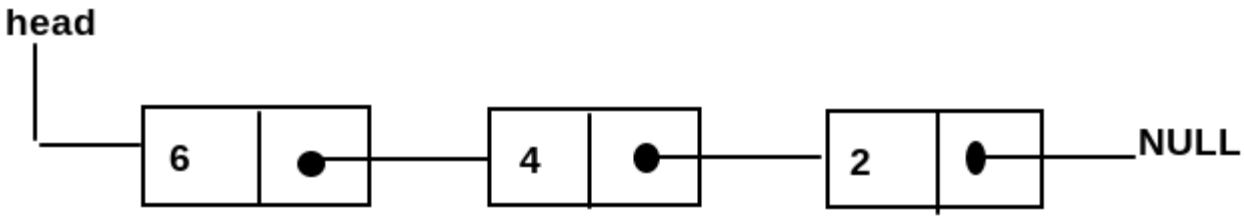
Homework #11

Due date: 21:30, December 29th, Tuesday, 2015

Problem statement

1. (50%) (1)Write a **insert function** to construct a Linked List using "**struct**".
(2)Traverse the Linked List from the **head** and Print them out.

```
struct Node {
   int data;
   struct Node* next;
};
```



Sample Run

Input the number of data you want to insert: 4
Data: 20 30 100 70
After insert: 20 ---> 30 ---> 100 ---> 70 ---> NULL

Hint

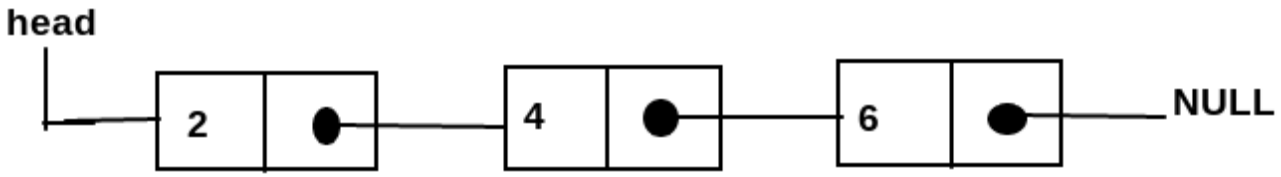
(1) Allocate memory for a Node.

```
#include <stdlib.h>

struct Node* temp ;

temp = malloc(sizeof(struct Node));
```

2. (35%) (1)Reverse the Linked List from **problem 1** .
(2)Traverse the Linked List from the **head** and Print them out.



Sample Run

After reverse: 70 ---> 100 ---> 30 ---> 20 ---> NULL

3. (15%) (1) Remove Duplicates from Sorted List.
(2) For example, Given 1 -> 1 -> 2, return 1 -> 2.
Given 1 -> 1 -> 2 -> 3 -> 3, return 1 -> 2 -> 3.

Sample Run

Input the number of data you want to insert: 5
Data: 1 1 2 3 3
After remove: 1 ---> 2 ---> 3 ---> NULL

Hint

Use "**free()**" :
For example,when you allocate memory:

```
struct Node* temp ;

temp = malloc(sizeof(struct Node));
```

You can free allocated memory:

```
free( temp);
```

Requirements

1. Write a C program that is capable of handling input.
2. You need to use three file (main.c and header.h and implement.c).

```
/* HW11_xxxxxx_header.h */
#include <stdlib.h>
#include <stdio.h>

strcut Node {
   int data;
   strcut Node* next;
};
struct Node*  insert(int value, struct Node* head);
struct Node*  reverse(struct Node* head);
struct Node*  remove(struct Node* head);
//Traverse linked list and print them out
void  traverse(struct Node* temp);
```

```
/* HW11_xxxxxxx_implement.c */
#include "HW_xxxxxxx_header.h"
struct Node*  insert(int value, struct Node * head) {
    ///To-do-list
}

//Traverse linked list and print them out
void traverse(struct Node * temp) {
     ///To-do-list
}

struct Node* reverse(struct Node* head) {
     ///To-do-list
}

struct Node* remove(struct Node* head) {
    ///To-do-list
}

/* HW11_xxxxxxx_main.c */
#include "HW11_xxxxxxx_header.h"
int main() {
    struct Node* head = NULL;
    printf("Input the number of data you want to insert: ");
    int N;
    scanf("%d", &N);
    printf("Data: ");
    for (int i = 0; i < N; i++) {
        int t;
        scanf("%d", &t);
        //1.(1)
        head = insert(t, head);
    }
    //1.(2)
    printf("After insert: ");
    traverse(head);

    //2.(1)
    head =reverse(head);

    printf("After reverse: ");
    //2.(2)
    traverse(head);
}
```

Submission

Be sure to upload your source code to E3 by the due date and name your file as
"**HW11_xxxxxxx_main.c**", where **xxxxxxx** is your student ID.
"**HW11_xxxxxxx_implement.c**", where **xxxxxxx** is your student ID.
"**HW11_xxxxxxx_header.h**", where **xxxxxxx** is your student ID.