Sardar Vallabhbhai National Institute of Technology, Surat

Department of Artificial Intelligence

Data Structure (AI102)

B.Tech I - II Semester

Assignment-3

1. Write a program in C to create and display a Singly link list.

```c
#include <stdio.h>
#include <stdlib.h>
typedef struct node {
    int data;
    struct node *next;
}node;
 node* createnode(int data){
     node* newnode=(node*)malloc(sizeof( node));
    newnode->data=data;
    newnode->next=NULL;
    return newnode;
}
int display( node* head){
    node* temp=head;
    while(temp!=NULL)
    {
        printf("%d->",temp->data);
        temp=temp->next;
    }
    printf("NULL");
```

```
21  }
22  int main() {
23      node* head=NULL;
24      node* node1=NULL;
25      node* node2=NULL;
26      head=createnode(10);
27      node1=createnode(20);
28      node2=createnode(30);
29      head->next=node1;
30      node1->next=node2;
31      display(head);
32      return 0;
33  }
```

```
10->20->30->NULL
--------------------------------
Process exited after 0.09857 seconds with return value 0
Press any key to continue . . .
```

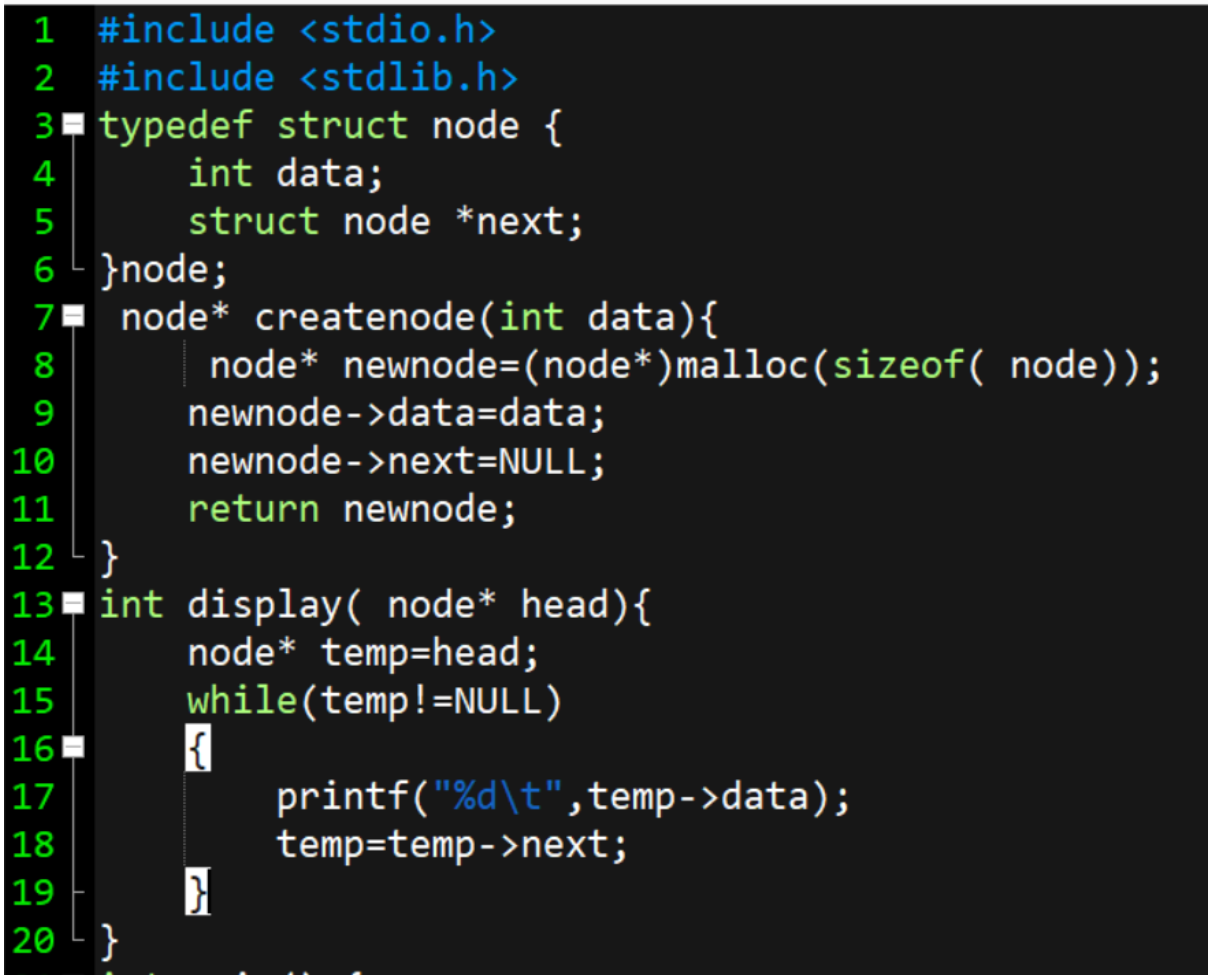
2. Write a program in C to insert a new node at the beginning of a Singly Linked List.

```c
#include <stdio.h>
#include <stdlib.h>
typedef struct node {
    int data;
    struct node *next;
}node;
 node* createnode(int data){
     node* newnode=(node*)malloc(sizeof( node));
    newnode->data=data;
    newnode->next=NULL;
    return newnode;
}
node* insertatbegin(node*head,int data){
    node*newnode=createnode(data);
    newnode->next=head;
    return newnode;
}
int display( node* head){
    node* temp=head;
    while(temp!=NULL)
```

```
    while(temp!=NULL)
    {
        printf("%d->",temp->data);
        temp=temp->next;
    }
    printf("NULL");
}
int main() {
     node* head=NULL;
     node* node1=NULL;
    node* node2=NULL;
    head=createnode(10);
    node1=createnode(20);
    node2=createnode(30);
    head->next=node1;
    node1->next=node2;
    head=insertatbegin(head,50);
    display(head);
    return 0;
}
```

```
50->10->20->30->NULL
--------------------------------
Process exited after 0.1048 seconds with return value 0
Press any key to continue . . .
```

