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School of Information Technology and Engineering

Assessment - V, JUNE 2020

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NAME	PRIYAL BHARDWAJ
REG. NO.	18BIT0272
COURSE CODE	ITE2002
COURSE NAME	WEB TECHNOLOGIES
SLOT	L-37+L-38
FACULTY	Prof. SUDHA S.

Assessment- 5 Questions

File system and Disk Management

(a) Implement the following Disk scheduling algorithms: **(Medium)**

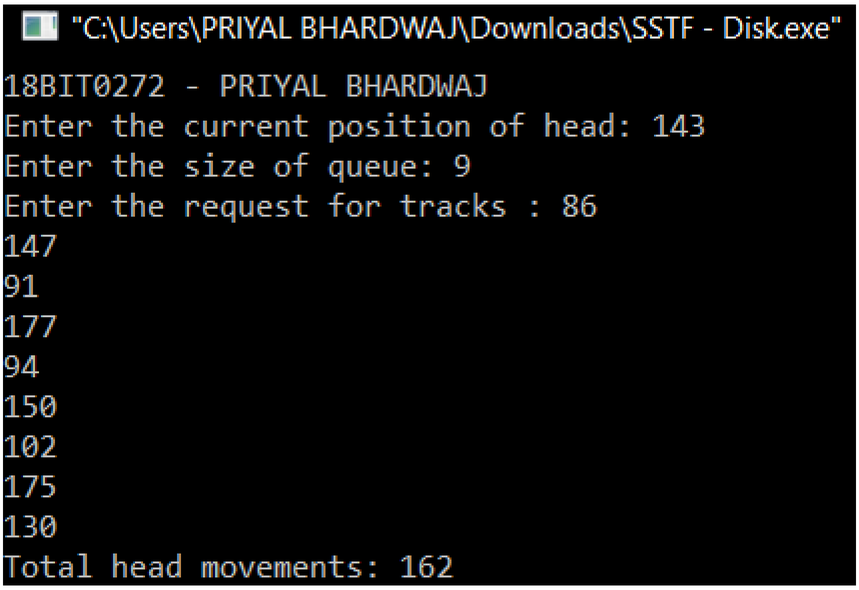
a. SSTF

CODE:

```
#include<iostream>
#include<stdlib.h>
using namespace std;
class sstf_disk
{
 int ref[100];
 int pos,size;
 int find_short(int );
public:
 void getdata();
 void total_move();
};
void sstf_disk::getdata()
{
 cout<<"Enter the current position of head: ";
 cin>>pos;
 cout<<"Enter the size of queue: ";
 cin>>size;
 cout<<"Enter the request for tracks : ";
 for(int i=0;i<size;i++)
 cin>>ref[i];
}
int sstf_disk::find_short(int num)
{
 int min=99999,ind,temp;
 for(int i=0;i<size;i++)
 {
 if(ref[i]!=-1)
 {
 temp=abs(num-ref[i]);
 if(min>temp)
 {
 min=temp;
 ind=i;
 }
 }
 }
 return ind;
}
```

```
void sstf_disk::total_move()
{
 int num=pos,move=0,ind;
 for(int i=0;i<size;i++)
 {
 ind=find_short(num);
 move+=abs(num-ref[ind]);
 num=ref[ind];
 ref[ind]=-1;
 }
 cout<<"Total head movements: "<<move;
}
int main()
{
cout<<"18BIT0272 - PRIYAL BHARDWAJ\n";
 sstf_disk sstf;
 sstf.getdata();
 sstf.total_move();
 return 0;
}
```

