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Q2A) Queue implementation using array

CODE

```
#include<iostream>
using namespace std;
int front=-1;
int rear=-1;
int size=100;

void insert(int arr[])
{
   if(rear==size-1)
   cout<<"21BCE0777 Queue is full";
   else
   {
      if(front==-1)
         front=0;
      rear++;
      cout<<"21BCE0777 Enter the element you want to enter in the queue:";
      int x;
      cin>>arr[rear];
   }
```

```
}

void deletes(int arr[])
{
   if(front==-1||front>rear)
   cout<<"21BCE0777 Queue is empty";
   else
   {
      int temp;
      temp=arr[front];
      front++;
      cout<<"21BCE0777 Deleted value is "<<temp;
   }
   cout<<endl;

}

void display(int arr[])
{
   if(front==-1||front>rear)
   cout<<"21BCE0777 Queue is empty";
   else
   {
      int *temp;
```

```
        temp=(arr);
        cout<<"21BCE0777 Displaying the queue:";
        for(int i=front;(i-1)!=rear;i++)
        {
            cout<<*(temp+i)<<" ";
        }
    }
    cout<<endl;
}

int main()
{
    int arr[size];
    do
    {
        int x;
        cout<<"21BCE0777 1. Enter the element:"<<endl;
        cout<<"21BCE0777 2. Delete a element"<<endl;
        cout<<"21BCE0777 3. Display"<<endl;
        cout<<"21BCE0777 4. Exit"<<endl;
        cout<<"21BCE0777 Enter your choice:";
        cin>>x;
        switch(x)
        {
```

```
            case 1:
            insert(arr);
            break;
            case 2:
            deletes(arr);
            break;
            case 3:
            display(arr);
            break;
            case 4:
            exit(0);
            break;
        }
        cout<<endl;
    }while(1);


}
```

OUTPUT

```
21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:1
21BCE0777 Enter the element you want to enter in the queue:2

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:1
21BCE0777 Enter the element you want to enter in the queue:3

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:1
```

```
21BCE0777 4. Exit
21BCE0777 Enter your choice:1
21BCE0777 Enter the element you want to enter in the queue:44

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:3
21BCE0777 Displaying the queue:2 3 44

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:2
21BCE0777 Deleted value is 2

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:3
21BCE0777 Displaying the queue:3 44
```

```
21BCE0777 4. Exit
21BCE0777 Enter your choice:3
21BCE0777 Displaying the queue:3 44

21BCE0777 1. Enter the element:
21BCE0777 2. Delete a element
21BCE0777 3. Display
21BCE0777 4. Exit
21BCE0777 Enter your choice:4
```

