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Assignment 3 | 7th August 2021

Question 1

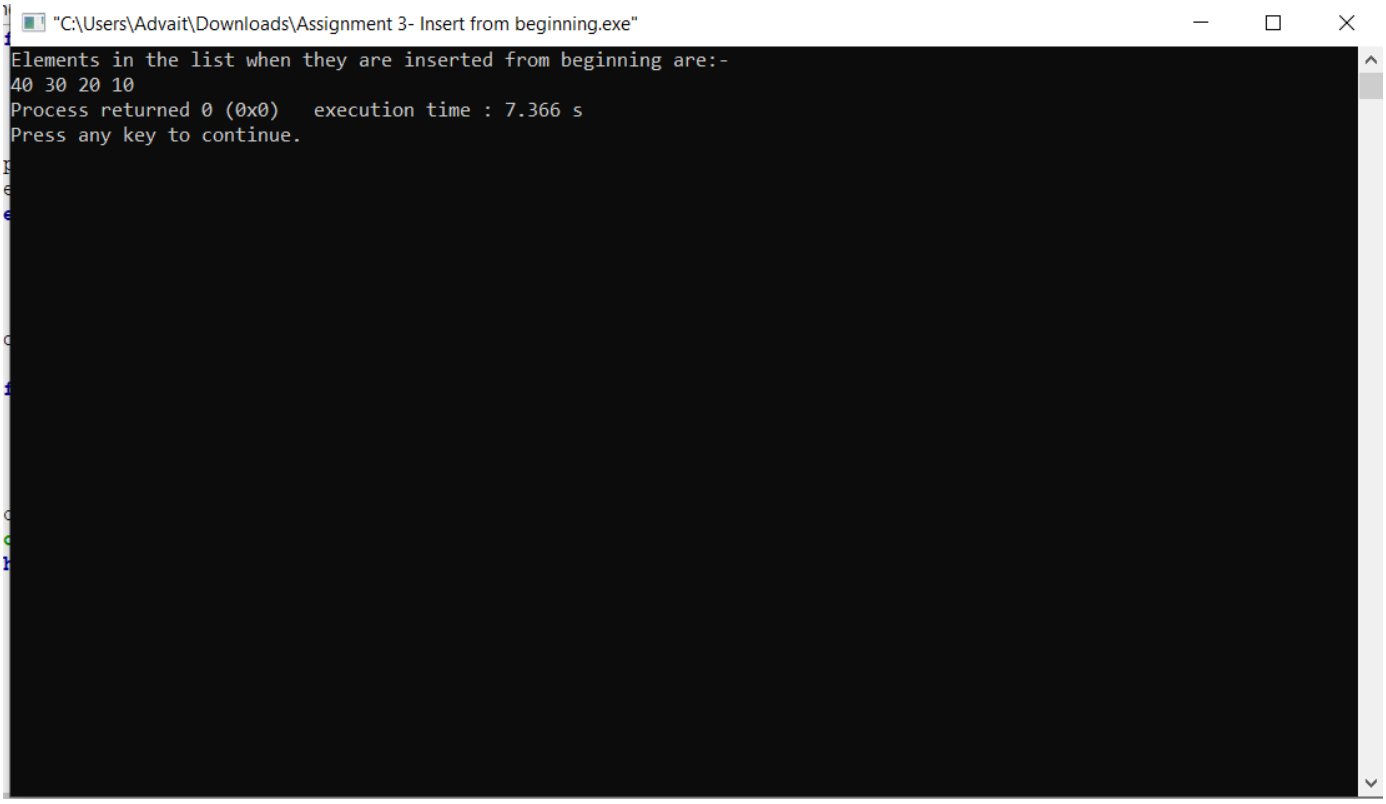
Write a program to perform insertion of elements from beginning in a linked list.