OUTPUT:



```
18BIT0272 - PRIYAL BHARDWAJ
Enter the current position of head: 143
Enter the size of queue: 9
Enter the request for tracks : 86
147
91
177
94
150
102
175
130
Total head movements: 162
```

b. SCAN

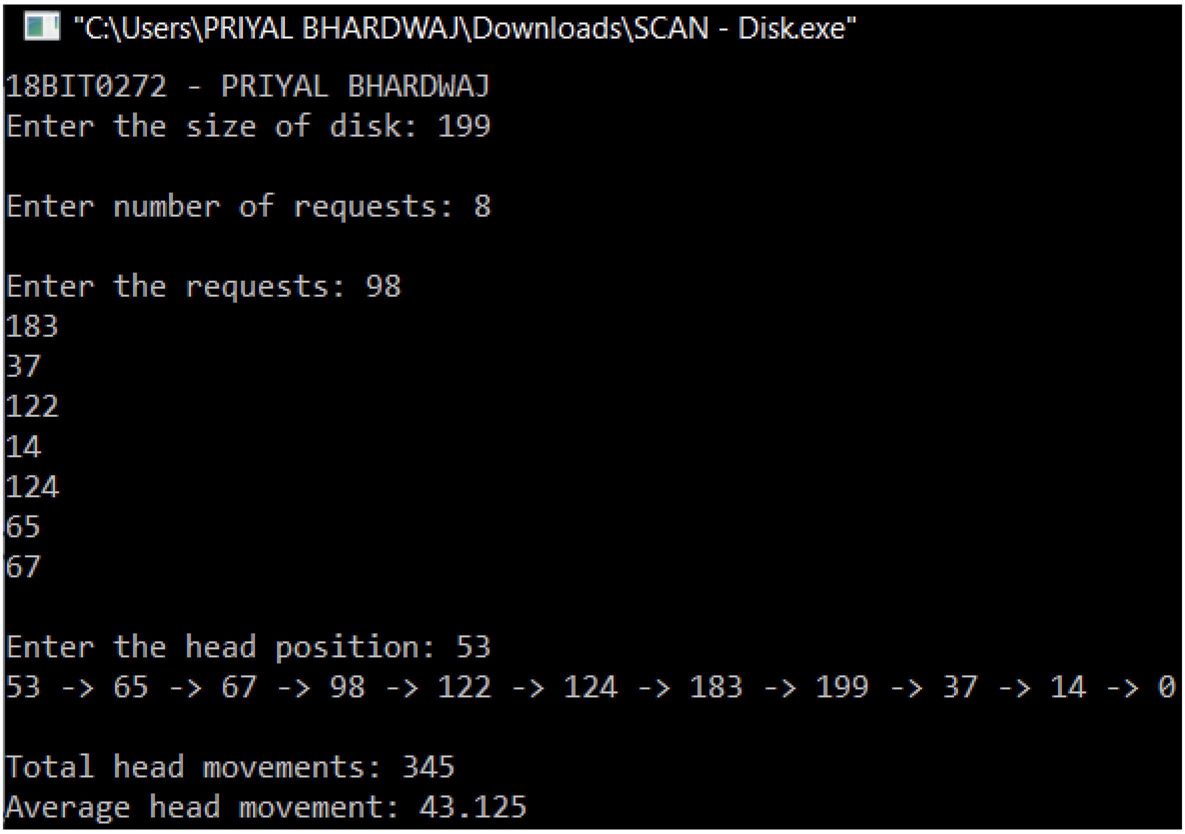
CODE:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
cout<<"18BIT0272 - PRIYAL BHARDWAJ\n";
 int i,j,k,n,m,sum=0,x,y,h;
 cout<<"Enter the size of disk: ";
 cin>>m;
```

```
cout<<"\nEnter number of requests: ";
cin>>n;
cout<<"\nEnter the requests: ";
vector <int> a(n),b;
for(i=0;i<n;i++){
cin>>a[i];
}
for(i=0;i<n;i++){
if(a[i]>m){
cout<<"\nError, Unknown position!"<<a[i];
return 0;
}
}
cout<<"\nEnter the head position: ";
cin>>h;
int temp=h;
a.push_back(h);
a.push_back(m);
a.push_back(0);
sort(a.begin(),a.end());
for(i=0;i<a.size();i++){
if(h==a[i])
break;
}
k=i;
if(k<n/2){
for(i=k;i<a.size();i++){
b.push_back(a[i]);
}
for(i=k-1;i>=0;i--){
b.push_back(a[i]);
}
}
else{
for(i=k;i>=0;i--){
b.push_back(a[i]);
}
for(i=k+1;i<a.size();i++){
b.push_back(a[i]);
}
}
temp=b[0];
cout<<temp;
for(i=1;i<b.size();i++){
cout<<" -> "<<b[i];
sum+=abs(b[i]-temp);
temp=b[i];
}
cout<<'\n';
cout<<"\nTotal head movements: "<< sum;
```

