

### Assignment-5 (Stack)

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1. Stack is one of the well-known linear data structure which follows Last-In-First-Out (LIFO) order to perform various operations over data values stored in a stack. Write a program which creates stack using linked list and performs different operations over the created stack as following:

- a) Write a function ***Insertion*** which takes odd number of elements as input from the user and inserts these elements within the stack.

**Sample Input:**

*Elements to insert:* 5 6 8 9 3 2 4

**Sample Output:**

*Elements of stack:* 4 → 2 → 3 → 9 → 8 → 6 → 5

- b) Write a function ***Delete\_middle*** which deletes the middle element of the stack and returns the remaining elements of the stack.

**Sample Output:**

*Elements of stack:* 4 → 2 → 3 → 8 → 6 → 5

- c) Write a function ***Reverse*** which reverses the elements of the stack and returns the reversed elements of stack as output.

**Sample Output:**

*Elements of stack:* 5 → 6 → 8 → 3 → 2 → 4

2. Write a program which utilizes the stack data structure to perform different tasks as following

- a) One of the widely used applications of stack data structure is to convert an infix expression into a postfix expression. Write a function ***Infix\_Postfix\_Conv*** which takes an infix expression as input from the user and computes the postfix expression corresponding to the user-given infix expression.

**Sample Input:**

*Enter the Infix expression:*  $2 + 3 * (4^2 - 8)^{(2 + 1 * 2)} - 7$

**Sample Output:**

*Postfix expression:*  $2342^8 - 212 * +^ * +7 -$

- b) Stacks are commonly utilized in evaluation of postfix expressions. Write a function ***Eval\_Postfix*** using stack data structure which takes postfix expression (generated in 2(a)) as input and returns the value obtained after evaluating the user-given postfix expression as output.

**Sample Input:**

*Postfix expression:*  $2342^8 - 212 * +^ * +7 -$

**Sample Output:**

*Evaluation Outcome:* 12283