Program :

```
#include<iostream>
using namespace std;

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

Node * create(int);
Node * insert_begin(Node *, int);

void display_list(Node *head);


Node *create(int item)   //Creation of Node
{
    Node * nptr = new Node;
    nptr -> data = item;
    nptr -> next = NULL;

    return nptr;
}

int main()
{
    Node * head = NULL;
    head = insert_begin(head, 10);
    head = insert_begin(head, 20);
```

```
    head = insert_begin(head, 30);
    head = insert_begin(head, 40);

    display_list(head);

    return 0;
}

Node * insert_begin(Node *head, int data)
{
    Node *np = create(data);
    if(!head)
    {
        head = np;
        return head;
    }
    np -> next = head;
    head = np;
    return head;

}


void display_list(Node *head) //Displaying Linked List
{
    if(!head)
    {
        cout << "List is Empty!!!" << endl;
        return;
    }
    Node *temp = head;
    cout << "Elements in the list when they are inserted from beginning are:- " << endl;
    while(temp != NULL)
    {
        cout << temp -> data<< " ";
        temp = temp -> next;
    }

}
```

Output :



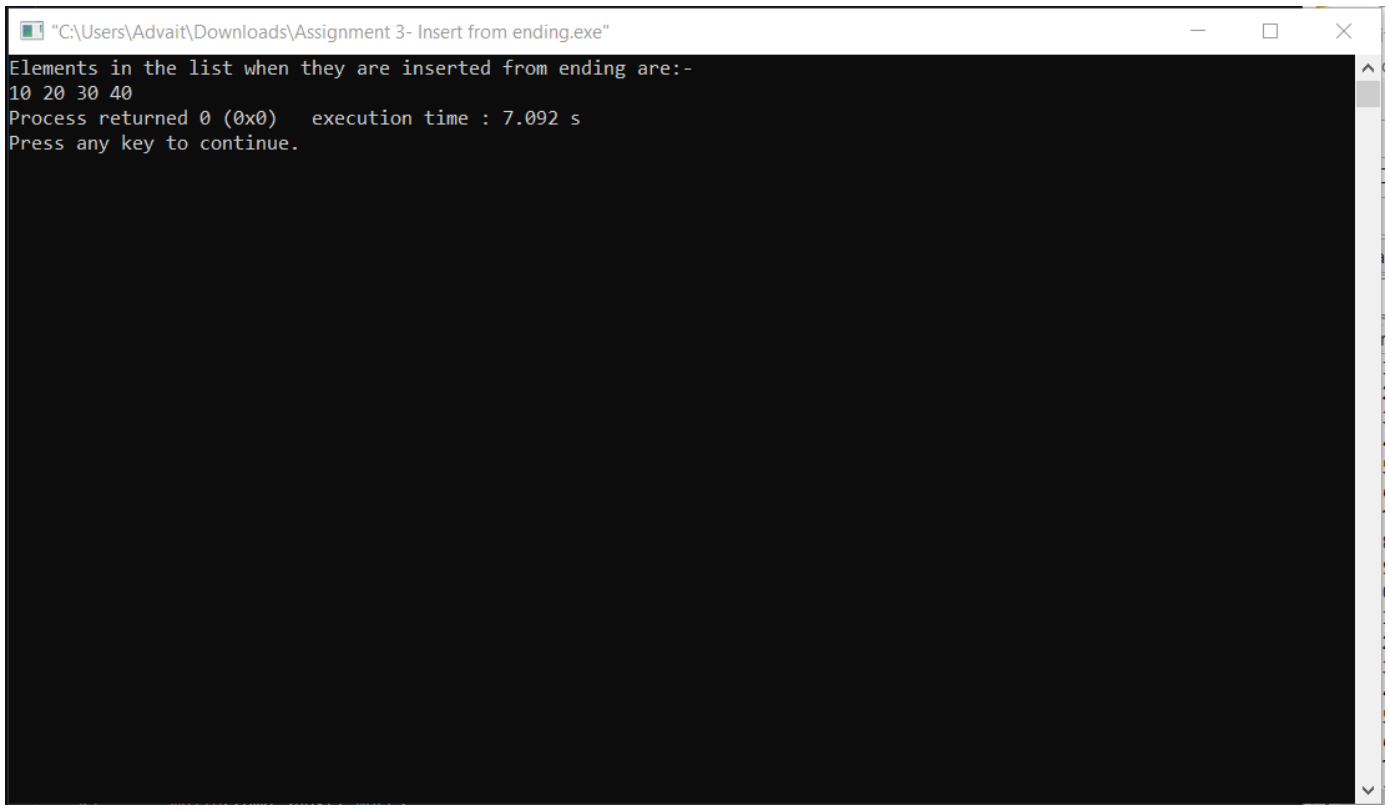
Question 2

Write a program to perform insertion of elements from ending in a linked list.