```
 cout<<"\nAverage head movement: "<<(float)sum/n;
 return 0;
}
```

OUTPUT:



"C:\Users\PRIYAL BHARDWAJ\Downloads\SCAN - Disk.exe"

```
18BIT0272 - PRIYAL BHARDWAJ
Enter the size of disk: 199

Enter number of requests: 8

Enter the requests: 98
183
37
122
14
124
65
67

Enter the head position: 53
53 -> 65 -> 67 -> 98 -> 122 -> 124 -> 183 -> 199 -> 37 -> 14 -> 0

Total head movements: 345
Average head movement: 43.125
```

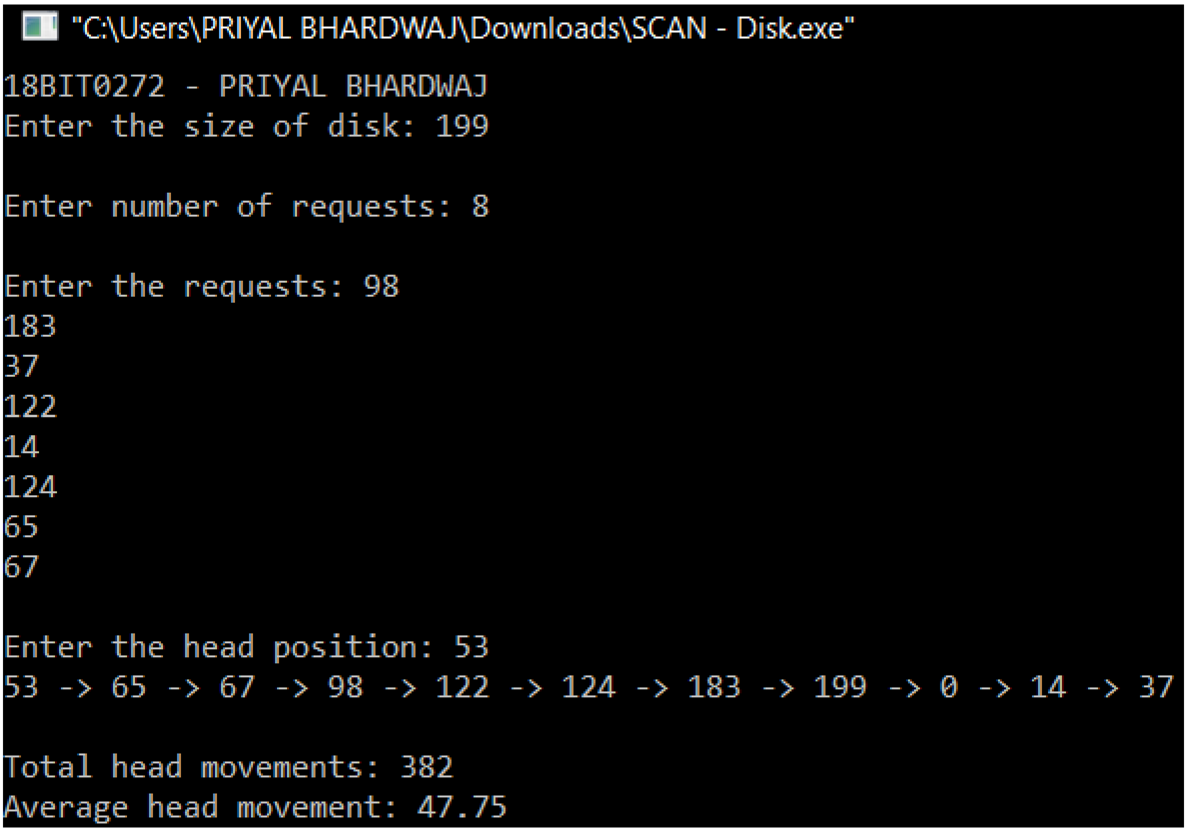
c. C-SCAN

CODE:

