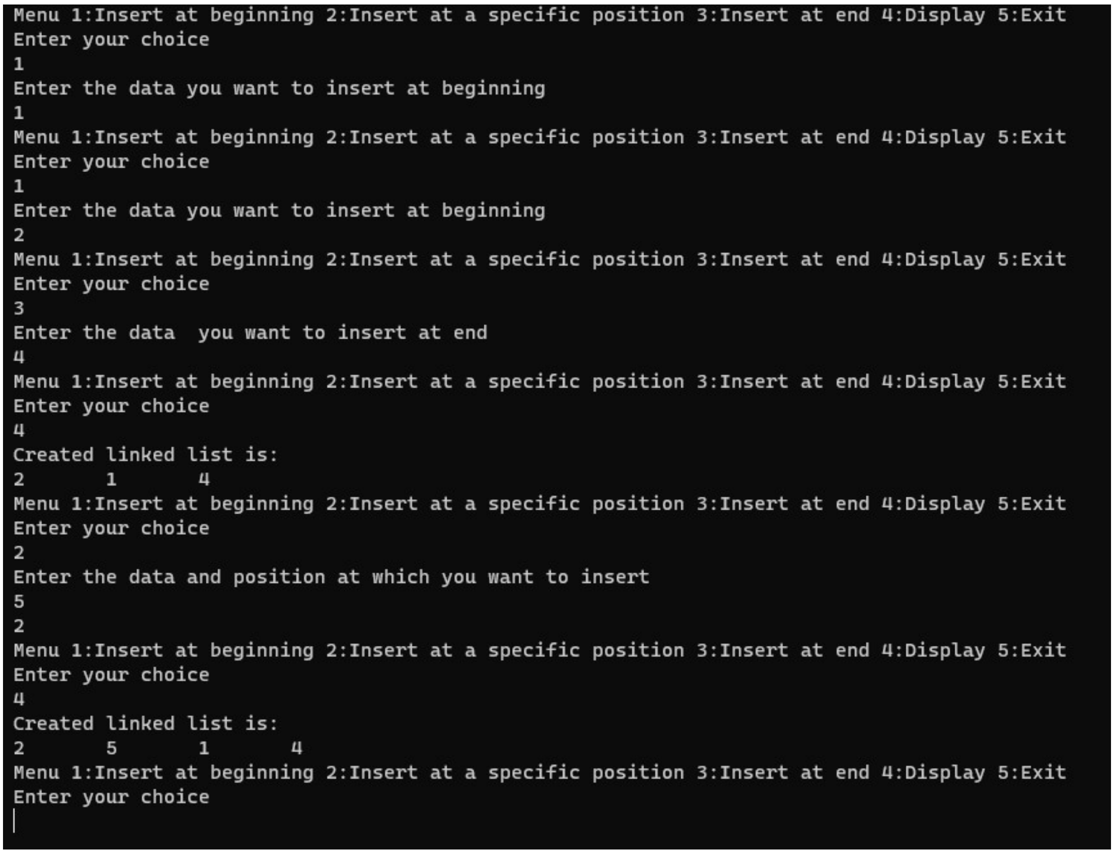
LAB-5 22/01/24

NAME:SHIVARAJ K PUJARI

1) INSERT IN LINKEDLIST

```
#include <stdio.h>

#include <stdlib.h>

struct node{

   int data;

   struct node* next;

};


void insertAtBeginning(struct node** head ,int val){

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

   newnode->data=val;

   newnode->next=*head;

   *head=newnode;

}


void insertAtEnd(struct node** head,int val){

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

   struct node* temp=*head;

   newnode ->data=val;

   newnode->next=NULL;


   if(*head==NULL){

      *head=newnode;

      return;
   }
   while(temp->next != NULL){
      temp=temp->next;
   }
   temp->next=newnode;

}

void insertAtPosition(struct node** head,int val,int pos){
    if(pos<=0){
      printf("Invalid position\n");
      return;
    }
    if(pos==1 || *head==NULL){
      insertAtBeginning(head,val);
      return;
    }
    struct node* newnode=(struct node*)malloc(sizeof(struct node));
    newnode->data=val;
    struct node* temp=*head;
    int count=1;

    while(count<pos-1 && temp->next !=NULL){
      temp=temp->next;
      count++;
    }
    if(count<pos-1){
      printf("Invalid Position\n");
      return;
    }

    newnode->next=temp->next;
    temp->next=newnode;
}

void display(struct node* head){
   struct node* temp=head;

   if(temp==NULL){
      printf("Linked List is Empty");
      return;
   }
   while(temp!=NULL){
      printf("%d\t",temp->data);
      temp=temp->next;
   }
   printf("\n");
}

int main()
{
   int ch,new,pos;

   struct node* head=NULL;

   while(ch!=5)

   {

   printf("Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display
5:Exit\n");

   printf("Enter your choice\n");

   scanf("%d",&ch);

   switch(ch)

   {

      case 1:

      {

      printf("Enter the data you want to insert at beginning\n");

      scanf("%d",&new);

      insertAtBeginning(&head,new);

      break;

      }

      case 2:

      {

      printf("Enter the data and position at which you want to insert \n");

      scanf("%d%d",&new,&pos);

      insertAtPosition(&head,new,pos);

      break;

      }

      case 3:

      {
      printf("Enter the data  you want to insert at end\n");

      scanf("%d",&new);

      insertAtEnd(&head,new);

      break;

      }

      case 4:

      {

         printf("Created linked list is:\n");

         display(head);

         break;

      }

      case 5:

      {

         return 0;

         break;

      }

      case 6:

      {

         printf("Invalid data!");

         break;

      }

      }

}

return 0;

}
```

