Write a C program to simulate disk scheduling algorithms:

(a) FCFS

(b) SCAN

(c) c-SCAN

Code:

(a) <u>FCFS:</u>

```
#include<stdio.h>

#include<stdlib.h>

int main()

{

        int RQ[100],i,n,TotalHeadMoment=0,initial;

   printf("Enter the number of Requests\n");

   scanf("%d",&n);

   printf("Enter the Requests sequence\n");

   for(i=0;i<n;i++)

    scanf("%d",&RQ[i]);

   printf("Enter initial head position\n");

   scanf("%d",&initial);


        // logic for FCFS disk scheduling
```

```
    for(i=0;i<n;i++)
          {
        TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
        initial=RQ[i];
          }

    printf("Total head moment is %d",TotalHeadMoment);
    return 0;

}
```

(b) SCAN:

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
        int RQ[100],i,j,n,TotalHeadMoment=0,initial,size,move;
    printf("Enter the number of Requests\n");
    scanf("%d",&n);
    printf("Enter the Requests sequence\n");
    for(i=0;i<n;i++)
     scanf("%d",&RQ[i]);
```

```
printf("Enter initial head position\n");
scanf("%d",&initial);
printf("Enter total disk size\n");
scanf("%d",&size);
printf("Enter the head movement direction for high 1 and for low 0\n");
scanf("%d",&move);

     // logic for Scan disk scheduling

   /*logic for sort the request array */
for(i=0;i<n;i++)
     {
   for(j=0;j<n-i-1;j++)
   {
      if(RQ[j]>RQ[j+1])
      {
            int temp;
            temp=RQ[j];
            RQ[j]=RQ[j+1];
            RQ[j+1]=temp;
      }
```

```
    }
      }

      int index;
for(i=0;i<n;i++)
      {
    if(initial<RQ[i])
    {
       index=i;
       break;
    }
      }

      // if movement is towards high value
if(move==1)
      {
    for(i=index;i<n;i++)
    {
       TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
       initial=RQ[i];
```

```
    }
    //  last movement for max size
    TotalHeadMoment=TotalHeadMoment+abs(size-RQ[i-1]-1);
    initial = size-1;
    for(i=index-1;i>=0;i--)
    {
        TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
        initial=RQ[i];


    }
      }
     // if movement is towards low value
else
      {
    for(i=index-1;i>=0;i--)
    {
       TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
       initial=RQ[i];
    }
    //  last movement for min size
    TotalHeadMoment=TotalHeadMoment+abs(RQ[i+1]-0);
```

```
        initial =0;
        for(i=index;i<n;i++)
        {
            TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
            initial=RQ[i];
        }
          }

    printf("Total head movement is %d",TotalHeadMoment);
    return 0;
}
```

(c) <u>c-SCAN:</u>

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
        int RQ[100],i,j,n,TotalHeadMoment=0,initial,size,move;
    printf("Enter the number of Requests\n");
    scanf("%d",&n);
    printf("Enter the Requests sequence\n");
    for(i=0;i<n;i++)
```

```
 scanf("%d",&RQ[i]);
printf("Enter initial head position\n");
scanf("%d",&initial);
printf("Enter total disk size\n");
scanf("%d",&size);
printf("Enter the head movement direction for high 1 and for low 0\n");
scanf("%d",&move);

      // logic for C-Scan disk scheduling

    /*logic for sort the request array */
for(i=0;i<n;i++)
      {
    for( j=0;j<n-i-1;j++)
    {
       if(RQ[j]>RQ[j+1])
       {
              int temp;
              temp=RQ[j];
              RQ[j]=RQ[j+1];
```

```
                RQ[j+1]=temp;
            }

        }
        }

        int index;
    for(i=0;i<n;i++)
        {
        if(initial<RQ[i])
        {
            index=i;
            break;
        }
        }

        // if movement is towards high value
    if(move==1)
        {
        for(i=index;i<n;i++)
```

