DATA STRUCTURES ASSIGNMENT-REPORT

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PROBLEM STATEMENT: To count the triplets in a sorted doubly linked list whose sum is equal to the given value x.

PROGRAM:

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


typedef struct node
  {
 int data;
 struct node * prev,*next;
 }node;


node * head =NULL,*tail = NULL,*temp = NULL,*ptr=NULL,*after = NULL;


void create(int data)
   {
temp = (node *)malloc(sizeof(node));
temp->prev = NULL;
temp->next = NULL;
temp->data = data;
    }

void insert(int data)
    {
if(head==NULL)//when there is new node
    {
create(data);
head = temp;
tail = head;

    }

else if(tail->data<data)


    {
create(data);
tail->next = temp;
 temp->prev = tail;
 tail = temp;
```

```
    }
  else if(head->data>data)//smallest element among all must me head
    {
  create(data);
  temp->next = head;
  head->prev = temp;
  head = temp;
    }


  else
    {
  ptr = head;
  while(ptr->data<data)//In between the nodes
  ptr = ptr->next;
  create(data);
  after = ptr->prev;
  after->next = temp;
  temp->prev = after;
  temp->next = ptr;
  ptr->prev = temp;
    }
    }
void display(int x)
   {
 printf("The elements of the list:");
 for(ptr=head;ptr!=NULL;ptr=ptr->next)

   {
      printf("%d, ",ptr->data);
   }

  printf("\nTriplets of the key:\n");
  node *ptr1=NULL,*ptr2=NULL,*ptr3=NULL;
  int count=0;
  for(ptr1=head;ptr1!=NULL;ptr1=ptr1->next)

{
  for(ptr2=ptr1->next;ptr2!=NULL;ptr2=ptr2->next)

{
  for(ptr3=ptr2->next;ptr3!=NULL;ptr3=ptr3->next)

{
  if((ptr1->data + ptr2->data + ptr3->data)==x)

{
  printf("(%d,%d,%d) \n",ptr1->data,ptr2->data,ptr3->data);
  count++;
 }
   }
```

```
   }
   }

printf("\n");


if(count==0)

  {
   printf("NO TRIPLETS FOR THE KEY\n");
  }
  else

  {
    printf("%d TRIPLETS EXIST\n", count);
  }
  }

void main()
  {
  int ch, data;

  printf("1.Insert no into the list:\n");
  printf("2. To display the triplets:\n");
  printf("3.Exit\n");
  for(;;){
  printf("Enter choice\n");
  scanf("%d",&ch);
  switch(ch)
  {
      case 1:
       printf("Enter data\n");
       scanf("%d",&data);
       insert(data);
       break;
      case 2:
      printf("Enter the key:");
       scanf("%d",&data);
       display(data);
       break;
      case 3:
 exit(0);
      default:
        printf("Wrong choice\n");
}}
}
```

EXPLANATION:

To find the triplets in an ordered doubly linked ls whose sum is equal to a given value, we must use three pointer variables called ptr1, ptr2 and ptr3. The ordered doubly linked list sorts the numbers in ascending order. The three pointers are used to traverse through the list. If the summation of the data parts of the three pointers is equal to the value of the key entered, the triplets are found and displayed. Otherwise, the triplets do not exist for the given key value and hence is not displayed.

SAMPLE INPUT AND OUTPUTS :

1.Insert no into the list:

2. To display the triplets:

3.Exit

Enter choice

1

Enter data

10

Enter choice

1

Enter data

50

Enter choice

1

Enter data

30

Enter choice

1

Enter data

20

Enter choice

1

Enter data

40

Enter choice

1

Enter data

70

Enter choice

2

Enter the key:100

The elements of the list:10, 20, 30, 40, 50, 70

Triplets of the key:

(10,20,70)

(10,40,50)

(20,30,50)

3 TRIPLETS EXISTS