3Write a program in C to traverse in a singly linked list.

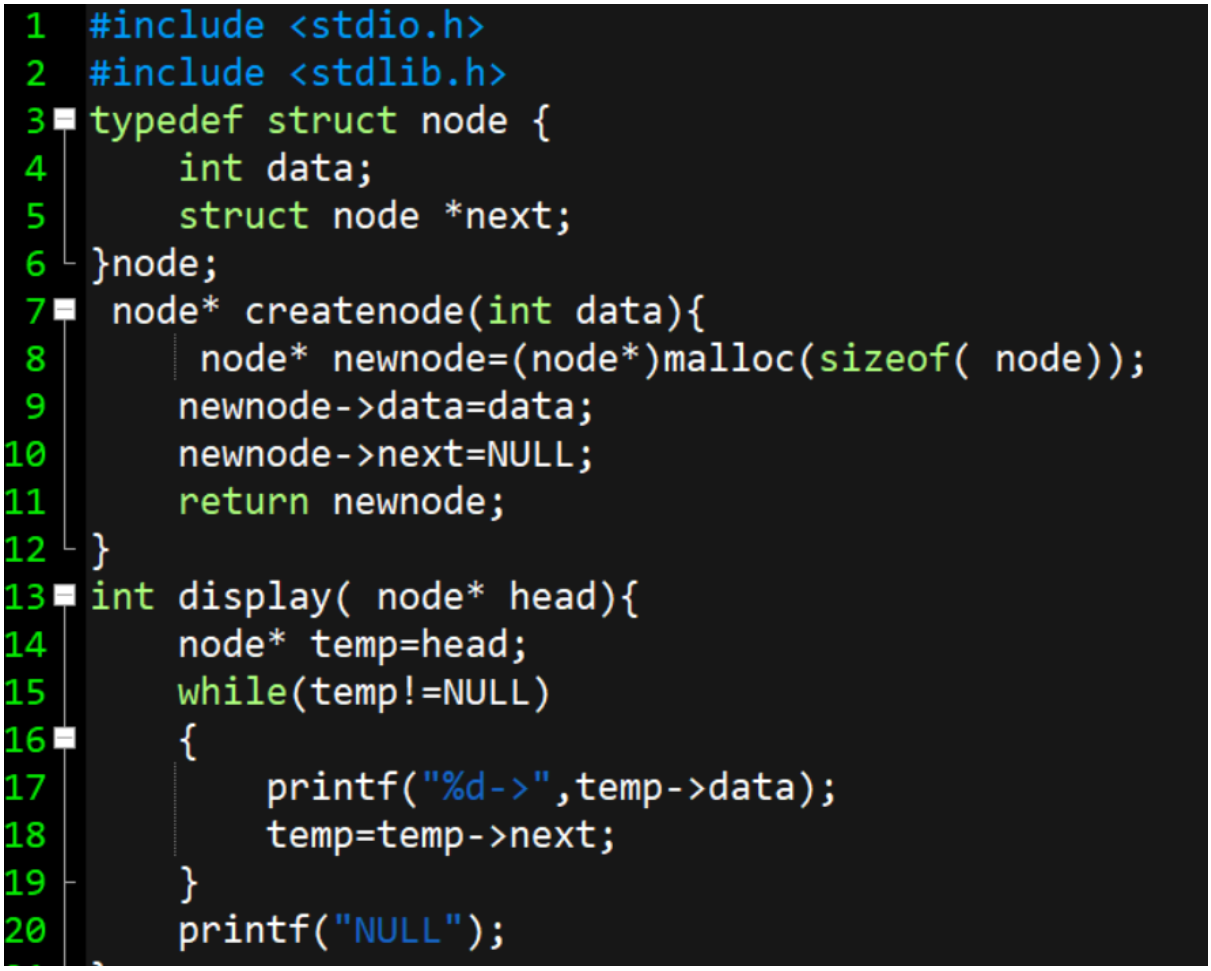


```c
#include <stdio.h>
#include <stdlib.h>
typedef struct node {
    int data;
    struct node *next;
}node;
 node* createnode(int data){
     node* newnode=(node*)malloc(sizeof( node));
    newnode->data=data;
    newnode->next=NULL;
    return newnode;
}
int display( node* head){
    node* temp=head;
    while(temp!=NULL)
    {
        printf("%d\t",temp->data);
        temp=temp->next;
    }
}
```

```
21  int main() {
22      node* head=NULL;
23      node* node1=NULL;
24      node* node2=NULL;
25      head=createnode(10);
26      node1=createnode(20);
27      node2=createnode(30);
28      head->next=node1;
29      node1->next=node2;
30      display(head);
31      return 0;
32  }
```

```
10      20      30
--------------------------------
Process exited after 0.09795 seconds with return value 0
Press any key to continue . . .
```