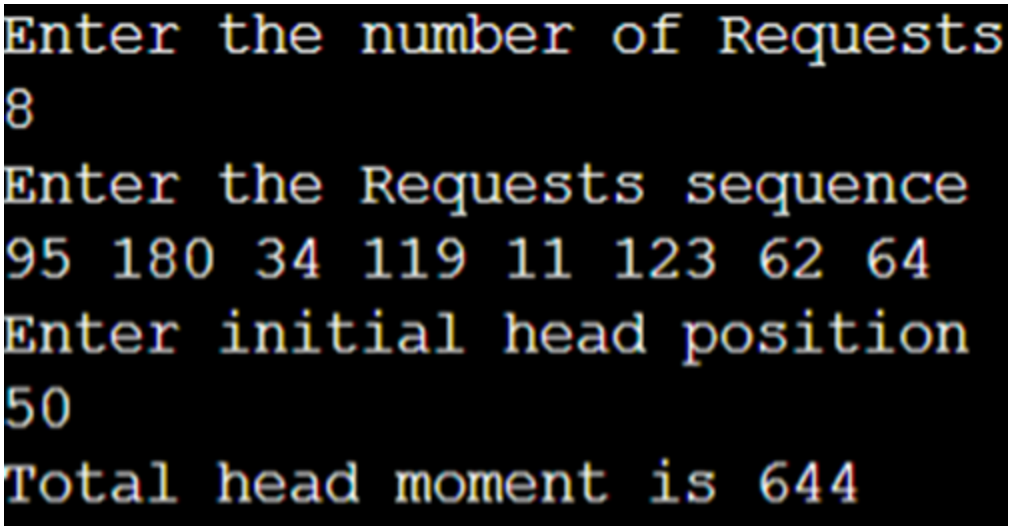
```
    {
       TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
       initial=RQ[i];
    }
    //  last movement for max size
    TotalHeadMoment=TotalHeadMoment+abs(size-RQ[i-1]-1);
    /*movement max to min disk */
    TotalHeadMoment=TotalHeadMoment+abs(size-1-0);
    initial=0;
    for( i=0;i<index;i++)
    {
        TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
        initial=RQ[i];

    }
      }
     // if movement is towards low value
else
     {
    for(i=index-1;i>=0;i--)
    {
```

```
        TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
        initial=RQ[i];
    }
    //  last movement for min size
    TotalHeadMoment=TotalHeadMoment+abs(RQ[i+1]-0);
    /*movement min to max disk */
    TotalHeadMoment=TotalHeadMoment+abs(size-1-0);
    initial =size-1;
    for(i=n-1;i>=index;i--)
    {
        TotalHeadMoment=TotalHeadMoment+abs(RQ[i]-initial);
        initial=RQ[i];
    }
     }

  printf("Total head movement is %d",TotalHeadMoment);
  return 0;
}
```

OUTPUT




```
Enter the number of Requests
6
Enter the Requests sequence
90 120 30 60 50 80
Enter initial head position
70
Enter total disk size
200
Enter the head movement direction for high 1 and for low 0
0
Total head movement is 190
```

```
Enter the number of Requests
3
Enter the Requests sequence
2 1 0
Enter initial head position
1
Enter total disk size
3
Enter the head movement direction for high 1 and for low 0
1
Total head movement is 4
```

Write a C program to simulate page replacement algorithms:

(a) FIFO

(b) LRU

(c) Optimal

Code:

```
#include<stdio.h>

int n, nf, i, j, k;

int in[100];

int p[50];

int hit=0;

int pgfaultcnt=0;


void getData()

{

   printf("\nEnter length of page reference sequence:");

   scanf("%d",&n);

   printf("\nEnter the page reference sequence:");

   for(i=0; i<n; i++)

      scanf("%d",&in[i]);

   printf("\nEnter no of frames:");

   scanf("%d",&nf);
```

```
}

void initialize()
{
        pgfaultcnt=0;
   for(i=0; i<nf; i++)
       p[i]=9999;
}

int isHit(int data)
{
   hit=0;
   for(j=0; j<nf; j++)
        {
       if(p[j]==data)
       {
          hit=1;
          break;
       }
        }
   return hit;
```

```
}

int getHitIndex(int data)
{
        int hitind;
   for(k=0; k<nf; k++)
        {
       if(p[k]==data)
       {
          hitind=k;
          break;
       }
        }
   return hitind;
}

void dispPages()
{
        for (k=0; k<nf; k++)
        {
       if(p[k]!=9999)
```

```
            printf(" %d",p[k]);
          }
}

void dispPgFaultCnt()
{
   printf("\nTotal no of page faults:%d",pgfaultcnt);
}

void fifo()
{
   initialize();
   for(i=0; i<n; i++)
         {
       printf("\nFor %d :",in[i]);

       if(isHit(in[i])==0)
       {

          for(k=0; k<nf-1; k++)
                p[k]=p[k+1];
```

```
            p[k]=in[i];
            pgfaultcnt++;
            dispPages();
        }
        else
            printf("No page fault");
          }
    dispPgFaultCnt();
}


void optimal()
{
    initialize();
          int near[50];
    for(i=0; i<n; i++)
          {

        printf("\nFor %d :",in[i]);
```

```
if(isHit(in[i])==0)
{

   for(j=0; j<nf; j++)
   {
         int pg=p[j];
         int found=0;
         for(k=i; k<n; k++)
         {
         if(pg==in[k])
         {
         near[j]=k;
         found=1;
         break;
         }
         else
         found=0;
         }
         if(!found)
         near[j]=9999;
   }
```

```
            int max=-9999;
            int repindex;
            for(j=0; j<nf; j++)
            {
                  if(near[j]>max)
                  {
                  max=near[j];
                  repindex=j;
                  }
            }
            p[repindex]=in[i];
            pgfaultcnt++;

            dispPages();
        }
        else
            printf("No page fault");
          }
    dispPgFaultCnt();
}
```

```
void lru()
{
   initialize();

        int least[50];
   for(i=0; i<n; i++)
        {

      printf("\nFor %d :",in[i]);

      if(isHit(in[i])==0)
      {

         for(j=0; j<nf; j++)
         {
               int pg=p[j];
               int found=0;
               for(k=i-1; k>=0; k--)
               {
               if(pg==in[k])
               {
```

```
        least[j]=k;
        found=1;
        break;
        }
        else
        found=0;
        }
        if(!found)
        least[j]=-9999;
}
int min=9999;
int repindex;
for(j=0; j<nf; j++)
{
        if(least[j]<min)
        {
        min=least[j];
        repindex=j;
        }
}
p[repindex]=in[i];
```

```
            pgfaultcnt++;


            dispPages();
        }
        else
            printf("No page fault!");
          }
    dispPgFaultCnt();
}


int main()
{
          int choice;
    while(1)
          {
                                    printf("\nPage Replacement Algorithms\n1.Enter data\n2.FIFO\n3.Optimal\n4.LRU\n5.Exit\nEnter your choice:");
        scanf("%d",&choice);
        switch(choice)
        {
        case 1: getData();
                    break;
```

```
        case 2: fifo();
                break;
        case 3: optimal();
                break;
        case 4: lru();
                break;
        default: return 0;
                break;
        }
          }
}
```