```
#include<bits/stdc++.h>
using namespace std;
int main(){
cout<<"18BIT0272 - PRIYAL BHARDWAJ\n";
 int i,j,k,n,m,sum=0,x,y,h;
 cout<<"Enter the size of disk: ";
 cin>>m;
 cout<<"\nEnter number of requests: ";
 cin>>n;
 cout<<"\nEnter the requests: ";
 vector <int> a(n),b;
 for(i=0;i<n;i++){
 cin>>a[i];
 }
 for(i=0;i<n;i++){
 if(a[i]>m){
```

```
 cout<<"\nError, Unknown position!"<<a[i];
 return 0;
 }
 }
 cout<<"\nEnter the head position: ";
 cin>>h;
 int temp=h;
 a.push_back(h);
 a.push_back(m);
 a.push_back(0);
 sort(a.begin(),a.end());
 for(i=0;i<a.size();i++){
 if(h==a[i])
 break;
 }
 k=i;
 if(k<n/2){
 for(i=k;i<a.size();i++){
 b.push_back(a[i]);
 }
 for(i=0;i<=k-1;i++){
 b.push_back(a[i]);
 }
 }
 else{
 for(i=k;i>=0;i--){
 b.push_back(a[i]);
 }
 for(i=a.size()-1;i>=k+1;i--){
 b.push_back(a[i]);
 }
 }
 temp=b[0];
 cout<<temp;
 for(i=1;i<b.size();i++){
 cout<<" -> "<<b[i];
 sum+=abs(b[i]-temp);
 temp=b[i];
 }
 cout<<'\n';
 cout<<"\nTotal head movements: "<< sum;
 cout<<"\nAverage head movement: "<<(float)sum/n;
 return 0;
}
```

OUTPUT:



"C:\Users\PRIYAL BHARDWAJ\Downloads\SCAN - Disk.exe"

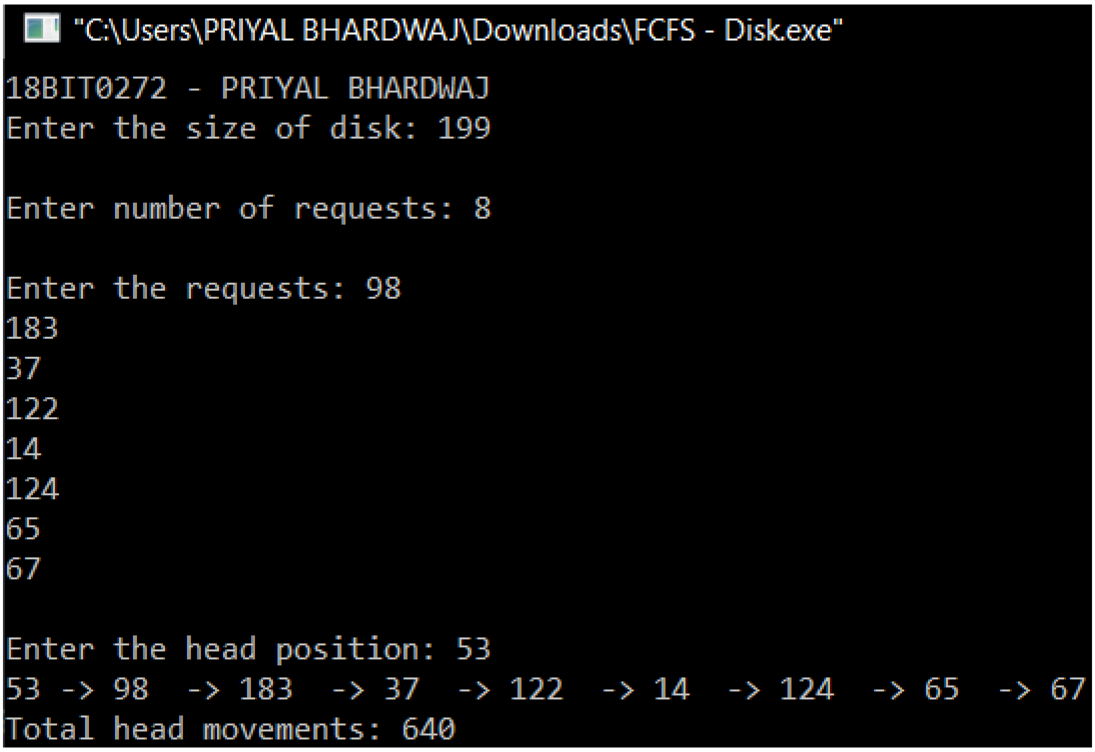
```
18BIT0272 - PRIYAL BHARDWAJ
Enter the size of disk: 199

