EXCERCISE 2

# DISK SCHEDULING

Post Work

## Question

write a program which compare FCFS,SSTF,SCAN,C-SCAN,LOOK,C-LOOK disk scheduling algorithm for a given input and choose the optimal one.

## CODE

```
#include<stdio.h>   \\abhishekmano
#include<stdlib.h>
void swap(int *a,int *b){
        int temp;
        temp=*a;
        *a=*b;
        *b=temp;
}
float fcfs(int n,int init,int req[]){
float total=0;
int i;
for(i=0;i<n;++i){
                if(req[i]<=init){
                        total+=init-req[i];
                        printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                }
                else{
                        total+=req[i]-init;
                        printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],req[i]-init);
                }
                init=req[i];
        }

        printf("***Total seek time is %f ***\n",total);
        printf("***Average seek time is %f ***\n",total/n);
        return total;
}
```

```
float sstf(int n,int init,int size,int req[]){
      int min,i,maxex=0,minex=0,count=n,least,max;
      float total=0;
      for(min=0;req[min]<=init &&  min < n;++min);
         //printf("%d",req[min]);
         min--;
      max=min+1;
      while(count > 0 ){
            if(max >= n){
                  maxex=1;
                  break;
            }
            if(min < 0){
                  minex=1;
                  break;
            }
            least=init-req[min];
            if(least > (req[max]-init)){
                  total+=req[max]-init;
                  //printf("inside while max side");
                          printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[max],req[max]-init);
                  init=req[max];
                  max++;
                  count--;
            }
            else{
                  total+=init-req[min];
                  //printf("inside while minside");
                          printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[min],init-req[min]);
                          init=req[min];
                          min--;
                          count--;
            }
      }
      if(maxex==1)
            for(i=min;i>=0;--i){
                  total+=init-req[i];
                          printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                        init=req[i];
            }
            if(minex==1)
                  for(i=max;i<n;++i){
                        total+=req[i]-init;
                                printf("Move from\t%d\tto\t%d\twith seek
%d\n",init,req[i],req[i]-init);
                              init=req[i];
                        }
            printf("***Total seek time is %f ***\n",total);
            printf("***Average seek time is %f ***\n",total/n);
            return total;
      }
```

```
float scan(int n,int init,int size,int req[]){   \\abhishekmano
        int min=0,i;
        float total=0;
        for(min=0;req[min]<=init &&  min < n;++min);
        //printf("%d",req[min]);
           min--;
        for(i=min;i>=0;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
        }
       if(min == n-1)
                return total;
        if(init!=0){
                printf("Move from\t%d\tto\t0\twith seek %d\n",init,init);
                total+=init;
                init=0;
        }
     if( min+1 < n )
                for(i=(min+1);i<n;++i){
                        total+=req[i]-init;
                        printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],req[i]-init);
                        init=req[i];
                }

        printf("***Total seek time is %f*** \n",total);
        printf("***Average seek time is %f*** \n",total/n);
        return total;
}


float cscan(int n,int init,int size,int req[]){  \\abhishekmano
        int min=0,i;
        float total=0;
        for(min=0;req[min]<=init &&  min < n;++min);
        //printf("%d",req[min]);
        min--;
        for(i=min;i>=0;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
        }
     if(min == n-1)
                return total;
        if(init!=0){
                printf("Move from\t%d\tto\t0\twith seek %d\n",init,init);
                total+=init;
                init=0;
        }
        printf("Move from\t0\tto\t%d\twith seek %d\n",size-1,size-1);
        init=size-1;
```

```
        total+=size-1;
        for(i=n-1;i>min;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
        }

        printf("***Total seek time is %f*** \n",total);
        printf("***Average seek time is %f*** \n",total/n);
        return total;
}
float look(int n,int init,int size,int req[]){   \\abhishekmano
        int min=0,i;
        float total=0;
        for(min=0;req[min]<=init &&  min < n;++min);
        //printf("%d",req[min]);
        min--;
        for(i=min;i>=0;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
        }
        for(i=(min+1);i<n;++i){
                total+=req[i]-init;
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],req[i]-init);
                init=req[i];
        }

        printf("***Total seek time is %f*** \n",total);
        printf("***Average seek time is %f*** \n",total/n);
        return total;
        }
float clook(int n,int init,int size,int req[]){
        int min=0,i;
        float total=0;
        for(min=0;req[min]<=init &&  min < n;++min);
        //printf("%d",req[min]);
        min--;
        for(i=min;i>=0;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
        }
     if(min == n-1)
                return total;
     total+=req[n-1]-init;
        printf("Move from\t%d\tto\t%d\twith seek %d\n",init,req[n-
1],req[n-1]-init);
        init=req[n-1];
        for(i=n-2;i>min;--i){
                total+=init-req[i];
                printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],init-req[i]);
                init=req[i];
```

```
        }

        printf("***Total seek time is %f*** \n",total);
        printf("***Average seek time is %f*** \n",total/n);
        return total;
}

int main(){    \\abhishekmano
        int size,init,n,pos,i,j;
        float total=0;

        printf("Enter the Disk size: ");
        scanf("%d",&size);
        printf("Enter the initial head position: ");
        scanf("%d",&init);
        pos=init;
        printf("Enter the number of requests: ");
        scanf("%d",&n);

        int *req=(int *)malloc(n*sizeof(int));
        printf("Enter the request\n");
        for(i=0;i<n;++i){
                scanf("%d",&req[i]);
                if(req[i]>=size || req[i]<0){
                        printf("are you dumb\n");
                        return 0;
                        break;
                }
        }

printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~FCFS~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        float tfcfs = fcfs(n,init,req);     ////////////
        for(i=0;i<n-1;++i)
                for(int j=i;j<n;++j)
                        if(req[i]>req[j])
                                swap(&req[i],&req[j]);

printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~SSTF~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        float tsstf = sstf(n,init,size,req);             ////////////


printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~SCAN~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
     float tscan = scan(n,init,size,req);     ////////////


        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~C-
SCAN~~~~~~~~~~~~~~~~~~~~~~~~\n");
     float tcscan= cscan(n,init,size,req);            ////////////



printf("~~~~~~~~~~~~~~~~~~~~~~~~~~~LOOK~~~~~~~~~~~~~~~~~~~~~~~~~~~\n");
        float tlook = look(n,init,size,req);    ////////////


        printf("~~~~~~~~~~~~~~~~~~~~~~~~~~C-
LOOK~~~~~~~~~~~~~~~~~~~~~~~~\n");
        float tclook = clook(n,init,size,req);   ////////////
```

```
        int arr[6];
        arr[0]=(int)tfcfs;
        arr[1]=(int)tscan;
        arr[2]=(int)tcscan;
        arr[3]=(int)tlook;
        arr[4]=(int)tclook;
        arr[5]=(int)tsstf;
        for(i=0;i<5;++i)
             for(j=i+1;j<6;++j)
                  if(arr[i]>arr[j])
                       swap(&arr[i],&arr[j]);
        if(arr[0]==tfcfs)
             printf("FCFS is the optimal With total seek time %f Average
seek time %f\n",tfcfs,tfcfs/n);
        else if(arr[0]==tscan)
             printf("SCAN is the optimal With seek time %f Average seek
time %f\n",tscan,tscan/n);
        else if(arr[0]==tcscan)
                printf("C-SCAN is the optimal With seek time %f Average
seek time %f\n",tcscan,tcscan/n);
        else if(arr[0]==tlook)
                printf("LOOK is the optimal With seek time %f Average
seek time %f\n",tlook,tlook/n);
        else if(arr[0]==tclook)
                printf("C-LOOK is the optimal With seek time %f Average
seek time %f\n",tclook,tclook/n);
        else if(arr[0]==tsstf)
                printf("SSTF is the optimal With seek time %f Average
seek time %f\n",tsstf,tsstf/n);

        return 0;
        }
```