Program :

```
#include<iostream>
using namespace std;
struct Node
{
    int data;
    Node *next;
};
Node * create(int);
Node * insert_end(Node *, int);
void display_list(Node *head);
Node *create(int item)   //Creation of Node
{
    Node * nptr = new Node;
    nptr -> data = item;
    nptr -> next = NULL;
    return nptr;
}
int main()
{
```

```
    Node * head = NULL;
    head = insert_end(head, 10);
    head = insert_end(head, 20);
    head = insert_end(head, 30);
    head = insert_end(head, 40);
    display_list(head);
    return 0;
}
Node * insert_end(Node *head, int data)
{
    Node *ptr=create(data);
    Node *temp=head;
    if(head==NULL)
    {
        head=ptr;
        return head;
    }
    while(temp->next!=NULL)
    {
        temp=temp->next;
    }
    temp->next=ptr;
    return head;
}
void display_list(Node *head) //Displaying Linked List
{
    if(!head)
    {
        cout << "List is Empty!!!" << endl;
        return;
    }
    Node *temp = head;
    cout << "Elements in the list when they are inserted from ending are:- " << endl;
    while(temp != NULL)
    {
        cout << temp -> data<< " ";
        temp = temp -> next;
    }
}
```



Question 3

Write a program to perform deletion of elements from ending in a linked list.

Program :

```
#include<iostream>

using namespace std;


struct Node

{

    int data;

    Node *next;
```

```
};

Node * create(int);
Node * insert_end(Node *, int);
Node * Delete_from_end(Node *,int);

void display_list(Node *head);
void display_list_after_delete_from_end(Node *head);

Node *create(int item)   //Creation of Node
{
    Node * nptr = new Node;
    nptr -> data = item;
    nptr -> next = NULL;

    return nptr;
}

int main()
{
    Node * head = NULL;
```