Enter number of requests: 8

Enter the requests: 98
183
37
122
14
124
65
67

Enter the head position: 53
53 -> 65 -> 67 -> 98 -> 122 -> 124 -> 183 -> 199 -> 0 -> 14 -> 37

Total head movements: 382
Average head movement: 47.75
```

d. FCFS

CODE:

```
 #include<bits/stdc++.h>
using namespace std;
int main(){
cout<<"18BIT0272 - PRIYAL BHARDWAJ\n";
 int i,j,k,n,m,sum=0,x,y,h;
 cout<<"Enter the size of disk: ";
 cin>>m;
 cout<<"\nEnter number of requests: ";
 cin>>n;
 cout<<"\nEnter the requests: ";
 // creating an array of size n
 vector <int> a(n);
 for(i=0;i<n;i++){
 cin>>a[i];
 }
 for(i=0;i<n;i++){
 if(a[i]>m){
 cout<<"\nError, Unknown position!"<<a[i];
 return 0;
 }
 }
 cout<<"\nEnter the head position: ";
 cin>>h;
 // head will be at h at the starting
 int temp=h;
 cout<<temp;
 for(i=0;i<n;i++){
 cout<<" -> "<<a[i]<<' ';
 // calculating the difference for the head movement
 sum+=abs(a[i]-temp);
 // head is now at the next I/O request
 temp=a[i];
 }
 cout<<"\nTotal head movements: "<< sum;
 return 0;
}
```

OUTPUT:



```
"C:\Users\PRIYAL BHARDWAJ\Downloads\FCFS - Disk.exe"
18BIT0272 - PRIYAL BHARDWAJ
Enter the size of disk: 199

Enter number of requests: 8

Enter the requests: 98
183
37
122
14
124
65
67

Enter the head position: 53
53 -> 98  -> 183  -> 37  -> 122  -> 14  -> 124  -> 65  -> 67
Total head movements: 640
```

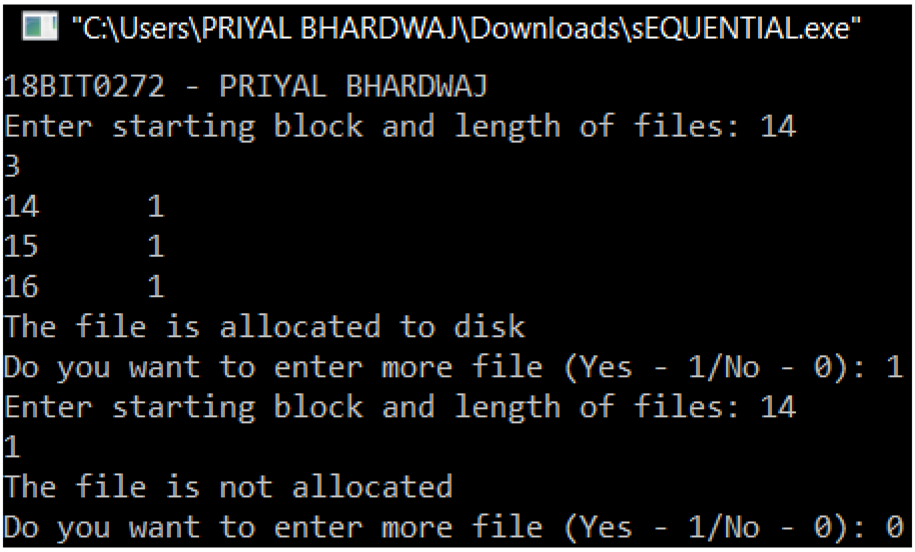
(b) Consider a file of size 1 MB. The size of a disk block is 512Bytes. Assume any number of available free blocks in the disk contiguously or noncontiguously. Implement the following algorithms to perform file allocation. Determine the efficiency of each file allocation strategies. **(High)**

a. Sequential

CODE:

```
#include<stdio.h>
#include<conio.h>
int main()
{
printf("18BIT0272 - PRIYAL BHARDWAJ\n");
int f[50], i, st, len, j, c, k, count = 0;
for(i=0;i<50;i++)
f[i]=0;
x: count=0;
printf("Enter starting block and length of files: ");
scanf("%d%d", &st,&len);
for(k=st;k<(st+len);k++)
if(f[k]==0)
count++;
if(len==count){
for(j=st;j<(st+len);j++)
if(f[j]==0){
f[j]=1;
printf("%d\t%d\n",j,f[j]);}
if(j!=(st+len-1))
printf("The file is allocated to disk\n");}
else
printf("The file is not allocated \n");
printf("Do you want to enter more file (Yes - 1/No - 0): ");
scanf("%d", &c);
if(c==1)
goto x;
else{
return 0;}
getch();
}
```

OUTPUT:



"C:\Users\PRIYAL BHARDWAJ\Downloads\sEQUENTIAL.exe"

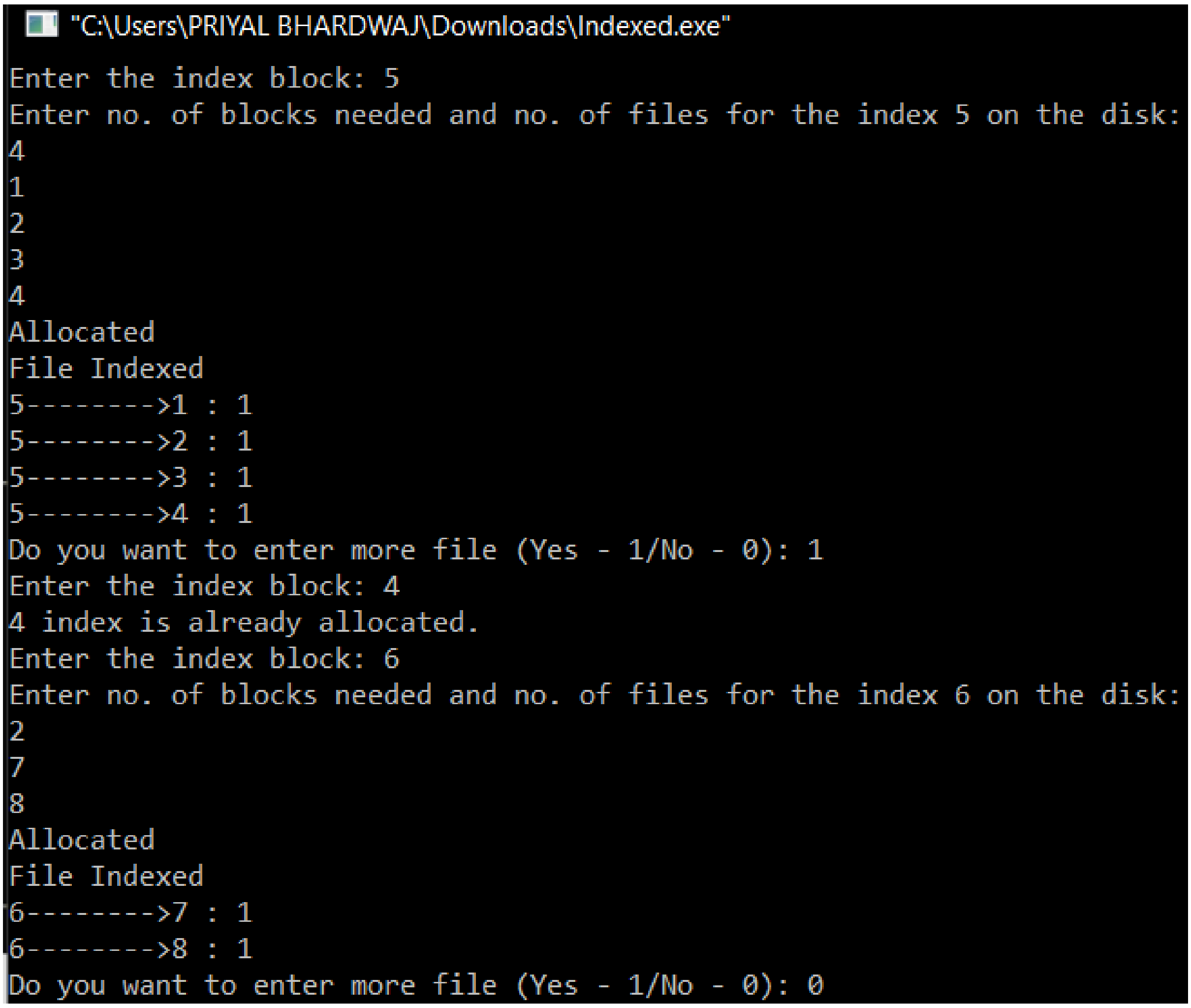
```
18BIT0272 - PRIYAL BHARDWAJ
Enter starting block and length of files: 14
3
14      1
15      1
16      1
The file is allocated to disk
Do you want to enter more file (Yes - 1/No - 0): 1
Enter starting block and length of files: 14
1
The file is not allocated
Do you want to enter more file (Yes - 1/No - 0): 0
```

b. Indexed

CODE:

```
##include<stdio.h>
#include<conio.h>
#include<stdlib.h>
int main()
{
printf("18BIT0272 - PRIYAL BHARDWAJ\n");
int f[50], index[50],i, n, st, len, j, c, k, ind,count=0;
for(i=0;i<50;i++)
f[i]=0;
x:printf("Enter the index block: ");
scanf("%d",&ind);
if(f[ind]!=1)
{
printf("Enter no. of blocks needed and no. of files for the index %d
on the disk: \n", ind);
scanf("%d",&n);
}
else
{
printf("%d index is already allocated. \n",ind);
goto x;
}
y: count=0;
for(i=0;i<n;i++)
{
scanf("%d", &index[i]);
if(f[index[i]]==0)
count++;
}
if(count==n)
{
for(j=0;j<n;j++)
f[index[j]]=1;
printf("Allocated\n");
printf("File Indexed\n");
for(k=0;k<n;k++)
printf("%d-------->%d : %d\n",ind,index[k],f[index[k]]);
}
else
{
printf("File in the index is already allocated \n");
printf("Enter another file indexed");
goto y;
}
printf("Do you want to enter more file (Yes - 1/No - 0): ");
scanf("%d", &c);
if(c==1)
goto x;
else
return 0;
getch();
}
```

OUTPUT:



"C:\Users\PRIYAL BHARDWAJ\Downloads\Indexed.exe"

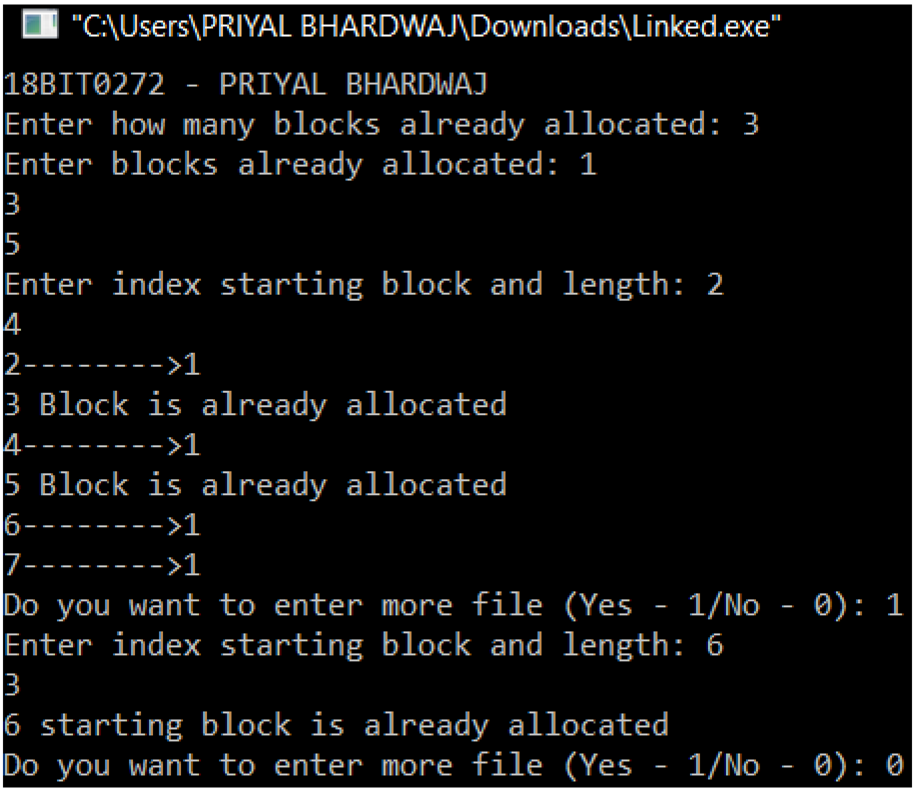
```
Enter the index block: 5
Enter no. of blocks needed and no. of files for the index 5 on the disk:
4
1
2
3
4
Allocated
File Indexed
5-------->1 : 1
5-------->2 : 1
5-------->3 : 1
5-------->4 : 1
Do you want to enter more file (Yes - 1/No - 0): 1
Enter the index block: 4
4 index is already allocated.
Enter the index block: 6
Enter no. of blocks needed and no. of files for the index 6 on the disk:
2
7
8
Allocated
File Indexed
6-------->7 : 1
6-------->8 : 1
Do you want to enter more file (Yes - 1/No - 0): 0
```

c. Linked

CODE:

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
void main()
{
printf("18BIT0272 - PRIYAL BHARDWAJ \n");
int f[50], p,i, st, len, j, c, k, a;
for(i=0;i<50;i++)
f[i]=0;
printf("Enter how many blocks already allocated: ");
scanf("%d",&p);
printf("Enter blocks already allocated: ");
for(i=0;i<p;i++)
{
scanf("%d",&a);
f[a]=1;
}
x: printf("Enter index starting block and length: ");
scanf("%d%d", &st,&len);
k=len;
if(f[st]==0)
{
for(j=st;j<(st+k);j++)
{
if(f[j]==0)
{
f[j]=1;
printf("%d-------->%d\n",j,f[j]);
}
else
{
printf("%d Block is already allocated \n",j);
k++;
}
}
}
else
printf("%d starting block is already allocated \n",st);
printf("Do you want to enter more file (Yes - 1/No - 0): ");
scanf("%d", &c);
if(c==1)
goto x;
else
return 0;
getch();
}
```

OUTPUT:



"C:\Users\PRIYAL BHARDWAJ\Downloads\Linked.exe"

```
18BIT0272 - PRIYAL BHARDWAJ
Enter how many blocks already allocated: 3
Enter blocks already allocated: 1
3
5
Enter index starting block and length: 2
4
2-------->1
3 Block is already allocated
4-------->1
5 Block is already allocated
6-------->1
7-------->1
Do you want to enter more file (Yes - 1/No - 0): 1
Enter index starting block and length: 6
3
6 starting block is already allocated
Do you want to enter more file (Yes - 1/No - 0): 0
```

****