Objective:

To perform following operation on linked list :

- Reverse the Given Linked List
- Find the Middle Element in Linked List

Code :

```
#include <stdio.h>
#include <stdlib.h>

typedef struct node {
    int value ;
    struct node* next ;
} node ;

node* getnewnode() ;
node* insertbeg( node* , int);
void displayll( node* );
node* reverse( node* );
int middle( node* );

int main(){

    int ch , n , temp ;
    node* start = NULL ;

    printf("1. Insert Beginning \n");
    printf("2. Display \n");
    printf("3. Middle \n");
    printf("4. Reverse \n");
    printf("5. End \n");

    do{
        printf("Enter Choice : ");
        scanf("%d" , &ch );

        switch(ch) {
            case 1 :
                printf("Enter Value to Insert in Beginnng : ");
                scanf("%d" , &n);
                start  = insertbeg(start , n);
                break;
            case 2 :
                displayll(start);
                break;
            case 3 :
                temp = middle(start);
                printf("%d\n" , temp );
            case 4 :
                start = reverse(start);
                break;
```

```
        }

    } while ( ch != 5) ;

}


node* getnewnode(){

    node* new = malloc(sizeof( node ) );
    return new;

}

node* insertbeg( node* start  , int x){

    node* q = getnewnode() ;
    q->value = x ;

    q->next = start ;
    start = q ;

    return start ;

}

void displayll(node* start){

    while(start != NULL ){

        printf("%d " , start->value);
        start = start->next ;

    }
    printf("\n") ;

}

node* reverse(node* start){

    node *q , *p ;

    if(start == NULL || start->next == NULL ){
        return start ;
    }

    p = start->next ;
    start->next =NULL ;

    while(p != NULL ){

        q = p->next ;
        p->next = start ;
        start = p ;
        p = q ;
    }
```

```
    return start ;
}


int middle(node* start){
    node *p , *q ;
    p = start ;
    q = start ;
    while(p != NULL && p->next != NULL ){
        p = p->next->next ;
        q = q->next ;
    }

    return q->value ;
}
```

Output :

```
PS D:\College\DS\Linked List> .\reverse
1. Insert Beginning
2. Display
3. Middle
4. Reverse
5. End
Enter Choice : 1
Enter Value to Insert in Beginnng : 1
Enter Choice : 1
Enter Value to Insert in Beginnng : 2
Enter Choice : 1
Enter Value to Insert in Beginnng : 3
Enter Choice : 2
3 2 1
Enter Choice : 4
Enter Choice : 2
1 2 3
Enter Choice : 3
2
Enter Choice : 5
```