Bangladesh Open University

School of Science and Technology

Bsc in Computer Science and Engineering

Lab report no. : lab-04.

Report on : single Link list with C Program

Course title : Data Structure Lab

Course code : CSE21P6

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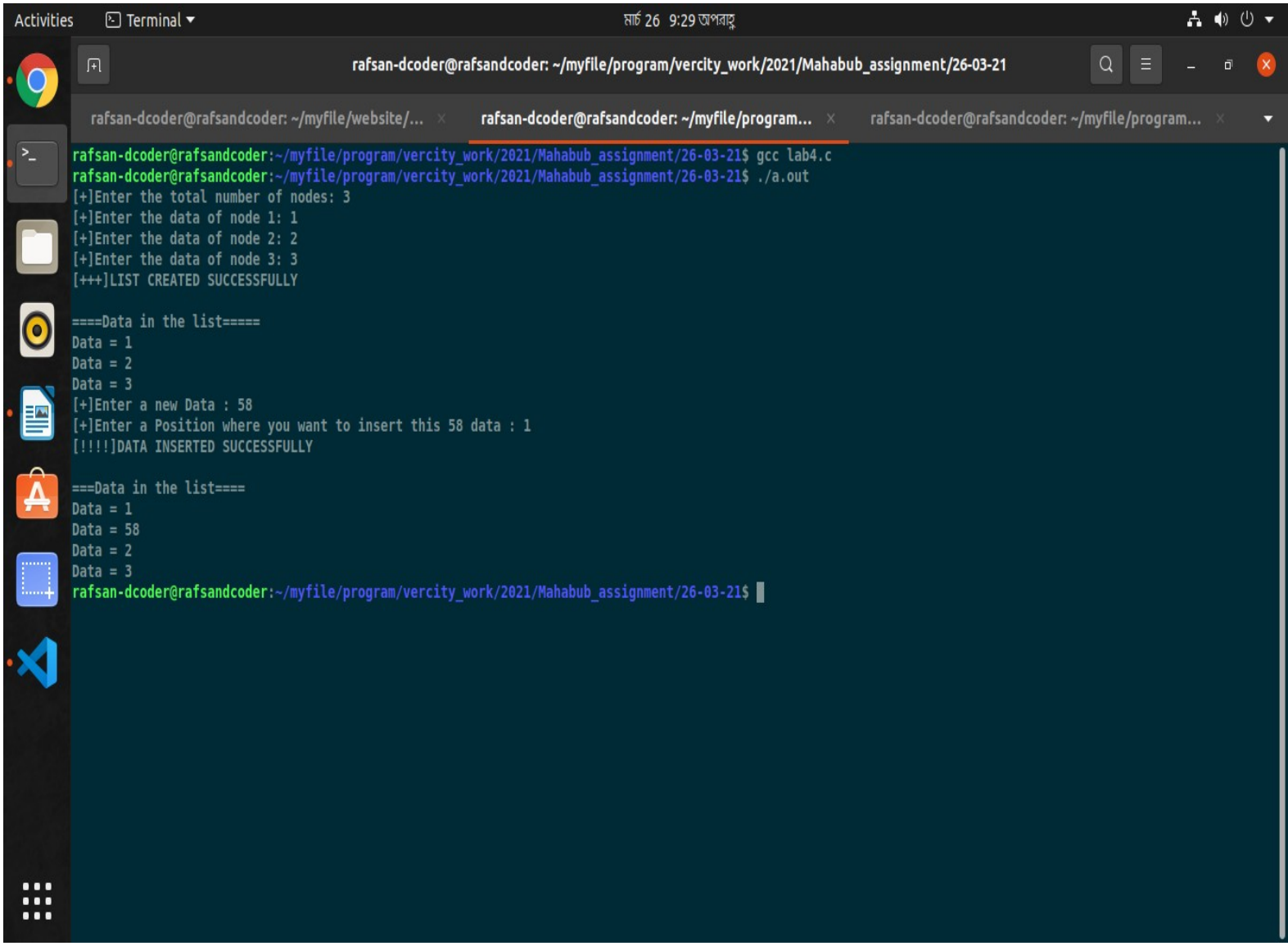
LAB 4

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


/* Structure of a node */
struct node {
int data; // Data
struct node *next; // Address
}*head;


void createList(int n);
void insertNodeAtMiddle(int data, int position);
void displayList();



int main()
{
int n, data, position;