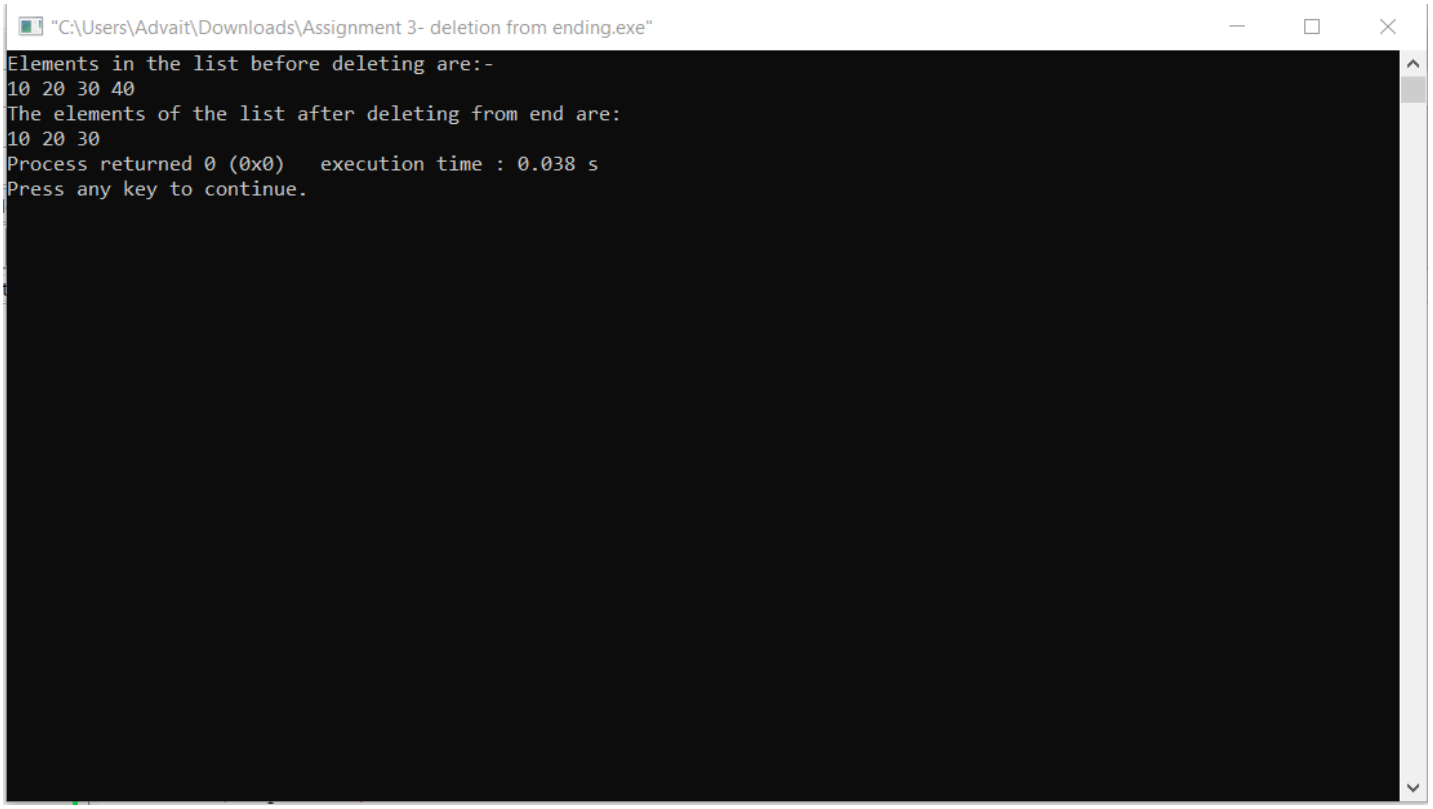
```
    head = insert_end(head, 10);
    head = insert_end(head, 20);
    head = insert_end(head, 30);
    head = insert_end(head, 40);

    display_list(head);

    display_list_after_delete_from_end(head);

    return 0;
}

Node * insert_end(Node *head, int data)
{
    Node *ptr=create(data);
    Node *temp=head;
    if(head==NULL)
    {
        head=ptr;
        return head;
    }
```

```
    while(temp->next!=NULL)
    {
        temp=temp->next;
    }
    temp->next=ptr;
    return head;
}



void display_list(Node *head) //Displaying Linked List
{
    if(!head)
    {
        cout << "List is Empty!!!" << endl;
        return;
    }
    Node *temp = head;
    cout << "Elements in the list before deleting are:- " << endl;
    while(temp != NULL)
    {
```

```
        cout << temp -> data<< " ";
        temp = temp -> next;
    }
}
Node *Delete_from_end(Node *head)
{
    Node *temp=head;
    if(head==NULL)
    {
        cout<<"The list is already empty.";
        return head;
    }
    if(head->next==NULL)
    {
        delete head;
        return NULL;
    }
    while(temp->next->next!=NULL)
    {
        temp=temp->next;
    }
```

```
    temp->next=NULL;
    return head;
}
void display_list_after_delete_from_end(Node *head)
{
    Node *temp=head;
    int count=0;
    if(temp==NULL)
    {
        cout<<"The list is empty.";
    }
    cout<<"\nThe elements of the list after deleting from end are:"<<endl;
    while(temp->next)
    {
        cout<<temp->data<< " ";
        temp=temp->next;
    }
}
```

Output:



Question 4

Write a program to perform deletion of elements from beginning in a linked list.

