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>
#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[]){
        int min=0,i;
        float total=0;
        for(min=0;req[min]<init &&  min < n;min++);
        //printf("%d",req[min]);
        for(i=min;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];
        }
       if(min == 0)
```

```
                return total;
        if(init!=size-1){
                printf("Move from\t%d\tto\t%d\twith seek %d\n",init,size-
1,size-1-init);
                total+=size-1-init;
                init=size-1;
        }
      if( min-1 >=0 )
                for(i=(min-1);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];
                }

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

        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]);
        for(i=min;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];
        }
      if(min == 0)
                return total;
        for(i=0;i<min;++i){
                if(i!=0){
                        total+=req[i]-init;
                        printf("Move from\t%d\tto\t%d\twith seek %d\
n",init,req[i],req[i]-init);
                }
                else{
                        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(){
        int size,init,n,pos,i,j,dir;
        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@hephaestus:~/Documents/SS lab/Disk Scheduling$ gcc diskcompareright.c
abhishek@hephaestus:~/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 1212 2296 2800 544 1618 356 1523 4965 3681
~~~~~~~~~~~~~~~~~~~~~~~~~~~FCFS~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2069    with seek 81
Move from       2069    to      1212    with seek 857
Move from       1212    to      2296    with seek 1084
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      4965    with seek 3442
Move from       4965    to      3681    with seek 1284
***Total seek time is 13011.000000 ***
***Average seek time is 1301.099976 ***
~~~~~~~~~~~~~~~~~~~~~~~~~~~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      4965    with seek 1284
Move from       4965    to      1618    with seek 3347
Move from       1618    to      1523    with seek 95
Move from       1523    to      1212    with seek 311
Move from       1212    to      544     with seek 668
Move from       544     to      356     with seek 188
***Total seek time is 7586.000000 ***
***Average seek time is 758.599976 ***
~~~~~~~~~~~~~~~~~~~~~~~~~~~SCAN~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2296    with seek 146
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4965    with seek 1284
Move from       4965    to      4999    with seek 34
Move from       4999    to      2069    with seek 2930
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1212    with seek 311
Move from       1212    to      544     with seek 668
Move from       544     to      356     with seek 188
***Total seek time is 7492.000000***
***Average seek time is 749.200012***
```

```
~~~~~~~~~~~~~~~~~~~~~~~~~~C-SCAN~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2296    with seek 146
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4965    with seek 1284
Move from       4965    to      4999    with seek 34
Move from       4999    to      0       with seek 4999
Move from       0       to      356     with seek 356
Move from       356     to      544     with seek 188
Move from       544     to      1212    with seek 668
Move from       1212    to      1523    with seek 311
Move from       1523    to      1618    with seek 95
Move from       1618    to      2069    with seek 451
***Total seek time is 9917.000000***
***Average seek time is 991.700012***
~~~~~~~~~~~~~~~~~~~~~~~~~~~LOOK~~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2296    with seek 146
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4965    with seek 1284
Move from       4965    to      2069    with seek 2896
Move from       2069    to      1618    with seek 451
Move from       1618    to      1523    with seek 95
Move from       1523    to      1212    with seek 311
Move from       1212    to      544     with seek 668
Move from       544     to      356     with seek 188
***Total seek time is 7424.000000***
***Average seek time is 742.400024***
~~~~~~~~~~~~~~~~~~~~~~~~~~C-LOOK~~~~~~~~~~~~~~~~~~~~~~~~~~
Move from       2150    to      2296    with seek 146
Move from       2296    to      2800    with seek 504
Move from       2800    to      3681    with seek 881
Move from       3681    to      4965    with seek 1284
Move from       4965    to      356     with seek 4609
Move from       356     to      544     with seek 188
Move from       544     to      1212    with seek 668
Move from       1212    to      1523    with seek 311
Move from       1523    to      1618    with seek 95
Move from       1618    to      2069    with seek 451
***Total seek time is 9137.000000***
***Average seek time is 913.700012***
LOOK is the optimal With seek time 7424.000000 Average seek time 742.400024
```

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Roll no 2