/*
* Create a singly linked list of n nodes
*/
printf("[+]Enter the total number of nodes: ");
scanf("%d", &n);
createList(n);

printf("\n====Data in the list===== \n");
displayList();

/*
* Insert data at middle of the singly linked list
*/
printf("[+]Enter a new Data : ");
scanf("%d", &data);
printf("[+]Enter a Position where you want to insert this %d data : ",data );
scanf("%d", &position);
insertNodeAtMiddle(data, position);
```

```
printf("\n===Data in the list==== \n");
displayList();

return 0;
}



/*
* Create a list of n nodes
*/
void createList(int n)
{
struct node *newNode, *temp;
int data, i;

head = (struct node *)malloc(sizeof(struct node));

/*
* If unable to allocate memory for head node
*/
if(head == NULL)
{
printf("[!!!!]Unable to allocate memory.");
}
else
{
/*
* Input data of node from the user
*/
printf("[+]Enter the data of node 1: ");
scanf("%d", &data);

head->data = data; // Link the data field with data
head->next = NULL; // Link the address field to NULL

temp = head;

/*
* Creates n nodes and adds to linked list
*/
for(i=2; i<=n; i++)
{
newNode = (struct node *)malloc(sizeof(struct node));

/* If memory is not allocated for newNode */
if(newNode == NULL)
{
printf("Unable to allocate memory.");
```

```
break;
}
else
{
printf("[+]Enter the data of node %d: ", i);
scanf("%d", &data);

newNode->data = data; // Link the data field of newNode with data
newNode->next = NULL; // Link the address field of newNode with NULL

temp->next = newNode; // Link previous node i.e. temp to the newNode
temp = temp->next;
}
}

printf("[+++]LIST CREATED SUCCESSFULLY\n");
}
}



/*
* Creates a new node and inserts at middle of the linked list.
*/
void insertNodeAtMiddle(int data, int position)
{
int i;
struct node *newNode, *temp;

newNode = (struct node*)malloc(sizeof(struct node));

if(newNode == NULL)
{
printf("Unable to allocate memory.");
}
else
{
newNode->data = data; // Link data part
newNode->next = NULL;

temp = head;

/*
* Traverse to the n-1 position
*/
for(i=2; i<=position-1; i++)
{
temp = temp->next;
```

```
if(temp == NULL)
break;
}

if(temp != NULL)
{
/* Link address part of new node */
newNode->next = temp->next;

/* Link address part of n-1 node */
temp->next = newNode;

printf("[!!!!]DATA INSERTED SUCCESSFULLY\n");
}
else
{
printf("[!!!]UNABLE TO INSERT DATA AT THE GIVEN POSITION\n");
}
}
}


/*
* Display entire list
*/
void displayList()
{
struct node *temp;


/*
* If the list is empty i.e. head = NULL
*/
if(head == NULL)
{
printf("[!!!]List is empty.");
}
else
{
temp = head;
while(temp != NULL)
{
printf("Data = %d\n", temp->data); // Print data of current node
temp = temp->next; // Move to next node
}
}
}
```


Activities
Terminal
মার্চ 26 9:29 অপরাহ্ণ
rafsan-dcoder@rafsandcoder: ~/myfile/program/vercity_work/2021/Mahabub_assignment/26-03-21
rafsan-dcoder@rafsandcoder: ~/myfile/website/...
rafsan-dcoder@rafsandcoder: ~/myfile/program...
rafsan-dcoder@rafsandcoder: ~/myfile/program...
rafsan-dcoder@rafsandcoder:~/myfile/program/vercity_work/2021/Mahabub_assignment/26-03-21$ gcc lab4.c
rafsan-dcoder@rafsandcoder:~/myfile/program/vercity_work/2021/Mahabub_assignment/26-03-21$ ./a.out
[+]Enter the total number of nodes: 3
[+]Enter the data of node 1: 1
[+]Enter the data of node 2: 2
[+]Enter the data of node 3: 3
[+++]LIST CREATED SUCCESSFULLY
====Data in the list=====
Data = 1
Data = 2
Data = 3
[+]Enter a new Data : 58
[+]Enter a Position where you want to insert this 58 data : 1
[!!!!]DATA INSERTED SUCCESSFULLY
===Data in the list====
Data = 1
Data = 58
Data = 2
Data = 3
rafsan-dcoder@rafsandcoder:~/myfile/program/vercity_work/2021/Mahabub_assignment/26-03-21$