write C program to simulate Disk scheduling

```
#include <stdio.h>
int n, nf
int in[100];
int p[50];
int hit = 0;
int i, j, k
int pgfaultcnt=0;
void getdata()
{
printf("\Enter length of page reference sequence:");
Scanf("%d", &n)
printf("\n Enter the page reference sequence!");
for(i=0; i<n; i++)
Scanf("%d", &in[i]);
printf("\n Enter no of frames:");
Scanf("%d", &nf)
void initialize()
{
pgfaultcnt=0;
for(i=0; i<nf; i++)
p[i]=9999;
int isHit(int data)
{
hit=0
for(j=0; j<nf; j++)
{
if(p[j]==data)
{
```

```
        hit = 1
        break;
    }
}
return hit;
}
int getHitIndex(int data)
{
int hitInd;
for (k=0; k<nf; k++)
  {
    if (p[k] == data)
      hitInd = k;
      break;
  }
}
return hitInd;
void dispPages()
  for (k=0; k<nf; k++)
    if (p[k] != 9999)
      printf ("%d ", p[k]);
}
void dispPgFaultCnt()
{
  printf ("\n Total no of page faults: %d", pgfaultcnt);
}
void fifo()
{
  initialize();
  for (i=0; i<n; i++)
  {
```

```
printf("\n for %d: ", in[i]);
if (is hit in[i] == 0)
{
for (k=0; k<nf-1; k++)
 p[k] = p[k+1];
 p[k] = in[i];
 pgfault cnt++;
 display ();
}
else
 printf("No page fault");
display fault cnt();
void optimal()
{
 initialise();
 int near[50];
 for(i=0; i<n; i++)
 {
  printf("\n For %d : ", in[i]);
  if (is hit in[i] == 0)
  {
   for(j=0; j<nf; j++)
   {
    int pg = p[j];
    int found = 0;
    for(k=i; k<n; k++)
    {
     if (pg == in[k])
     {
      near[j] = k
      found = 1;
```

```
        break;
      }
      else
        found = 0;
    }
    if (!found)
      near[j]++;
  }
}
void lru()
{
  int max = -9999;
  int repindex;
  for (j=0; j<nf; j++)
  {
    if (near[j] > max)
    {
      max = near[j];
      repindex = j;
    }
  }
  p[repindex] = in[i];
  pgfaultcnt++;
  dispages();
}
else
  printf("No page fault");
}
dispgfault();
void lru()
{
  initialize();
  int least[50];
  for (i=0; i<n; i++)
  {
    printf("\n For %d: ", in[i]);
    if (isHit(in[i]) == 0)
```

```
{
for (j=0; j<n; j++)
int pg = p[j];
int found = 0;
for (k=0; k<=0; k--)
{ if (pg == cm[k])
{ least[j] = k;
found = 1;
break;
}else
found = 0;
}if (!found)
least[j] = 9999;
}
int min = 9999;
int repindex;
for (j=0; j<n; j++)
{ if (least[j] < min)
{ min = least[j];
repindex = j;
}
}cm[repindex] = pg[i];
pgfaultcnt++;
displaypgs();
}else printf("No page fault!");
}displaypgfaultcnt();
}int main()
{ int choice;
while(1)
{
printf("\n Page replacement Algorithms \n1.Enter data
\n2.FIFO \n3.Optimal \n4.LRU \n5.Exit \nEnter choice");
```

```
scanf(
switch(choice) {
case 1: getdata();
        break;
case 2: fifo(); break;
case 3: optimal(); break;
case 4: lru(); break;
   default:
     return 0;
   break;
  }
 }
}
```

Output

1) FCFS

enter no of requests

3

enter the sequence

55 12 37 22

enter head position

20

Total head is 118

2) SCAN & CSAN

enter the requests sequence

35 12 37 22 40

enter head position

20

enter total size

100

enter the head direction

high 1 for low 0
Total head movement for SCAN is 93
Total head movement for CSAN is 172

10/10

28/8/23