**LAB TASK 4 BT23CSE112 Long precision arithmetic**

Q2. Write a C program to add 2 long integers which are represented using linked list and store the result in the resultant linked list.

#include <stdio.h>

#include <stdlib.h>

struct Node {

int data;

struct Node\* next;

};

struct Node\* createNode(int data) {

struct Node\* newNode = (struct Node\*)malloc(sizeof(struct Node));

newNode->data = data;

newNode->next = NULL;

return newNode;

}

struct Node\* insertAtBeginning(struct Node\* head, int data) {

struct Node\* newNode = createNode(data);

if (!newNode) return head;

newNode->next = head;

head = newNode;

return head;

}

struct Node\* add(struct Node\* head1, struct Node\* head2) {

struct Node\* result = NULL;

struct Node \*temp, \*prev = NULL;

int carry = 0, sum;

while (head1 != NULL || head2 != NULL) {

sum = carry;

if (head1 != NULL) {

sum += head1->data;

head1 = head1->next;

}

if (head2 != NULL) {

sum += head2->data;

head2 = head2->next;

}

carry = sum / 10;

sum = sum % 10;

temp = createNode(sum);

if (result == NULL) {

result = temp;

} else {

prev->next = temp;

}

prev = temp;

}

if (carry > 0) {

temp = createNode(carry);

prev->next = temp;

}

return result;

}

void display(struct Node\* head) {

while (head != NULL) {

printf("%d", head->data);

head = head->next;

}

printf("\n");

}

struct Node\* reverseList(struct Node\* head) {

struct Node\* prev = NULL;

struct Node\* current = head;

struct Node\* next = NULL;

while (current != NULL) {

next = current->next;

current->next = prev;

prev = current;

current = next;

}

return prev;

}

int readLargeNumber(int\* arr) {

int length = 0, num;

printf("Enter digits one by one : ");

while (scanf("%d", &num) && num != -1) {

if (num < 0 || num > 9) {

printf("Invalid input. Only single digit integers are allowed.\n");

exit(1);

}

arr[length++] = num;

}

return length;

}

struct Node\* convertArrayToList(int\* arr, int length) {

struct Node\* head = NULL;

for (int i = 0; i < length; i++) {

head = insertAtBeginning(head, arr[i]);

}

return head;

}

int main() {

int num1[1000], num2[1000];

int len1, len2;

struct Node\* head1 = NULL;

struct Node\* head2 = NULL;

struct Node\* result = NULL;

len1 = readLargeNumber(num1);

len2 = readLargeNumber(num2);

head1 = convertArrayToList(num1, len1);

head2 = convertArrayToList(num2, len2);

result = add(head1, head2);

result = reverseList(result);

printf("Result: ");

display(head1);

display(head2);

display(result);

return 0;

}