**SSN College of Engineering, Kalavakkam**

Department of Computer Science and Engineering

III Semester - CSE 'A ',’B’ & ‘C’

UCS 1312 Data Structures Lab Laboratory

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**Exercise 1: Searching and Sorting**

Write a menu driven program to perform the following operations

1. Linear Search

2. Binary Search

3. Any two sorting algorithms

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#include<stdio.h>

void linear(int a[],int n);

void binary(int arr[],int n);

void bubble(int a[],int n);

void selection(int arr[],int n);

int main()

{

int arr[20],n,x;

printf("Enter the number of terms:");

scanf("%d",&n);

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

{

printf("Enter the %d th element",i+1);

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

}

printf("Press\n1.Linear Search.\n2.Binary Search.\n3.Bubble Sort.\n4.Selection Sort.\n5.Exit.\n");

scanf("%d",&x);

while(x!=5)

{

switch(x)

{

case 1:linear(arr,n);break;

case 2:binary(arr,n);break;

case 3:bubble(arr,n);break;

case 4:selection(arr,n);break;

case 5:return 0;

default:printf("Invalid Input!\n");

}

printf("Press\n1.Linear Search.\n2.Binary Search.\n3.Bubble Sort.\n4.Selection Sort.\n5.Exit.\n");

scanf("%d",&x);

}

}

void linear(int a[],int n)

{

int i,s;

printf("Enter te element you want to search:");

scanf("%d",&s);

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

{

if(a[i]==s)

{

printf("Element is found in %dth Position!\n",i+1);

break;

}

}

if(i==n)

{

printf("Element Not Found!\n");

}

}

void binary(int arr[],int n)

{

selection(arr,n);

int x;

printf("Enter the element to be searched:");

scanf("%d",&x);

int first,mid,last;

first=0;

last=n-1;

mid= (first+last)/2;

while(first<= last)

{

if(x>arr[mid])

{

first=mid+1;

mid=(first+last)/2;

}

else if(x==arr[mid])

{

printf("Element is found in the array!\n");

break;

}

else

last=mid-1;

mid=(first+last)/2;

}

if(first==last)

{

printf("Element not found!\n");

}

}

void bubble(int a[],int n)

{

int temp;

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

{

for(int j=i;j<n;j++)

{

if(a[i]>a[j])

{

temp=a[i];

a[i]=a[j];

a[j]=temp;

}

}

}

printf("Sorted Array:");

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

{

printf(" %d ",a[i]);

}

printf("\n");

}

void selection(int arr[],int n)

{

int min,temp;

for(int i=0;i<n-1;i++)

{

min = i;

for(int j=i+1;j<n;j++)

{

if(arr[j]<arr[min])

min=j;

}

temp=arr[min];

arr[min]=arr[i];

arr[i]=temp;

}

printf("Sorted Array:");

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

{

printf(" %d ",arr[i]);

}

printf("\n");

}

**Sample input and output:**

**Linear Search:**

Enter the number of elements:5

Enter the 1 th element:3

Enter the 2 th element:6

Ente r the 3 th element:5

Enter the 4 th element:4

Enter the 5 th element:7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

1

Enter the element you want to search:5

Element is found in 3th position!

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

5

**Binary Search:**

Enter the number of elements:5

Enter the 1 th element:3

Enter the 2 th element:6

Ente r the 3 th element:5

Enter the 4 th element:4

Enter the 5 th element:7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

2

Sorted Array: 3 4 5 6 7

Enter the element to be searched:5

Element is found in the array!

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

5

**Bubble Sort:**

Enter the number of elements:5

Enter the 1 th element:3

Enter the 2 th element:6

Ente r the 3 th element:5

Enter the 4 th element:4

Enter the 5 th element:7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

3

Sorted Array: 3 4 5 6 7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit

5

**Selection Sort:**

Enter the number of elements:5

Enter the 1 th element:3

Enter the 2 th element:6

Ente r the 3 th element:5

Enter the 4 th element:4

Enter the 5 th element:7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit.

4

Sorted Array: 3 4 5 6 7

Press

1.Linear Search.

2.Binary Search.

3.Bubble Sort.

4.Selection Sort.

5.Exit

5