Output

```
abhishek@abhishek:~/Documents/SS lab/Disk Scheduling$ gcc diskcompare.c
abhishek@abhishek:~/Documents/SS lab/Disk Scheduling$ ./a.out
Enter the Disk size: 5000
Enter the initial head position: 2150
Enter the number of requests: 10
Enter the request
2069 1222 2296 2800 544 1618 356 1523 4963 3681
~~~~~~~~~~~~~~~~~~~~~~~~~~~FCFS~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1222    with seek 847
Move from       1222    to      2296    with seek 1074
Move from       2296    to      2800    with seek 504
Move from       2800    to      544     with seek 2256
Move from       544     to      1618    with seek 1074
Move from       1618    to      356     with seek 1262
Move from       356     to      1523    with seek 1167
Move from       1523    to      4963    with seek 3440
Move from       4963    to      3681    with seek 1282
***Total seek time is 12987.000000 ***
***Average seek time is 1298.699951 ***
~~~~~~~~~~~~~~~~~~~~~~~~~~~SSTF~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      2296    with seek 227
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4963    with seek 1282
Move from       4963    to      1618    with seek 3345
Move from       1618    to      1523    with seek 95
Move from       1523    to      1222    with seek 301
Move from       1222    to      544     with seek 678
Move from       544     to      356     with seek 188
***Total seek time is 7582.000000 ***
***Average seek time is 758.200012 ***
~~~~~~~~~~~~~~~~~~~~~~~~~~~SCAN~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1222    with seek 301
Move from       1222    to      544     with seek 678
Move from       544     to      356     with seek 188
Move from       356     to      0       with seek 356
Move from       0       to      2296    with seek 2296
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4963    with seek 1282
***Total seek time is 7113.000000***
***Average seek time is 711.299988***
```

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~C-SCAN~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1222    with seek 301
Move from       1222    to      544     with seek 678
Move from       544     to      356     with seek 188
Move from       356     to      0       with seek 356
Move from       0       to      4999    with seek 4999
Move from       4999    to      4963    with seek 36
Move from       4963    to      3681    with seek 1282
Move from       3681    to      2800    with seek 881
Move from       2800    to      2296    with seek 504
***Total seek time is 9852.000000***
***Average seek time is 985.200012***
~~~~~~~~~~~~~~~~~~~~~~~~~~~LOOK~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1222    with seek 301
Move from       1222    to      544     with seek 678
Move from       544     to      356     with seek 188
Move from       356     to      2296    with seek 1940
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4963    with seek 1282
***Total seek time is 6401.000000***
***Average seek time is 640.099976***
~~~~~~~~~~~~~~~~~~~~~~~~~~~C-LOOK~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1222    with seek 301
Move from       1222    to      544     with seek 678
Move from       544     to      356     with seek 188
Move from       356     to      4963    with seek 4607
Move from       4963    to      3681    with seek 1282
Move from       3681    to      2800    with seek 881
Move from       2800    to      2296    with seek 504
***Total seek time is 9068.000000***
***Average seek time is 906.799988***
LOOK is the optimal With seek time 6401.000000 Average seek time 640.099976
```

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Roll no 2