	Output
1 2 3 4 5	> 3 4 5 > 5 4 3 2 1
Input	Output
1 2 3 4 5 6	> 4 5 6 > 6 5 4 3 2 1

Task 2: (I/O: 35 points, coding style: 5 points)

Please implement several basic operations related to queue:

1. Add (Enqueue) elements at the end of the queue.
2. Output the front element of the queue.
3. Delete (Dequeue) the front element of the queue.

Assume user only input integers and right format. Your program has to read till the input row has only -1.

The program must be implemented **by queue**, or you will get zero points.

Input Description:

If input "1", please read another integer x ($1 \leq x \leq 10^9$) and enqueue the number.

If input "2", print the front element. If the queue is empty, then output "> -2".

If input "3", dequeue the front element. If the queue is empty, then output "> -3".

If input "-1", terminate the program.

Example:

Input	Output
3 2 1 1 1 2 1 3 2 3 3 2 1 4 3 2 3 3 2 1 5 2 3 -1	> -3 -2 1 3 4 -3 -2 5

Put the files below in the folder (folder name: studentID), and compress this folder as **"studentID.zip"**.

1. Two source code files (filename: studentID_1.c, studentID_2.c)
2. One report with your coding environment (OS, IDE, ...), problems you encountered, and references. (filename: studentID.pdf) (10 points)

All the file names are correct, or you'll get zero points. (10 points)

You must hand in the assignment on time, or you will get zero points.

Warning: We encourage you to discuss assignments with each other. However, you have the responsibility to finish the assignments individually. **Do not copy others' assignment, or you will get zero points.**