Q2B) Singly Linked List

CODE

```
#include<iostream>
using namespace std;
struct node
{
   node *next;
   int data;
}*head=NULL;

void ins_f(int x)
{
   struct node *newnode=(struct node*)malloc(sizeof(struct node*));
   if(head==NULL)
   {
      head=newnode;
      newnode->next=NULL;
   }
   else
   {
      newnode->next=head;
      head=newnode;
   }
```

```
    newnode->data=x;
}
void ins_l(int x)
{
    struct node *newnode=(struct node*)malloc(sizeof(struct node*));



    if(head==NULL)
    {
        ins_f(x);
    }
    else
    {
        struct node *temp;
        temp=head;
        while(temp->next!=NULL)
        {
            temp=temp->next;
        }
        temp->next=newnode;
        newnode->next=NULL;
        newnode->data=x;
    }
```

```
}
void ins_p(int x)
{
   node *newnode=(struct node*)malloc(sizeof(struct node*));
   node *temp;
   int p;
   cout<<"21BCE0777 Enter the position you want to enter:";
   cin>>p;
   if(p==1)
   ins_f(x);
   else if(head==NULL)
   cout<<"21BCE0777 The linked list is empty";
   else
   {
      temp=head;
      for(int i=0;i<p-2;i++)
      {
         temp=temp->next;
      }
      newnode->next=temp->next;
      temp->next=newnode;
      newnode->data=x;
   }
```

```
}
void del_f()
{
   if(head==NULL)
   {
      cout<<"21BCE0777 The linked list is empty";
   }
   else
   {
      node *temp;
      temp=head;
      head=temp->next;
      cout<<"21BCE0777 The first element is being deleted:"<<temp->data;
      free(temp);
   }
}
void del_l()
{
   if(head==NULL)
   {
      cout<<"21BCE0777 The linked list is empty";
   }
   else
   {
```

```
        node *temp;
        temp=head;
        node *t;
        t=head;
        while(temp->next!=NULL)
        {
           t=temp;
           temp=temp->next;
        }
        t->next=NULL;
        cout<<"21BCE0777 The element deleted is:"<<temp->data;
        free(temp);
    }

}
void del_p()
{
    if(head==NULL)
    {
        cout<<"21BCE0777 The linked list is empty";
    }
    cout<<"21BCE0777 Enter the position you want to delete:";
    int x;
    cin>>x;
```

```
    if(x==1)
    {
        del_f();
    }
    else
    {
        node *temp=head;
        for(int i=0;i<x-2;i++)
        {
            temp=temp->next;
        }
        node *t=temp->next;
        temp->next=t->next;
        cout<<"21BCE0777 Deleted value is:"<<t->data;
        free(t);
    }

}
void display()
{
    if(head==NULL)
    {
        cout<<"21BCE0777 The linked list is empty";
    }
```

```
    else
    {
        node *temp;
        temp=head;
        cout<<"21BCE0777 Your Linked List is:";
        while(temp!=NULL)
        {
            cout<<temp->data<<" ";
            temp=temp->next;
        }
    }

}
void search(int x)
{
    int fl=0;
    if(head==NULL)
    {
        cout<<"21BCE0777 The linked list is empty";
    }
    else
    {
        node *temp=head;
        while(temp!=NULL)
```

```
        {
            if(temp->data==x)
            {
                fl++;
            }
            temp=temp->next;
        }
        if(fl)
        {
            cout<<"21BCE0777 Element was found "<<fl<<" times in the Linked list";
        }
        else
        {
            cout<<"21BCE0777 Element was not present";
        }

    }
}
int main()
{
    do
    {
        int y;
        cout<<"\n1. Insert first"<<endl;
```

```
cout<<"2. Insert last"<<endl;
cout<<"3. Insert at Position"<<endl;
cout<<"4. Delete at first"<<endl;
cout<<"5. Delete at last"<<endl;
cout<<"6. Delete at position"<<endl;
cout<<"7. Display"<<endl;
cout<<"8. Search an element"<<endl;
cout<<"9. Exit"<<endl;
cout<<"Enter your choice:";
int x;
cin>>x;
switch(x)
{
   case 1:
   cout<<"21BCE0777 Enter the element you want to enter:";
   cin>>y;
   ins_f(y);
   break;
   case 2:
   cout<<"21BCE0777 Enter the element you want to enter:";
   cin>>y;
   ins_l(y);
   break;
   case 3:
```

```
cout<<"21BCE0777 Enter the element you want to enter:";
cin>>y;
ins_p(y);
break;
case 4:
del_f();
break;
case 5:
del_l();
break;
case 6:
del_p();
break;
case 7:
display();
break;
case 8:
cout<<"21BCE0777 Enter the element you want to search:";
cin>>y;
search(y);
break;
case 9:
exit(0);
break;
```

```
    }
  } while (1);

}
```

OUTPUT

```
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:1
21BCE0777 Enter the element you want to enter:10

1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
```

```
7. Display
8. Search an element
9. Exit
Enter your choice:2
21BCE0777 Enter the element you want to enter:30

1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:3
21BCE0777 Enter the element you want to enter:20
21BCE0777 Enter the position you want to enter:2

1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
```

```
7. Display
8. Search an element
9. Exit
Enter your choice:7
21BCE0777 Your Linked List is:10 20 30
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:4
21BCE0777 The first element is being deleted:10
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:7
21BCE0777 Your Linked List is:20 30
```

```
8. Search an element
9. Exit
Enter your choice:7
21BCE0777 Your Linked List is:20 30
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:5
21BCE0777 The element deleted is:30
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:7
21BCE0777 Your Linked List is:20
1. Insert first
```

```
9. Exit
Enter your choice:7
21BCE0777 The linked list is empty
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:8
21BCE0777 Enter the element you want to search:10
21BCE0777 The linked list is empty
1. Insert first
2. Insert last
3. Insert at Position
4. Delete at first
5. Delete at last
6. Delete at position
7. Display
8. Search an element
9. Exit
Enter your choice:9
```