OUTPUT:



```
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
1
Enter the data you want to insert at beginning
1
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
1
Enter the data you want to insert at beginning
2
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
3
Enter the data  you want to insert at end
4
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
4
Created linked list is:
2       1       4
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
2
Enter the data and position at which you want to insert
5
2
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
4
Created linked list is:
2       5       1       4
Menu 1:Insert at beginning 2:Insert at a specific position 3:Insert at end 4:Display 5:Exit
Enter your choice
```

2)DELETE:

```
#include <stdio.h>

#include<stdlib.h>




typedef struct Node {

   int data;

   struct Node *next;

}Node;



void InsertAtBeginning( Node **head_ref,int new_data);

void DeleteAtBeginning( Node **head_ref);
void DeleteAtEnd( Node **head_ref);

void Delete( Node **prev_node,int pos);

void PrintList(Node * next);


void InsertAtBeginning( Node **head_ref,int new_data)

{

   Node *new_node=(struct Node*)malloc(sizeof( Node));

   new_node->data=new_data;

   new_node->next=*head_ref;

   *head_ref=new_node;

}


void DeleteAtBeginning( Node **head_ref)

{

   Node *ptr;

if(head_ref == NULL)

{

printf("\nList is empty");

}

else

{

ptr = *head_ref;

*head_ref = ptr->next;

free(ptr);

printf("\n Node deleted from the beginning ...");
```

```
}

}



void DeleteAtEnd(Node **head_ref)

{

   Node *ptr,*ptr1;


if(*head_ref == NULL)


{


printf("\nlist is empty");


}


else if((*head_ref)-> next == NULL)


{


free(*head_ref);


*head_ref= NULL;


printf("\nOnly node of the list deleted ...");
```

