**PRACTICAL:01**

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Roll no.:25 Batch: B2

**AIM: To study an Array ADT and to implement various search operations on  
an Array ADT. [include Linear search and Binary search]**

**CODE**:

#include <stdio.h>

void binarysearch(int arr[], int element, int n)

{

int high, low, mid;

high = n;

low = 0;

while (1)

{

mid = (high + low) / 2;

if (arr[mid] == element)

{

printf("Element %d found at %dth position ", element, mid + 1);

break;

}

else if (arr[mid] > element)

{

high = mid - 1;

}

else

{

low = mid + 1;

}

}

}

void printarray(int arr[], int n)

{

int i;

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

{

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

}

}

int main()

{

int n;

int arr[100], i, m, k, j, temp;

printf("Enter the size of an array:");

scanf("%d", &n);

printf("Enter the Elements of the Array:");

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

{

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

}

int a;

printf("Enter the operation you want to Perform on the array:\n");

printf("Enter 1 for Insertion of new element\n");

printf("Enter 2 for Deletion of a particular element\n");

printf("Enter 3 to search a particular element\n");

printf("Enter 4 to Sort the Array\n");

printf("Enter 5 to perform searching using binary search");

printf("Enter your choice:\n");

scanf("%d", &a);

switch (a)

{

case 1:

printf("Enter the new element:");

scanf("%d", &k);

printf("Enter the index you want to insert the array:");

scanf("%d", &m);

n++;

for (i = n - 1; i >= m; i--)

{

arr[i + 1] = arr[i];

}

arr[m] = k;

printf("The new element has been added successfully!");

printf("The new array is ");

printarray(arr, n);

break;

case 2:

printf("Enter the index of the array you want to delete:");

scanf("%d", &m);

for (i = m + 1; i < n; i++)

{

arr[i - 1] = arr[i];

}

n--;

printarray(arr, n);

break;

case 3:

printf("Enter the element you want to search ");

scanf("%d", &k);

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

{

if (k == arr[i])

{

printf("The element is found at %dth position", i + 1);

}

}

break;

case 4:

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

{

m = i;

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

{

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

{

m = j;

}

if (m != i)

{

temp = arr[m];

arr[m] = arr[i];

arr[i] = temp;

}

}

}

printf("the sorted array is \n");

printarray(arr, n);

break;

case 5:

printf("Enter the element you want to find using binary search\n");

scanf("%d", &k);

binarysearch(arr, k, n);

}

return 0;

}

**OUTPUT:**

Text

Description automatically generated