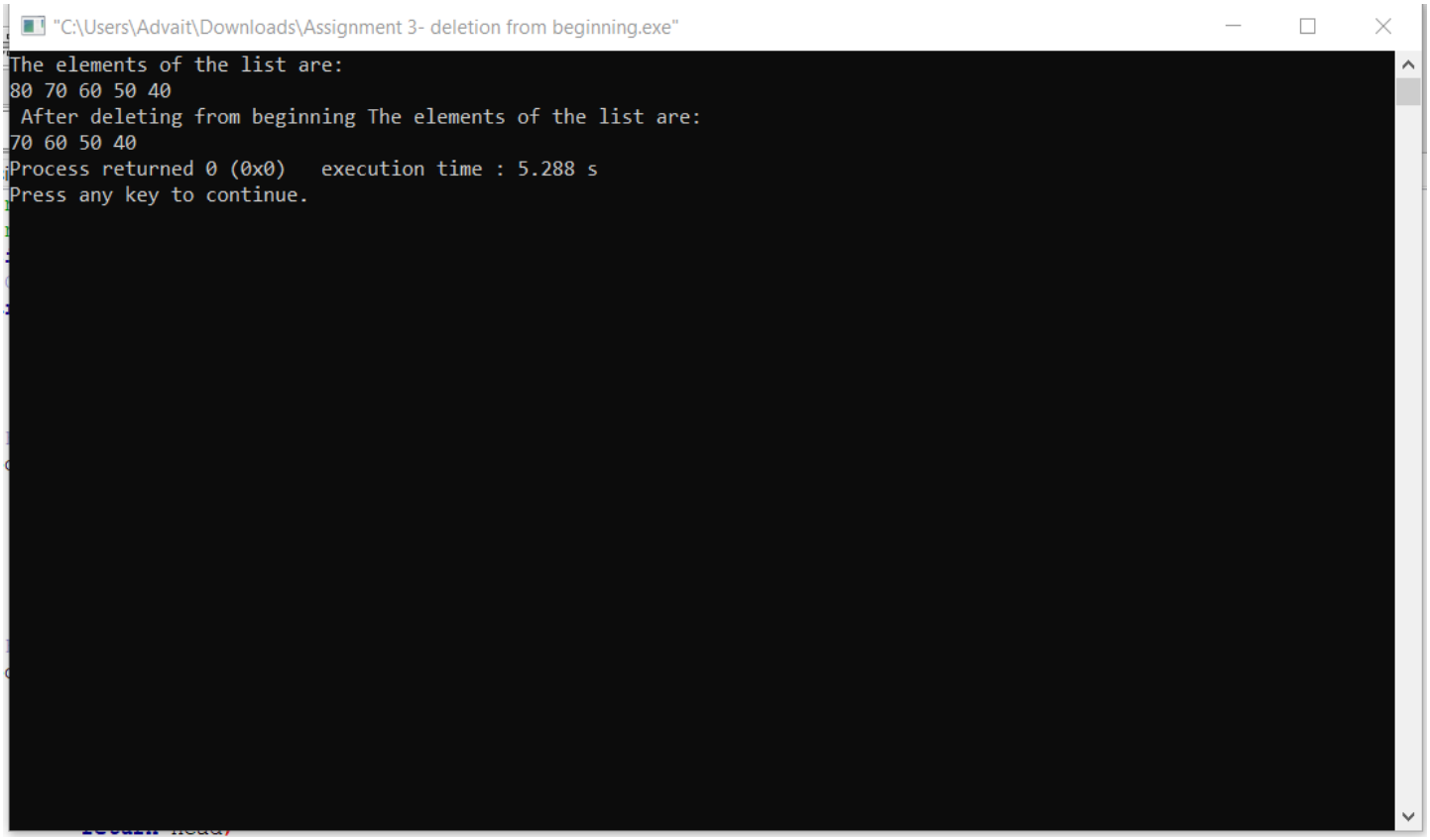
Program :

```
#include <iostream>
#include<stdlib.h>
using namespace std;

struct Node
{
    int Data;
    Node *next;
};
.
Node *create(int Data)
{
```

```
    Node *nptr=new(Node);
    nptr->Data=Data;
    nptr->next=NULL;
    return nptr;
}

Node *insert_beg(Node *head, int x)
{
    Node *pt=create(x);
    if(head==NULL)
    {
        head=pt;
        return head;
    }
    pt->next=head;
    head= pt;
    return head;
}
Node *Delete_from_beginning(Node *head)
{
    Node *newhead=NULL;
    if(head==NULL)
    {
        cout<<"Nothing to Delete. The list is already empty.";
        return head;
    }
    else
    {
        newhead=head->next;
        delete(head);
    }
    return newhead;
}

void display(Node *head)
{
```

```
    Node *temp=head;
    int count=0;
    if(temp==NULL)
    {
        cout<<"The list is empty.";
    }
    cout<<"The elements of the list are:"<<endl;
    while(temp!=NULL)
    {
        cout<<temp->Data<< " ";
        temp=temp->next;

    }
}
int main()
{
    Node *head, *temp;
    head= NULL;
    head=insert_beg(head,40);
    head=insert_beg(head,50);
    head=insert_beg(head,60);
    head=insert_beg(head,70);;
    head=insert_beg(head,80);
    display(head);
    cout<<"\n After deleting from beginning ";
    head=Delete_from_beginning(head);
    display(head);

    return 0;
}
```

Output:


"C:\Users\Advait\Downloads\Assignment 3- deletion from beginning.exe"
The elements of the list are:
80 70 60 50 40
After deleting from beginning The elements of the list are:
70 60 50 40
Process returned 0 (0x0)   execution time : 5.288 s
Press any key to continue.