4. Write a program in C to copy the elements of the array to a singly linked list.

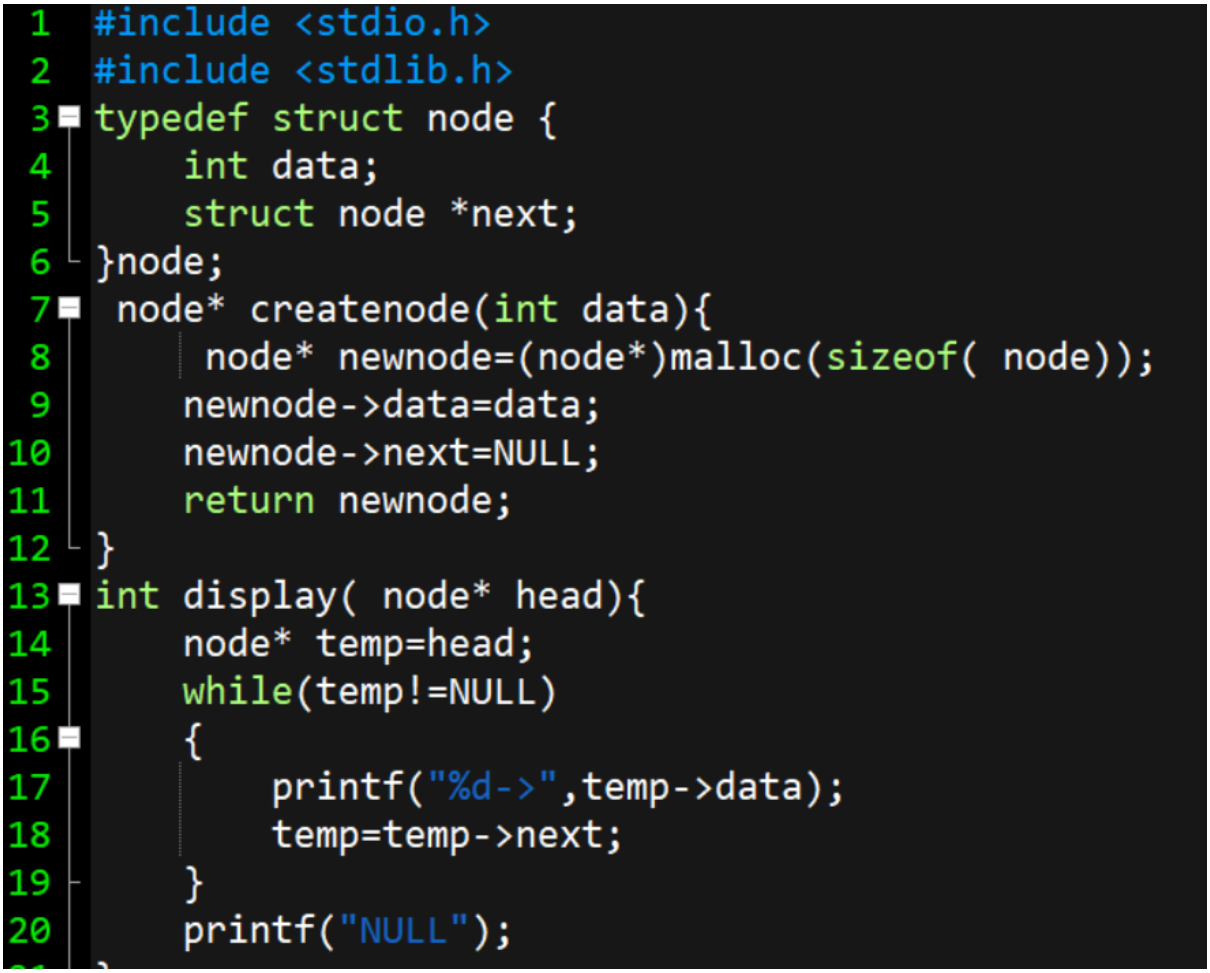


```c
#include <stdio.h>
#include <stdlib.h>
typedef struct node {
    int data;
    struct node *next;
}node;
 node* createnode(int data){
     node* newnode=(node*)malloc(sizeof( node));
    newnode->data=data;
    newnode->next=NULL;
    return newnode;
}
int display( node* head){
    node* temp=head;
    while(temp!=NULL)
    {
        printf("%d->",temp->data);
        temp=temp->next;
    }
    printf("NULL");
```

```
}
int main() {
int a[3],i;
   printf("enter array elements\n");
   for(i=0;i<3;i++)
   scanf("%d",&a[i]);
   for(i=0;i<3;i++)
   printf("%d\t",a[i]);
    node* head=NULL;
    node* node1=NULL;
    node* node2=NULL;
    head=createnode(a[0]);
    node1=createnode(a[1]);
    node2=createnode(a[2]);
    head->next=node1;
    node1->next=node2;
    printf("\n");
    display(head);
    return 0;
}
```

```
enter array elements
1
2
3
1       2       3
1->2->3->NULL
--------------------------------
Process exited after 9.343 seconds with return value 0
Press any key to continue . . .
```

5. Write a C program that converts a singly linked list into an array and returns it.



```c
