S.No: 17	Exp. Name: *Write a C program to implement different Operations on Queue using Linked Lists*	Date:2023-06-15

Aim:

Write a program to implement queue using **linked lists**.

```
Sample Input and Output:
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 1
        Enter element : 57
        Successfully inserted.
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 1
        Enter element : 87
        Successfully inserted.
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 5
        Queue size : 2
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 3
        Elements in the queue : 57 87
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 2
        Deleted value = 57
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 2
        Deleted value = 87
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 3
        Queue is empty.
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 5
        Queue size : 0
        1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit
        Enter your option : 6
```

Source Code:

QueueUsingLL.c

```c
#include <conio.h>
#include <stdio.h>
#include "QueueOperationsLL.c"
int main() {
    int op, x;
    while(1) {
        printf("1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit\n");
        printf("Enter your option : ");
        scanf("%d",&op);
        switch(op) {
            case 1:
                printf("Enter element : ");
                scanf("%d",&x);
```

```
                    enqueue(x);
                    break;
                case 2:
                    dequeue();
                    break;
                case 3:
                    display();
                    break;
                case 4:
                    isEmpty();
                    break;
                case 5:
                    size();
                    break;
                case 6: exit(0);
            }
        }
}
```

QueueOperationsLL.c

```
int count=0;
struct node{
    int info;
    struct node *next;
};
struct node *front=NULL,*rear=NULL;
struct node *new_node();
struct node *new_node()
{
    struct node *temp;
    temp=(struct node*)malloc(sizeof(struct node));
    temp->next=NULL;
    return temp;
}
void enqueue(int x)
{
    struct node *temp;
    temp=new_node();
    temp->info=x;
    if(front==NULL&&rear==NULL)
    {
        front=temp;
        rear=temp;
        count++;
    }
    else
    {
        rear->next=temp;
        rear=temp;
        count++;
    }
    printf("Successfully inserted.\n");
}
void dequeue()
```

```c
{
    struct node *ptr;
    if(front==NULL)
    {
        printf("Queue is underflow.\n");
        return;
    }
    else
    {
        if(front==rear&&front!=NULL)
        {
            ptr=front;
            printf("Deleted value = %d\n",ptr->info);
            front=rear=NULL;
            free(ptr);
            count--;
        }
        else
        {
            ptr=front;
            printf("Deleted value = %d\n",ptr->info);
            front=front->next;
            free(ptr);
            count--;
        }
    }
}
void display()
{
    struct node *ptr;
    if(front==NULL)
    {
        printf("Queue is empty.\n");
        return;
    }
    else
    {
        ptr=front;
        printf("Elements in the queue : ");
        while(ptr!=NULL)
        {
            printf("%d ",ptr->info);
            ptr=ptr->next;
        }
        printf("\n");
    }
}
void isEmpty()
{
    if(front==NULL)
    {
        printf("Queue is empty.\n");
        return;
    }
    else
    {
```

```
        printf("Queue is not empty.\n");
    }
}
void size()
{
    printf("Queue size : %d\n",count);
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 2
Enter your option : 2
Queue is underflow. 3
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 3
Enter your option : 3
Queue is empty. 4
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 4
Enter your option : 4
Queue is empty. 5
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 5
Enter your option : 5
Queue size : 0 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 44
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 55
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 66
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 67
Successfully inserted. 3
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 3
Enter your option : 3
Elements in the queue : 44 55 66 67 2
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 2
Enter your option : 2
Deleted value = 44 2
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 2
Enter your option : 2
Deleted value = 55 5
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 5

Enter your option : 5
Queue size : 2 4
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 4
Enter your option : 4
Queue is not empty. 6
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 6
Enter your option : 6

Test Case - 2
User Output
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 23
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 234
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 45
Successfully inserted. 1
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 1
Enter your option : 1
Enter element : 456
Successfully inserted. 2
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 2
Enter your option : 2
Deleted value = 23 3
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 3
Enter your option : 3
Elements in the queue : 234 45 456 2
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 2
Enter your option : 2
Deleted value = 234 3
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 3
Enter your option : 3
Elements in the queue : 45 456 4
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 4
Enter your option : 4
Queue is not empty. 5
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 5
Enter your option : 5
Queue size : 2 6
1.Enqueue 2.Dequeue 3.Display 4.Is Empty 5.Size 6.Exit 6
Enter your option : 6