## Aim:

Write a C program that uses functions to perform the following operations on double linked list i) Creation ii) Insertion iii) Deletion iv) Traversal

## **Source Code:**

## AllOperationsDLL.c

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
struct dnode
   struct dnode *prev;
   int data;
   struct dnode *next;
};
struct dnode *start = NULL;
void insert(int);
void remov(int);
void display();
int main()
   int n, ch;
   do
   {
      printf("Operations on doubly linked list");
      printf("\n1. Insert \n2.Remove\n3. Display\n0. Exit");
      printf("\nEnter Choice 0-4? : ");
      scanf("%d", &ch);
      switch (ch)
      {
         case 1:
         printf("Enter number: ");
         scanf("%d", &n);
         insert(n);
         break;
         case 2:
         printf("Enter number to delete: ");
         scanf("%d", &n);
         remov(n);
         break;
         case 3:
         display();
         break;
   }while (ch != 0);
}
```

```
void insert(int num)
   struct dnode *nptr, *temp = start;
   nptr = malloc(sizeof(struct dnode));
   nptr->data = num;
   nptr->next = NULL;
   nptr->prev = NULL;
   if (start == NULL)
   {
      start = nptr;
   }
   else
   {
            while (temp->next != NULL)
               temp = temp->next;
                     nptr->prev = temp;
                        temp->next = nptr;
   }
}
void remov(int num)
   struct dnode *temp = start;
   while (temp != NULL)
      if (temp->data == num)
         if (temp == start)
            start = start->next;
            start->prev = NULL;
         }
         else
         {
            if (temp->next == NULL)
            temp->prev->next = NULL;
            else
               temp->prev->next = temp->next;
               temp->next->prev = temp->prev;
            }
            free(temp);
         }
         return ;
      }
      temp = temp->next;
```

```
printf("%d not found.\n", num);
}
void display()
   struct dnode *temp = start;
   while (temp != NULL)
      printf("%d\t", temp->data);
      temp = temp->next;
   printf("\n");
}
```

## Execution Results - All test cases have succeeded!

Test Case - 1

```
User Output
Operations on doubly linked list 1
1.Insert 1
2.Remove 1
3.Display 1
0.Exit 1
Enter Choice 0-4?: 1
Enter number: 15
Operations on doubly linked list 1
1.Insert 1
2.Remove 1
3.Display 1
0.Exit 1
Enter Choice 0-4?: 1
Enter number: 16
Operations on doubly linked list 1
1.Insert 1
2.Remove 1
3.Display 1
0.Exit 1
Enter Choice 0-4?: 1
Enter number: 17
Operations on doubly linked list 1
1.Insert 1
2.Remove 1
3.Display 1
0.Exit 1
Enter Choice 0-4?: 1
Enter number: 18
Operations on doubly linked list 3
1.Insert 3
2.Remove 3
3.Display 3
```

Enter Choice 0-4?: 3 15	
15	0.Exit 3
Operations on doubly linked list 2  1.Insert 2  2.Remove 2  3.Display 2  0.Exit 2  Enter Choice 0-4?: 2  Enter number to delete: 19  19 not found 3  Operations on doubly linked list 3  1.Insert 3  2.Remove 3  3.Display 3  0.Exit 3  Enter Choice 0-4?: 3  15 16 17 18 2  Operations on doubly linked list 2  1.Insert 2  2.Remove 2  3.Display 2  0.Exit 2  Enter Choice 0-4?: 2  Enter Choice 0-4?: 2  Enter Choice 0-4?: 2  Insert 2  2.Remove 2  3.Display 2  0.Exit 2  Enter Choice 0-4?: 2  Enter Operations on doubly linked list 0  1.Insert 0  2.Remove 0  3.Display 0  0.Exit 0	Enter Choice 0-4?: 3
1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 19 19 not found 3 Operations on doubly linked list 3 1.Insert 3 2.Remove 3 3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15 16 17 18 2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	15 16 17 18 2
2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 19 19 not found 3 Operations on doubly linked list 3 1.Insert 3 2.Remove 3 3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15 16 17 18 2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	Operations on doubly linked list 2
3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 19 19 not found 3 Operations on doubly linked list 3 1.Insert 3 2.Remove 3 3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15 16 17 18 2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	1.Insert 2
0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 19 19 not found 3 Operations on doubly linked list 3 1.Insert 3 2.Remove 3 3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15 16 17 18 2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	2.Remove 2
Enter Choice 0-4?: 2 Enter number to delete: 19  19 not found 3  Operations on doubly linked list 3  1.Insert 3  2.Remove 3  3.Display 3  0.Exit 3  Enter Choice 0-4?: 3  15	3.Display 2
Enter number to delete: 19  19 not found 3  Operations on doubly linked list 3  1.Insert 3  2.Remove 3  3.Display 3  0.Exit 3  Enter Choice 0-4?: 3  15 16 17 18 2  Operations on doubly linked list 2  1.Insert 2  2.Remove 2  3.Display 2  0.Exit 2  Enter Choice 0-4?: 2  Enter Choice 0-4?: 2  Enter number to delete: 16  Operations on doubly linked list 0  1.Insert 0  2.Remove 0  3.Display 0  0.Exit 0	0.Exit 2
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2.Remove 3 3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15	Operations on doubly linked list 3
3.Display 3 0.Exit 3 Enter Choice 0-4?: 3 15   16   17   18   2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	1.Insert 3
<pre>0.Exit 3 Enter Choice 0-4?: 3 15     16     17     18</pre>	2.Remove 3
Enter Choice 0-4?: 3 15    16    17    18    2 Operations on doubly linked list 2 1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	3.Display 3
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Operations on doubly linked list 2  1.Insert 2  2.Remove 2  3.Display 2  0.Exit 2  Enter Choice 0-4?: 2  Enter number to delete: 16  Operations on doubly linked list 0  1.Insert 0  2.Remove 0  3.Display 0  0.Exit 0	Enter Choice 0-4?: 3
1.Insert 2 2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	15 16 17 18 2
2.Remove 2 3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	Operations on doubly linked list 2
3.Display 2 0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	1.Insert 2
0.Exit 2 Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	2.Remove 2
Enter Choice 0-4?: 2 Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	3.Display 2
Enter number to delete: 16 Operations on doubly linked list 0 1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	0.Exit 2
Operations on doubly linked list 0  1.Insert 0  2.Remove 0  3.Display 0  0.Exit 0	Enter Choice 0-4?: 2
1.Insert 0 2.Remove 0 3.Display 0 0.Exit 0	Enter number to delete: 16
2.Remove 0 3.Display 0 0.Exit 0	Operations on doubly linked list 0
3.Display 0 0.Exit 0	1.Insert 0
0.Exit 0	2.Remove 0
	3.Display 0
Enter Choice 0-4?: 0	0.Exit 0
	Enter Choice 0-4?: 0