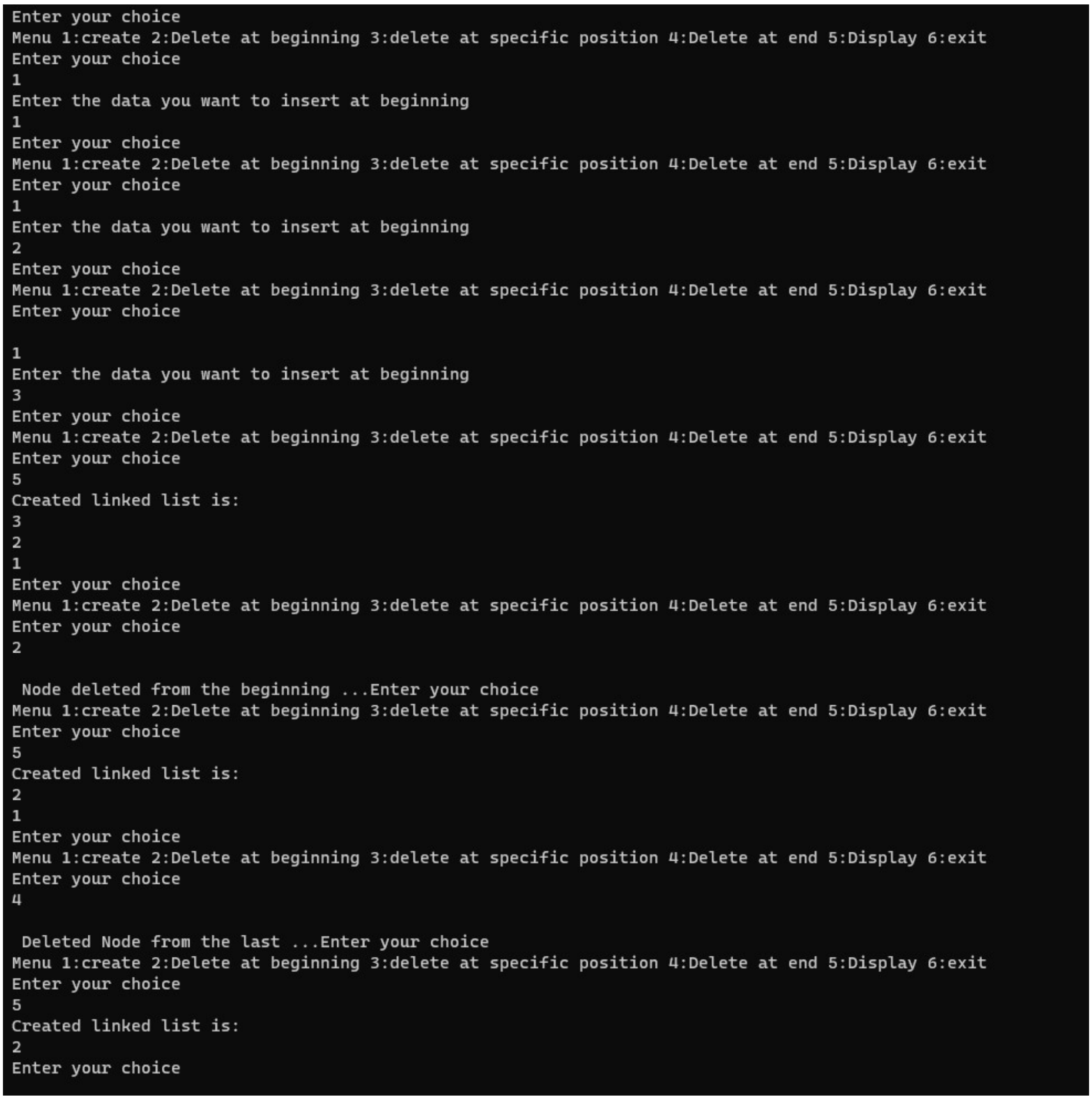
```
}

else

{

ptr = *head_ref;

while(ptr->next != NULL)

{

ptr1 = ptr;

ptr = ptr ->next;

}

ptr1->next = NULL;

free(ptr);

printf("\n Deleted Node from the last ...");

}
```

```
}

void Delete(Node **head_ref, int pos)

{

    Node *temp = *head_ref, *prev;


    if (temp == NULL)

    {

        printf("\nList is empty");

        return;

    }


    if (pos == 1)

    {

        *head_ref = temp->next;

        free(temp);

        printf("\nDeleted node with position %d", pos);

        return;

    }


    for (int i = 0; temp != NULL && i < pos - 1; i++)

    {

        prev = temp;

        temp = temp->next;

    }
    if (temp == NULL)
    {
        printf("\nPosition out of range");
        return;
    }

    prev->next = temp->next;
    free(temp);
    printf("\nDeleted node with position %d", pos);
}
void PrintList(Node *node)
{
    while (node!=NULL)
    {
        printf("%d\n",node->data);
        node=node->next;
    }
}


int main()
{
    int ch,new,pos;
    Node* head=NULL;
    while(ch!=6)
    {
```

```
  printf("Enter your choice\n");
  printf("Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit\n");
  printf("Enter your choice\n");
  scanf("%d",&ch);
  switch(ch)
  {
    case 1:
    {
    printf("Enter the data you want to insert at beginning\n");
    scanf("%d",&new);
    InsertAtBeginning(&head,new);
    break;
    }
    case 2:
    {
    DeleteAtBeginning(&head);
    break;
    }
    case 3:
    {
    printf("Enter the position at which you want to delete \n");
    scanf("%d",&pos);
    Delete(&head,pos);
    break;
    }
```

```
        case 4:

        {

        DeleteAtEnd(&head);

        break;

        }

        case 5:

        {

           printf("Created linked list is:\n");

           PrintList(head);

           break;

        }

        case 6:

        {

           return 0;

           break;

        }

        default:

        {

           printf("Invalid data!");

           break;

        }

        }

}

return 0;

}
```

OUTPUT:



```
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
1
Enter the data you want to insert at beginning
1
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
1
Enter the data you want to insert at beginning
2
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice

1
Enter the data you want to insert at beginning
3
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
5
Created linked list is:
3
2
1
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
2

 Node deleted from the beginning ...Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
5
Created linked list is:
2
1
Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
4

 Deleted Node from the last ...Enter your choice
Menu 1:create 2:Delete at beginning 3:delete at specific position 4:Delete at end 5:Display 6:exit
Enter your choice
5
Created linked list is:
2
Enter your choice
```