#include <stdio.h>
#include <stdlib.h>
typedef struct node {
    int data;
    struct node *next;
}node;
 node* createnode(int data){
     node* newnode=(node*)malloc(sizeof( node));
    newnode->data=data;
    newnode->next=NULL;
    return newnode;
}
int display( node* head){
    node* temp=head;
    while(temp!=NULL)
    {
        printf("%d->",temp->data);
        temp=temp->next;
    }
    printf("NULL");
```

```
}
int array(node* head){
    int a[3],i=0;
    node* temp=head;
    while(temp!=NULL)
    {
        a[i]=temp->data;
        temp=temp->next;
        i++;
    }
    for(i=0;i<3;i++)
   printf("%d\t",a[i]);
}
int main() {
     node* head=NULL;
     node* node1=NULL;
    node* node2=NULL;
    head=createnode(10);
    node1=createnode(20);
    node2=createnode(30);
```

```
40      node2=createnode(30);
41      head->next=node1;
42      node1->next=node2;
43      printf("\n as a linked list\n");
44      display(head);
45      printf("\n");
46      printf("as a array\n");
47      array(head);
48      return 0;
49  }
```

```
 as a linked list
10->20->30->NULL
as a array
10      20      30
--------------------------------
Process exited after 0.09989 seconds with return value 0
Press any key to continue . . .
```